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Master Thesis

Do CEO dismissal improve financial performance?: An empirical study of companies in the S&P 1500 Index

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Content

Abstract

There has been a drastic increase in CEO dismissals in recent years. This paper studies the effects a CEO dismissal has on financial performance in light of a company's corporate governance to see if the increase in dismissals is justified. We analyze the financial performance of a large sample of US companies in the S&P 1500 Index. We find that companies that dismissed their CEO between 2010 and 2018 perform significantly worse in the years leading up to dismissal and have signs of improved performance after dismissal. However, we find that the performance three years after dismissal is not better than two years before, and one measurement even shows that it decreases. Our findings suggest that CEO dismissals do not seem to improve financial performance. Implications of our findings are that the decision to dismiss a CEO when financial performance is poor seems to be an irrational act by the board of directors of making the CEO a scapegoat to illustrate control.

Acknowledgements

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1. Introduction

CEOs (Chief Executive Officers) are always at risk of being fired. In fact – over the last decades, the frequency of CEOs getting fired has increased drastically (Wiersema & Zang, 2011). Despite this increase, there has not been an equal increase in research on the topic. The remarkable increase in CEO dismissals poses the question, "why is this happening?". The CEO is the highest-ranking executive in a company and is responsible for overall success. Despite being the company's leader, they are working on behalf of the board of directors and shareholders, with the primary purpose of developing and implementing a strategy to increase shareholder wealth (Ismail, 2019).There are several reasons for CEO succession. Some are unrelated to the company and the board, like the CEO getting sick or dying. Conversely, some are forced by the company and board, like breaking company policies or laws. However, the most critical and well-known reason for forced succession is unsatisfactory financial performance (Wiersema & Zang, 2011). The fact that more CEOs are getting fired and the most critical reason for dismissal is poor financial performance leaves the question: Do CEO dismissals improve financial performance?

Financial accounts are the most common way to measure a company's financial performance. Financial performance is the evaluation of a company's overall standings and can be measured through different metrics based on the balance sheet, the income statement, and the cash flow statement (CFI Education Inc., 2022b). Much research confirms that a lack of financial performance leads to dismissal (Fredrickson, Hambrick, & Baumrin, 1988). Still, this relationship does not mean that a dismissal is beneficial. The CEO often is credited or blamed too much by the board for the company's performance (Jenter & Kanaan, 2015), which could point toward firing a CEO sometimes being unnecessary. Interestingly, there is very little research on the effects post CEO dismissal, and the research on CEO dismissals is primarily on past performance and what triggers the decision. However, one article on a similar topic, namely football manager successions, found no benefit of firing a manager and even that keeping the manager improved performance more (Arnulf, Mathisen & Hærem, 2012).

In this paper, we aim to investigate the research question, *"Do CEO dismissal lead to improved financial performance?"*. This research paper seeks to expand the research field on CEO dismissals and help understand the implication a dismissal has on a firm's financial performance. We will investigate the topic in light of a company's corporate governance and the role of the board of directors. We start by describing key concepts and theories to establish a foundation for our research. We then review the current literature to present the existing research on CEO dismissals and financial performance. From there, we analyze companies in the S&P 1500 Index where a dismissal occurred between 2010 and 2018. By looking at changes in Return on Equity and Return on Assets, we get a good indication of whether dismissal improves financial performance. We choose Return on Equity and Return on Assets because they are two of the most common metrics for firm financial performance. Further, they show income relative to the value of assets/equity and how efficiently the company utilizes assets/equity to generate profit. Given that the primary goal of a company is to generate profits, these metrics are suited for comparing companies regardless of size or industry. Our research finds that financial performance decreases in the last two years before dismissal and increases in the following two years. However, the financial performance seems to flatten out after two years and never exceeds the initial level, indicating that the companies do not seem to have improved financially.

2. Literature review

2.1. Corporate governance

To analyze CEO dismissals, understanding a company's corporate governance is essential. The Cadbury report (1992) stated, "*Corporate governance is the system by which companies are directed and controlled"*. Corporate governance results from the separation of ownership and management that happened during the nineteenth century, mainly caused by the rise of industrial capitalism. A company has several stakeholders who are involved in the company's governance. We divide these stakeholders into five categories:

1. The CEO as the leader of daily operations.

2. The board of directors who is responsible for hiring, firing, and compensating senior management (Baysinger & Butler, 1985).
3. The shareholders who own the company's equity.
4. The finance markets where the company's shares are bought and sold.
5. Stakeholders like customers, suppliers, local authorities, and others who are dependent on the company.

The five categories are either external or internal to a company's governance. Although the shareholders are the owners of a company's equity, we view them as external concerning a company's corporate governance since they are not directly involved in daily operations or strategic decision-making. The finance markets are another external stakeholder concerning corporate governance. Positive market perception of the company's governance can help value creation and survival through potentially lower capital costs. There are several other relevant external stakeholders to the company's governance, like customers, suppliers, and local authorities. However, their relevance depends on their ability to affect the company's value creation and survival through bargaining power or the possibility of changing the company's reputation.

The last two stakeholders, the CEO and the board, are internal to the company's governance. The board of directors is the highest form of leadership in a company, elected by the shareholders to protect and enhance shareholder wealth (Furtado & Karan, 1990). They have the power to hire, fire, and compensate the CEO (Baysinger & Butler, 1985). The CEO is hired to be in charge of the daily operations and is usually responsible for developing and implementing a strategy (Ismail, 2019).

In this paper, we focus on the financial effects of CEO dismissals to see if there is any rationale behind the decision. Consequently, our primary focus will be on the dismissed CEO, the board of directors who makes the decision, and the possible changes in wealth for existing and potential shareholders.

2.2.1 Board of Directors

Although there are many essential mechanisms of corporate governance, with the shareholders, the CEO, the board, and others. The board of directors is assumed to

be a fundamental mechanism given their position as an intermediate between the company and the external shareholders (Hermanson & Rittenberg, 2003:47), which is also the most important mechanism for our paper. The board's composition differentiates depending on company size, industry, cultural, legal, and financial factors. The only consistent thing is that every board must elect a Chair of Board. However, our research will not focus on board composition or the role of the individual board members. Conversely, we will focus on the board as one entity.

For a long time, there has been a widespread assumption that boards generally do not work effectively and, at best, are only "rubber-stamps" or "window-displays" (Minichilli, Gabrielsson, & Huse, 2007). However, lately, there has been an increase in external pressure for corporate accountability (Judge & Zeithaml, 1992). The board of directors has responded to this pressure by increasing their involvement in their respective companies. Their role has consequently evolved into being more controlling and strategic in determining and monitoring the strategic directions of a firm (Heidrick & Struggles, 1990; Judge & Zeithaml, 1992). Some even argue that the new roles could make the board a potential competitive advantage for a firm (Huse, 2005; Minichilli et al., 2007).

The roles of the board are many, and several approaches to categorize these roles exist. The most common way to categorize the roles is in terms of the board's tasks. Zahra and Pierce (1989) identified the control, strategic, and service roles as the most common categories.

The control role concerns tasks performed on behalf of externals (Huse, 2007). The main task is controlling that the shareholders' return on investment is sufficient. It is also related to controlling and monitoring top management and tackling internal issues (Huse, 2007).

The strategic role is partly related to the control role in the sense of monitoring the management's performance regarding the implementation of strategies (Beatty & Zajac, 1994; Fama & Jensen, 1983). However, the strategic role is primarily associated with the directing role through giving advice and guiding management about strategy development and decision making.

The service role is related to the strategic role with the board offering their competence and knowledge to the management. Further, the service role concerns tasks like networking and lobbying to access valuable resources (Huse, 2007).

The roles and tasks of the board can be explained through theories of corporate governance. Several theories with different views on the tasks and roles can help understand CEO dismissals and their effect. We divide these theories into three dimensions:

1. The fact that the board dismisses CEOs.
2. Why the board dismisses CEOs.
3. The board's process of deciding on a new CEO.

In this paper, we do not analyze the CEOs but merely the overall financial performance of the companies. Therefore, the theories relevant for our paper concern the decision to dismiss a CEO and less about the new CEO. The following theories are particularly relevant:

The Agency Theory is a widespread theory used to explain issues related to the relationship between shareholders and the company executives. The theory is based on a principal who hires an agent to act on their behalf (Jensen & Meckling, 1976). In this case, the shareholders elect a board of directors. According to this theory, the board's central role is to control and monitor management to ensure sufficient returns for the shareholders. Concerning CEO dismissals, the Agency Theory can be used to understand the fact that boards choose to dismiss CEOs.

The Institutional Theory can be used to understand why the board dismisses CEOs. It argues that organizational changes are driven less by functional considerations and more by symbolic actions and external influences (Meyer & Rowan, 1977). Structures and processes are viewed as sensible when legitimized by the environment "because it implies responsible management, pleases external constituencies, and avoids potential claims of negligence if something goes wrong" (Eisenhart, 1988; Judge & Zeithaml, 1992:2). This theory is vital for understanding CEO dismissals because it might explain the board's decision as a symbolic act or a solution to a problem because "everyone else does it".

The Scapegoat Theory, similar to the institutional theory, can be used to understand why the board dismisses CEOs. "Scapegoat theory refers to the tendency to blame someone else for one's own problems…" (Baumeister & Vohs, 2007:779). Concerning CEO dismissals, this can be if a firm performs poorly, the board dismisses the CEO to push the blame away from themselves and over on the CEO.

2.2.2. Board accountability

There is an increase in expectations from external stakeholders regarding the board's involvement in value creation, leading to increased accountability for the board of directors (Minichilli et al., 2007). Value creation can have a different meaning depending on the different stakeholders. According to Morten Huse (2007), value creation can be economical or social. Economic value creation is related to financial performance, share performance, etc., while social value creation is related to ethical behavior, product quality, customer relationships, and sustainability. In this paper, we investigate the financial effects of a CEO dismissal; hence, our focus will be on the economic aspects of value creation.

In light of the agency theory, the board has the power to act on behalf of the shareholders to minimize agency costs and create value for the shareholders. When the shareholders' interests are not protected, the board is accountable for acting. If a company's performance is poor, the board might feel accountable for taking action to improve the situation, which could lead to a CEO dismissal. While the agency theory helps understand the fact that the board dismisses CEOs, the institutional theory and the scapegoat theory help understand why they make this decision. According to institutional theory, dismissal might result from the environment accepting this as an action. The increased frequency of dismissals has almost made it a norm because "everyone else does it". When companies are in a complex financial situation, board members might want to acquit themselves. Therefore, by dismissing the CEO, the board shows responsible management according to institutional theory, and the blame shifts onto someone else according to scapegoat theory. Moreover, researchers Rasmussen, Arnulf, Hiersing & Berner (2021) draw comparisons between the human sacrifices of past cultures to the dismissals of top management in today's corporate world. They

find that a dismissal sometimes is more of a symbolic act than an act to solve the problem.

2.2. CEO dismissal and firm financial performance

There are four categories to divide the main reasons for dismissals; a) Expectations and attributes of the board of directors, b) the board's allegiance and values, c) the availability of alternative CEO candidates, and lastly, d) the power of the incumbent CEO (Fredrickson, Hambrick & Baumrin, 1988). It is well established that CEO dismissals occur when organizations perform poorly (Lausten, 1998). Poor performance can be seen as a failure to meet the board's expectations, leading to a dismissal of the CEO. However, CEOs also get fired for reasons unrelated to financial performance, like factors directly related to the CEO or the board's allegiance and values. This can lead to CEOs sometimes being fired when the financial performance is good (Fredrickson, Hambrick & Baumrin, 1988).

When a CEO is dismissed, the financial performance preceding the dismissal decreases significantly. It then largely improves post dismissal (Denis & Denis, 1995)—indicating that a CEO dismissal could be beneficial when firm performance decreases significantly. Although a dismissal can look justified through financial performance, the increased performance post dismissal can also be attributed to other factors than the board's decision to change the CEO (Denis & Denis, 1995). Therefore it can be assumed that keeping the same CEO sometimes gives the same outcome.

There is a positive relationship between CEO tenure and firm performance (Cao, Im & Syed, 2021). Companies with continuity in the CEO position tend to perform better than companies with higher CEO turnover. This relationship can indicate that a goal of the board should be to find long-term solutions for the CEO position and therefore avoid dismissals when possible.

The probability of dismissal and firm performance in the preceding years has an inverse relationship, ensuring that CEOs act in the best interest of the shareholders (Lausten, 1998). According to the agency theory, this alignment of interests is a matter of a principal-agent problem. Suppose a CEO (agent) does not act in the

best interest of the shareholders (principal), which is to increase shareholder wealth and improve performance. In that case, the threat of the CEO losing their job increases.

2.2.1 "Big Bath"

When there is a change in the CEO position, some argue that management sometimes manipulates present results to make future results look better (Kirchenheiter & Melumad, 2002). This manipulation is often referred to as "Big Bath" and is done by writing down the values of assets and expensing costs instead of having them on the balance sheet. These actions can potentially increase costs in the current year, worsening net income. However, in the following years, this extra cost will not be there, making net income higher, consequently showing an improvement in net income.

The practice of "Big Bath" will affect metrics like *Return on Equity (ROE) and Return on Assets (ROA)*. They can be enhanced without improving operating performance because they are calculated by dividing net income by the value of assets/equity. Zimmerman & Murphy (1992) examined financial performance related to CEO turnover. They argued that the practice of "Big Bath" often happened after a CEO changed to make the new CEO look better.

2.3. Is there a gap in the research field?

CEO dismissals have been researched for a long time and in various world regions. Much research exists to explain and understand the triggers of CEO dismissals, both through analysis of a company's corporate governance and firm performance. Conversely, there is a lack of research on the effects after dismissal and understanding if this act can be justified. Most research on financial performance through financial accounts does not analyze CEO dismissals specifically but rather CEO turnover and succession.

Moreover, CEO dismissal seems to have increased exponentially recently, especially after 2000. This increase is illustrated below by Rasmussen, J., Arnulf, J. K., Hjersing, S. W. & Berner, S. W. (2021), which shows the times the Norwegian press mentioned CEO dismissals between 1940 and 2018. We find

that most research on the topic is from the early 2000s or even older, which indicates that the amount of research has not increased in parallel with the increase in dismissal cases. Therefore, there is a need for more updated research on the topic.

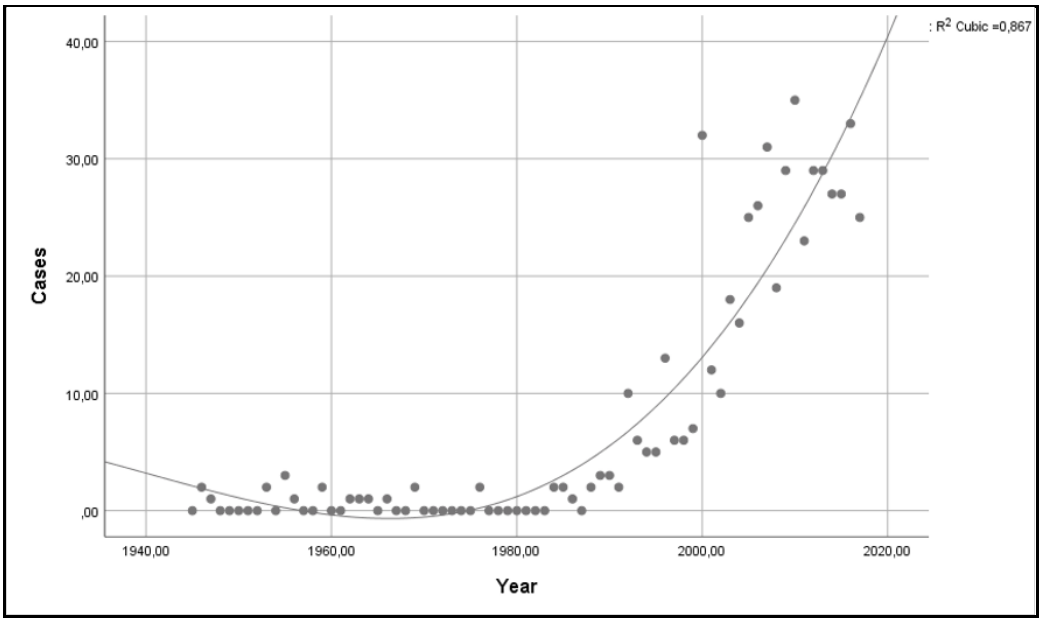

Figure 1. Number of involuntary top executive dismissals mentioned in the Norwegian press, 1945-2018. Source: (Rasmussen, Arnulf, Hjersing & Berner, 2021)

As we have seen from our review of the current literature, there is a lack of research on CEO dismissals in recent times and especially on the effects after a CEO dismissal. Based on our findings about the status of the literature, we want to have an overall approach to our analysis to create a good foundation for future research. We, therefore, decide to keep our original research question without making any further specifications.

3. Research Design

To fill the gaps in the research field, we will collect quantitative data for firms where a dismissal has taken place and use an inductive approach by exploring the data to find patterns and understand the general effects (Saunders, Lewis & Thornhill, 2007, p.118). Our data will be based on secondary data from an already made dataset by R.J. Gentry, J.S. Harrison, T.J. Quigley & S. Boivie (2021), and financial reporting data we collected from The Wharton School of The University of Pennsylvania's online database. We use financial reporting data in our analysis

because it gives a good indication of a company's overall financial standings (CFI Education Inc., 2022b). Consequently, investigating how the reporting data changes in the years relative to dismissal will give an excellent insight into a dismissal's effects. Since our analysis includes a substantial number of companies, it is natural to use secondary data from an online database instead of analyzing fewer companies and collecting more detailed data directly from each company.

Gentry, Harrison, Quigley & Boivie's dataset categorizes cases by the cause for CEO succession and contains only qualitative data. Conversely, the financial reporting data we collect are purely quantitative, so our analysis will be mixed-method research (Saunders, Lewis & Thornhill, 2007, p.145). A mixed-method study combines qualitative and quantitative research methods (Saunders, Lewis & Thornhill, 2007, p.110). In our case, it is primarily a quantitative study, but because we include qualitative elements related to the reasoning behind the CEO dismissal, it makes our study a mixed method. Since we only look at CEO dismissals, we choose to include the qualitative aspect because it is necessary to exclude unforced CEO successions. Moreover, it allows us to compare the different types of dismissals, making our analysis more detailed.

We will analyze the topic through a longitudinal study with a time horizon for the dismissals from 2010 to 2018. A longitudinal study investigates the development of something over a set time horizon (Saunders, Lewis & Thornhill, 2007, p.148). Since we are analyzing accounting numbers of the same companies from two years before until three after a CEO dismissal, our study is longitudinal. Another approach could be to conduct a cross-sectional study by comparing the performance of some companies at the year of dismissal with others three years after dismissal. However, we choose a longitudinal study because we think analyzing how a group of companies change over time gives a more reliable result than comparing two groups of companies that might differ in size and industry.

3.1. Validity

Our research has to be replicable and consistent to be valid, meaning that other researchers should be able to replicate our findings using the same design. For the research to be valid, it must fulfill three measures of validity (Saunders, Lewis & Thornhill, 2015). Firstly, there must be measurement validity, meaning the

measure in use and the phenomenon of the study must measure exactly what they are intended to measure. For our analysis, we must use metrics for financial performance that can also be used for comparisons between companies. Secondly, our research must have internal validity, so the analysis results must be advanced accurately with a causal relationship between two variables. For our analysis, we must not conclude too quickly but look at the patterns and results from our data in light of the complexity of CEO dismissals and firm performance. Lastly, our research must be generalizable to be of external validity (Saunders et al., 2015). This requirement means that our results must be relevant to several situations and cases, not just the specific cases we have investigated.

4. Data collection

4.1. CEO departure dataset

To analyze the impact of CEO dismissals on financial performance, we have used a dataset on CEO dismissals in US companies as our base. The data set is from 17 March 2021 and is created by R.J. Gentry, J.S. Harrison, T.J. Quigley & S. Boivie (Gentry, Harrison, Quigley & Boivie, 2021). It contains the reasons for CEO departures between 2000 and 2018 in firms on the Standard & Poors 1500, or S&P 1500 for short. This index combines the S&P 500, the S&P MidCap400, and the S&P SmallCap 600, which cover approximately 90% of the US market capitalization (S&P Dow Jones Indices, 2022).

They created the dataset through collaboration between researchers from four different schools, the University of Mississippi, Texas Christian University, University of Georgia & Texas A&M University. The departures were coded based on the reason for departure. This coding was performed by collecting news coverage on the departure with an automated Google News search which was then verified and partly analyzed by Amazon M-Turk workers. Around two-thirds of the complete analysis and coding were performed by undergraduate students in a computer lab during a collective effort, where two doctoral students supervised and monitored in real-time. The remaining third was outsourced to a data collection company outside the United States because the COVID-19 pandemic stopped the in-person coding effort. In Figure 2, we can see the departure codes

they used with a brief description. The dataset contains 4 141 CEO departures from 2000 through 2018, with the date and year of departure, the company and company code, name of the CEO, and code for departure reason.

Code	Title	Brief description
1	Involuntary—CEO death	The CEO died while in office and did not have an opportunity to resign before health failed
2	Involuntary—CEO illness	Required announcement that the CEO was leaving for health concerns rather than removed during a health crisis
3	Involuntary—CEO dismissed for job performance	The CEO stepped down for reasons related to job performance. This included situations where the CEO was immediately terminated as well as when the CEO was given some transition period, but the media coverage was negative. Often the media cited financial performance or some other failing of CEO job performance (e.g., leadership deficiencies, innovation weaknesses, etc.)
4	Involuntary—CEO dismissed for personal issues	The CEO was terminated for behavioral or policy-related problems. The CEO's departure was almost always immediate, and the announcement cited an instance where the CEO violated company HR policy, expense account cheating, and so forth
5	Voluntary—CEO retired	Voluntary retirement based on how the turnover was reported in the media. Here, the departure did not sound forced, and the CEO often had a voice or comment in the succession announcement. Media coverage of voluntary turnover was more valedictory than critical. Firms use different mandatory retirement ages, so we could not use 65 or older and facing mandatory retirement as a cut off. We examined coverage around the event and subsequent coverage of the CEO's career when it sounded unclear
6	Voluntary—New opportunity	The CEO left to pursue a new venture or to work at another company. This frequently occurred in startup firms and for founders
7	Other	Interim CEOs, CEO departure following a merger or acquisition, company ceased to exist, company changed key identifiers so it is not an actual turnover, and CEO may or may not have taken over the new company
8	Missing	Despite attempts to collect information, there was not sufficient data to assign a code to the turnover event. These will remain the subject of further investigation and expansion

Figure 2. CEO departure reasons and definitions. Source: (Gentry, Harrison, Quigley & Boivie, 2021)

In our research, we investigate CEO dismissals and will not analyze all the companies in the dataset. We exclude companies with codes 1 and 2 as they are subject to factors outside the CEOs' control and unrelated to the company; therefore, we do not see these as relevant for our analysis. Further, we exclude companies with codes 5 and 6 since these are voluntary departures, not dismissals. Finally, we exclude companies with codes 7 and 8 as these departures result from being an interim CEO, company mergers and acquisitions, or an unknown reason. We include companies with code 3, which are involuntary dismissals based on poor job performance, and companies with code 4, which are involuntary

dismissals based on personal issues like violation of company HR policy, expense account cheating, etc. We have limited our analysis to the period from 2010 through 2018 and will only use the companies in the dataset from this period. We do this to avoid the financial crisis that happened in 2008, as this could give very extreme data and skewed results.

4.2. Financial data collection

As the dataset only contains qualitative data about the companies, we needed to gather financial data for all the companies included in our analysis. To do this, we used the database made by The Wharton School of The University of Pennsylvania. We used the S&P Global Market Intelligence Data through Wharton Research Data Services, a leading provider of financial and industry data, research, news, and analytics (Wharton Research Data Services, 2020). They have several databases and datasets. For our research, we needed standardized financial data for North American firms and therefore used their Compustat Fundamentals database on North American firms.

We wanted to analyze two types of data; financial ratios and fundamental data. Primarily, we want to analyze Return on Equity (ROE). Secondly, we want to analyze Return on Assets (ROA) and total assets to see if any potential changes in Return on Assets result from changes in net profit or assets and investigate the theory of "Big Bath". By checking for changes in assets, we can see if there are any tendencies of "Big Bath", a phenomenon explained previously in the assignment. Since our paper focuses on the financial effects of dismissal in light of corporate governance, we primarily focus on Return on Equity because it is a good measurement for shareholder wealth creation, which is a crucial aspect of corporate governance. However, including Return on Assets could give us a better image of how efficiently the business utilizes resources to generate money, since it measures income relative to the value of assets. Return on Equity and Return on Assets is calculated by dividing profit by the book value of assets/equity. Despite their similarity in the calculation, they can give significantly different outputs. Figure 3 below shows a simplified balance sheet illustrating how a company's assets are financed through equity and liabilities. From this, it is clear that most companies' book value of assets and equity are not equal, and hence the two

metrics will give different outputs. From a shareholder's perspective, one could argue that Return on Equity is a more valuable metric since it measures the value creation on the part of the business they own. In contrast, a bank could look more at general performance metrics like Return on Assets before issuing credit.

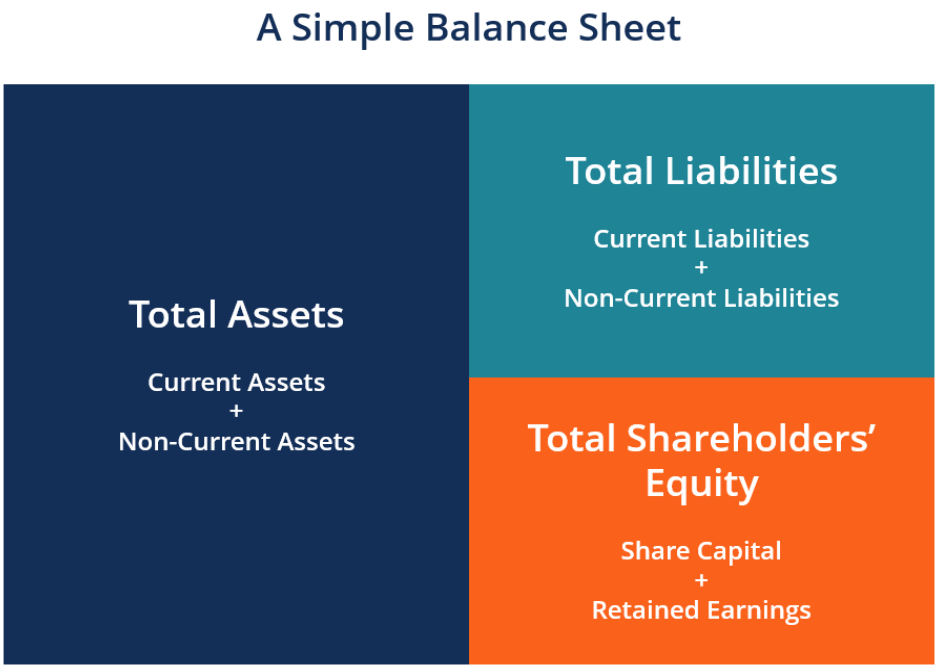

Figure 3. Simplified illustration of a balance sheet. Source: (CFI Education Inc., 2022)

To extract the data from Wharton, we used the date range from 01.01.2005 to 01.04.2022, the company code (gvkey) that we have from the dataset by Gentry, Harrison, Quigley & Boivie, and chose the variables Return on Assets(roa), Return on Equity(roe) and ATQ – Assets - Total (ATQ). Wharton then created one dataset for financial ratios and one for total assets. The dataset for financial ratios is in decimals, meaning that a Return on Equity or Return on Assets of 10% is shown as 0.10. The calculation is based on data obtained from Wharton's Compustat Quarterly and Annual file and created with the definitions in Appendix 1 and 2 by a set of codes made by Wharton (Wharton Research Data Services, 2020). The Return on Equity calculated by Wharton is net income divided by the average book value of equity from the last two periods. The Return on Assets is calculated by dividing operating income before depreciation by the average value of assets from the last two years. It is essential to remember that the Return on Assets is based on results before depreciation when interpreting the results,

especially regarding the theory of "Big Bath". For the dataset with fundamental data, it is presented as quarterly data with the numbers being per million dollars, see Appendix 3.

4.3. Combining the datasets

Before analyzing the data, we had to combine the two datasets provided by Wharton and the CEO departure dataset by Gentry, Harrison, Quigley & Boivie. To do this, we used excel to sort all the information for each company together and created a new variable for the year relative to dismissal. The variable ranges from -2 to 3, where -2 is two years before dismissal and 3 are three years after dismissal. We then created variables for the changes in Return On Equity, Return on Assets, and Total Assets. These were total changes from two years before to three years after dismissal (TotalChange) and the change after the dismissal happened (ChangeAfterDismissal). See Appendix 14 for the dataset. Table 1 below illustrates how these variables were made for Return on Assets. The final dataset consists of 189 observations, all containing data for 24 quarters.

Total change in Return on Assets
$Yearly\ ROA_{Three\ years\ after} - Yearly\ ROA_{Two\ years\ before}$
Change after dismissal on Return on Assets
$Yearly\ ROA_{Three\ years\ after} - Yearly\ ROA_{Same\ year}$

Table 1. Formulas used to create variables for Return on Assets. (Q is short for Quarter)

4.4. Data cleaning

When the dataset was finalized, we proceeded to read it into R Studio to analyze the data. R Studio is a data software for data science, scientific research, and technical communication and a programming language for statistical computing and graphics (R-Studio, 2022). A few companies in our dataset were missing data for some periods, and we consequently removed these companies. Further, to increase the reliability of our data, we removed extreme observations and outliers.

We excluded observations with Return on Equity larger than 0.5 or lower than -0.5, Return on Assets larger than 0.5 or lower than -0.5, and Total assets lower than 0. We choose these restrictions because we view companies with Return on Equity and Return on Assets of more than 50% or less than -50% as outliers. These values could result from specific accounting methods that result in negative or extremely low values on the balance sheet. Some companies with heavy share buyback programs can result in negative book value of equity without there being anything to worry about. We also think that this removes most of the complex cases. Like companies under chapter 11 protection where the company is restructuring to avoid bankruptcy, the Return on Equity and Return on Assets metrics could be misleading from an analytical perspective.

5. Data analysis

With our analysis, we intend to find patterns of how Return on Equity changes in the period around a dismissal. We will also look at Return on Assets and Total Assets to provide depth in our analysis. To do this, we used the variable for time relative to dismissal to create six subsets containing all the data for each year relative to dismissal. We then proceeded to find the average Return on Equity and Return on Assets for each of the five subsets. The values we obtained can be seen in table 2 and table 3.

5.1. Analysis of Return on Equity and Return on Assets

Analysis of Return on Equity

Looking at the results for Return on Equity in table 2 below, we see an evident pattern. The company's performance has been worsening a lot in the last two years before dismissal, which could be the reason for the dismissal. Then the two first years after dismissal, it goes back to almost the same level as before and then seems to flatten out at that level. We find it necessary to note that the Return on Equity, in general, is relatively low, and we can assume that most shareholders would not be satisfied with this level of return. Further, we see that the Return on Equity at no point is at the same level or higher level than two years before the dismissal, which means that there is no increase in performance according to

Return on Equity. However, there is a rebound after the poor performance in the year of the dismissal.

	Return on Equity
Two years before dismissal	7.39%
One year before dismissal	5.32%
Same year as the dismissal	4.45%
One year after dismissal	6.16%
Two years after dismissal	7.02%
Three years after dismissal	6.44%

Table 2. Average Return on Equity in the period around dismissal.

We also see a very similar pattern when plotting the relationship between Return on Equity and time relative to dismissal, see appendix 4. The smooth spline shows that Return on Equity decreases before and then increases after dismissal but at no point gets back to the initial level.

To further analyze the changes in Return on Equity, we plot histograms for two variables containing 1) the total change in Return on Equity and 2) the change in Return on Equity after dismissal. The histograms show the distribution of the companies' change in performance from two years before dismissal to three years after and from the year of dismissal to three years after. We can see in the left histogram in Figure 4 that the companies' change in Return on Equity for the entire period is pretty evenly distributed and very centered around 0 but slightly left-skewed. This distribution indicates that the companies, on average, experience a slight decrease in performance. The right histogram shows that the distribution of changes following dismissal is also centered around 0 but slightly right-skewed, indicating that most companies see an improvement in Return on Equity post dismissal. Both histograms show that the vast majority of the companies see minimal improvement over our research period, except for a few companies that have a significant improvement.

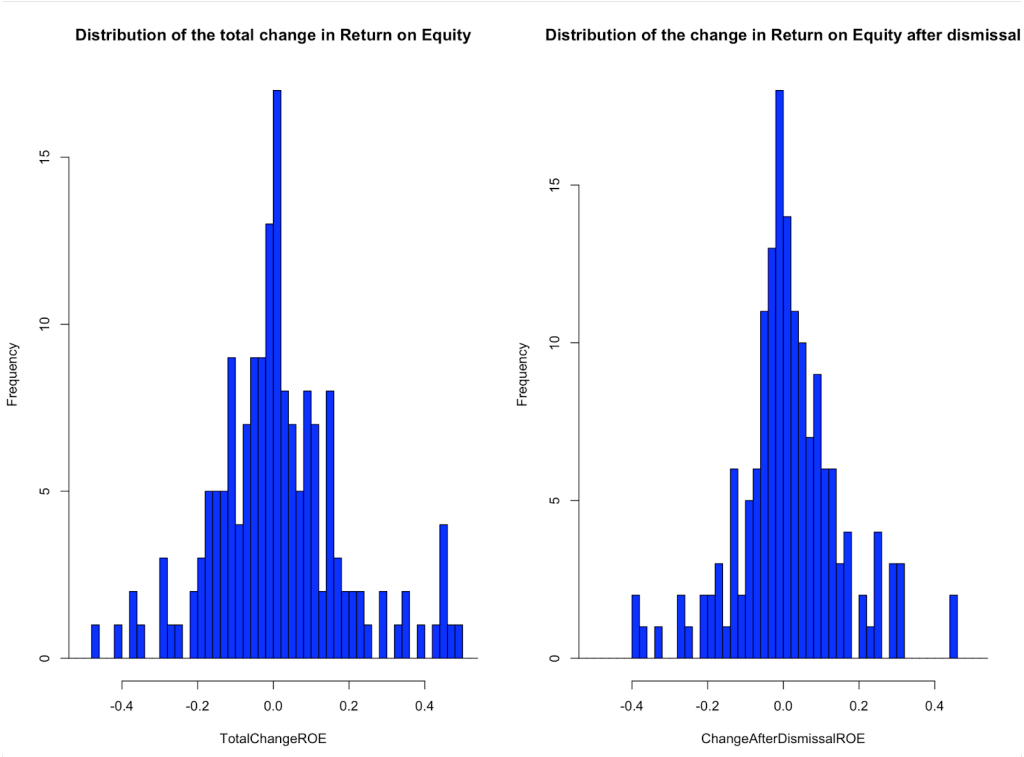

Figure 4: Histogram for change in Return on Equity in the entire period and after dismissal

The data clearly suggest a negative trend for Return on Equity leading up to a dismissal and a positive trend following a dismissal. However, the overall trend seems to be flat with a dip in performance in the middle.

Analysis of Return on Assets

	Return on Assets
Two years before dismissal	11.19%
One year before dismissal	10.64%
Same year as the dismissal	10.13%
One year after dismissal	10.36%
Two years after dismissal	10.39%
Three years after dismissal	9.96%

Table 3. Average Return on Assets in the period around dismissal.

We now look at Return on Assets compared to our results for Return on Equity. The average Return on Assets in table 3 above shows decreased performance leading up to dismissal, similar to Return on Equity. However, in the period after dismissal, there does not seem to be an increase in performance. We even see a slight decrease three years after dismissal. This result contrasts with the Return on Equity results, which substantially improved after dismissal. This difference can be explained by the fact that our Return on Assets is calculated with operating profit and not net income like Return on Equity. Further, we see much less variation in Return on Assets compared to Return on Equity, which seems logical since the assets' value is often larger than the equity value.

Similar to the analysis of Return on Equity, we plot the relationship between Return on Assets and time relative to dismissal, see Appendix 5. This plot shows the same negative trend leading up to dismissal and that the performance seems to flatten out after.

Further, we plot histograms for two variables containing 1) the total change in Return on Assets and 2) the change in Return on Assets after dismissal. We see that the two histograms are similar to the ones for Return on Equity but with much less variation. For most companies, the total change is negative except for a few companies with a significant improvement.

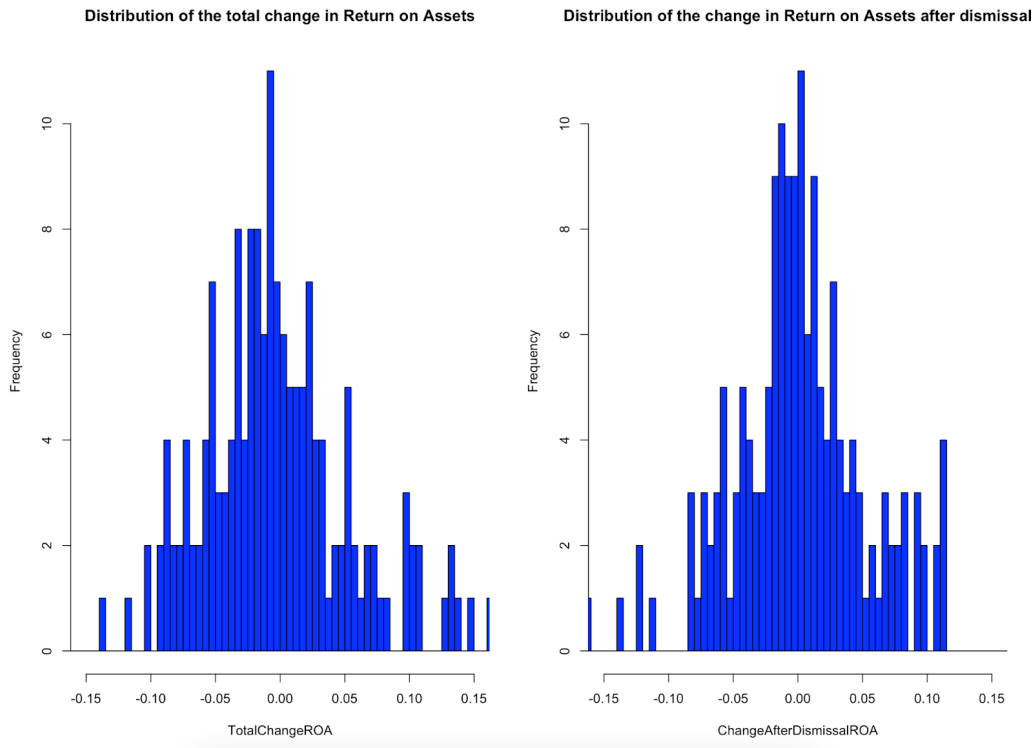

Figure 5: Histogram for change in Return on Assets in the entire period and after dismissal

The data suggests that Return on Assets decreases in the period prior to dismissal and then flattens out after dismissal. The averages and the histogram show that the changes after dismissal are minimal. We find similarities between Return on Equity and Return on Assets. However, this is primarily in the years before dismissal.

What we find most interesting is that even though the companies have decided to dismiss a CEO in the period, they have still not improved their financial performance three years after the dismissal compared to two years before the dismissal. The decreased performance before dismissal could result from primarily external factors and not poor decisions from the CEO. Maybe the performance was good compared with industry rivals. Similarly, the improved performance after dismissal is not necessarily a result of a new CEO coming in and turning the company around. Instead, it could be because of other factors unrelated to the CEO change, as previous research has also pointed out (Denis & Denis, 1995). This finding is in line with the notion presented by Jenter & Kanaan (2015) that CEOs often get credited or blamed for performance out of their control. Concerning our research question, we find that the overall trend in

financial performance seems to be flat, with a dip around dismissal. This result could indicate that the decrease before dismissal was inevitable and can not be blamed on the CEO. Similarly, the increase after dismissal can not be credited to the new CEO.

Further, our findings seem to align with corporate governance theories. The agency theory explains that the board might feel pressured to act when the performance declines steeply as this does not benefit the shareholders. By taking action and dismissing the CEO, they signal accountability and responsible management to the shareholders and simultaneously shift the blame away from themselves, as explained by the institutional theory and the scapegoat theory.

5.2. Testing the significance

To test the reliability of our numbers and see if the averages in the different years are significantly different from each other, we performed several "Welch Two Sample t-tests". This test " determines if there is a significant difference between two groups" (Hayes, Brown & Beer, 2022). To determine if the test is valid, we use a confidence interval of 95%, where all tests have at least 1350 degrees of freedom, meaning that the p-value must be lower than 0.05 and the t-value must be higher than 1.96 (See t-table in Appendix 6). The t-value indicates how large the differences between the two groups are, so a large t-value indicates considerable differences exist between the two groups. We looked at the relationship between the averages for Return on Equity and Return on Assets two years before dismissal and in the same year. This way, we find out if the negative trend leading up to dismissal is significant and if it could indicate a CEO dismissal to come. Similarly, we looked at the relationship between the averages in the same year and the averages in the third year after dismissal to see if the dismissal significantly impacted the company's performance and whether dismissing a CEO could be beneficial.

```
        Welch Two Sample t-test

data:  Two_years_before$ROE and Same_year$ROE
t = 3.6821, df = 1356.3, p-value = 0.0002404
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 0.01375023 0.04510892
sample estimates:
 mean of x  mean of y
0.07391104 0.04448147
```

Figure 6: t-test for Return on Equity two years before dismissal and the same year as dismissal.

We see from the test that the average Return on Equity is significantly different two years before dismissal compared to in the same year as dismissal. The test has a t-value of 3.6821, which is very high and above our threshold for significance. Further, the test has a p-value of 0.0002404, meaning it is significant on a 0.1% level with a confidence interval of 95%.

```
        Welch Two Sample t-test

data:  Three_years_after$ROE and Same_year$ROE
t = 2.2108, df = 1385.4, p-value = 0.02721
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 0.002244778 0.037590251
sample estimates:
 mean of x  mean of y
0.06439899 0.04448147
```

Figure 7: t-test for Return on Equity the same year as dismissal and three years after dismissal

We see from the test that the average Return on Equity is significantly different two years before dismissal compared to in the same year as dismissal. The test has a t-value of 2.2108, clearly above our threshold of 1.96. Further, it has a p-value of 0.02721, meaning it is significant on a 5% level with a confidence interval of 95%.

The average Return on Assets is significantly different two years before dismissal compared to the same year as dismissal, see Appendix 7. However, it is not significantly different in the same year as dismissal compared to three years after, see Appendix 8.

As we can see from Figures 6-7 and Appendix 7-8, all the relationships are significantly different except for the average Return on Assets in the same year as dismissal compared with the third year after dismissal. The fact that Return on Assets does not significantly change after dismissal indicates that dismissal does not improve performance.

Further, we have that the negative trend we see for both Return on Assets and Return on Equity prior to dismissal is significant and might indicate a dismissal to come. Our dataset is made of dismissals based on job performance and personal issues. Naturally, the companies with a dismissal based on job performance have bad results in the period leading up to the dismissal. A dataset with only dismissals based on personal issues might give completely different results. We divide our dataset into two types of dismissals to investigate this.

5.3. Splitting the data into two types of dismissals

The subset for job performance consists of 169 companies, and the subset for personal issues consists of 20 companies. We see that most of our dataset consists of dismissals based on job performance. From this, we can assume that our results for the subset for job performance will be very similar to those for the entire dataset. The overweight of job performance dismissals substantiates what other researchers have found, that most dismissals result from poor performance.

Return on Equity		
	Job performance	**Personal issues**
Two years before dismissal	6.84%	12.23%
One year before dismissal	4.72%	10.24%
Same year as the dismissal	3.50%	11.80%
One year after dismissal	5.27%	13.18%
Two years after dismissal	6.53%	11.00%
Three years after dismissal	5.96%	10.38%

Table 4: Average Return on Equity for dismissals based on job performance and personal issues.

We can see from table 4 that the pattern for job performance dismissals is very similar to what we got for the entire dataset, which is expected given that this subset represents 89% of the entire dataset. Return on Equity decreases before dismissal, then almost gets back to the initial level the first two years after dismissal, and then seems to flatten out at that level. We see that both the decrease before dismissal and the increase after dismissal is significant changes. See appendixes 9 and 10. Conversely, there seems to be a flat trend for personal issues dismissals with minor fluctuations from year to year. What is more interesting is the difference in the actual level of Return on Equity between the groups. The personal issues subset has a remarkably higher Return on Equity than the job performance subset.

The results for Return on Assets show the same pattern as Return on Equity for both subsets. For the job performance subset, there is a slight decrease before dismissal and flattens out after dismissal, with the increase before dismissal being significant, see appendix 11 and 12. Moreover, there are no patterns for the personal issues subset, and the Return on Assets seems to be on the same level with minor changes from year to year. The most important takeaway is that the job performance subset underperforms compared to the personal issues subset in every research year.

Return on Assets		
	Job performance	**Personal issues**
Two years before dismissal	10.98%	13.02%
One year before dismissal	10.47%	11.98%
Same year as the dismissal	9.77%	12.99%
One year after dismissal	10.01%	13.18%
Two years after dismissal	10.05%	13.13%
Three years after dismissal	9.76%	11.64%

Table 5. Average Return on Assets for dismissals based on job performance and personal issues.

We see a clear difference in the performance of the two types of dismissals. The Return on Equity and the Return on Assets has a similar pattern for the job performance subset compared with the overall dataset. Conversely, for the personal issues subset, neither Return on Equity nor Return on Assets had any clear pattern. The most noteworthy difference between the two types is in the overall level of Return on Equity. Suppose we assume that the companies with dismissals based on personal issues can be used as a benchmark for standard-performing companies. In that case, the companies with dismissals based on job performance are generally poorly performing companies. Even though the subset based on personal issues only consists of 20 companies and therefore could give skewed numbers, we think the differences between the two groups are worth considering.

5.4. How big is the decrease in operating profit prior to dismissal?

To further illustrate the impact of the decreasing performance, we calculated how big the decrease in operating profit was on average in the period prior to dismissal. We calculated the operating profit each year for the companies with a dismissal based on job performance. As we can see from table 6, there is a drop on average of almost 400 million dollars in operating profit before depreciation in the period before dismissal, making the year of dismissal the worst year for operating profit. We also find it interesting that operating profit is worse three years after dismissal than both years before dismissal.

	Operating profit	**Change YoY**
Two years before dismissal	3 607 919 430$	-
One year before dismissal	3 411 693 122$	-196 226 308$
Same year as the dismissal	3 213 411 474$	-198 281 648$
One year after dismissal	3 329 082 327$	115 670 853$
Two years after dismissal	3 457 469 792$	128 387 465$
Three years after dismissal	3 389 797 210$	-67 672 582$

Table 6. Calculation of decrease in operating profit leading up to dismissal.

We made this calculation to understand further the board's and shareholders' sides of the decision. It is reasonable to think that top management might feel the need to make changes to improve performance after such a decrease. One of the actions they can do in such a situation is forcing a dismissal of the CEO. A dismissal of the CEO could be presented as a straightforward solution to what could be much more complex underlying issues. We see from our analysis that the operating profit does not increase to the initial level two years before dismissal, indicating that dismissal does not solve the issue.

5.5. Analyzing the theory of "Big Bath"

	Total Assets	**Change in assets YoY (%)**
Two years before dismissal	41 324 378 927$	-
One year before dismissal	41 620 405 143$	0.72%
Same year as the dismissal	42 691 909 944$	2.57%
One year after dismissal	42 715 815 028$	0.06%
Two years after dismissal	44 016 407 597$	3.04%
Three years after dismissal	44 715 865 038$	1.59%

Table 7. Average Assets and percentage change in assets in the period around dismissal. (assets in total value).

Looking at asset changes is helpful for our analysis for two main reasons. Firstly, we wanted to see if there is any evidence of "Big bath" taking place. Secondly, assets are a key component of Return on Assets, which we use to analyze the financial performance. Looking at the changes in assets, it is noteworthy that the change in assets is at its lowest one year after the dismissal, with an increase of only 0.06%. Further, as presented previously, the operating profit decreased by 200 million dollars in the year of dismissal. There could be numerous reasons for these changes. However, it could indicate a "Big Bath" pattern, where write-downs have happened following the dismissal of the old CEO, and more items have been expensed instead of placed on the balance sheet. Lower values of assets and higher values of operating profit will increase Return on Assets.

Consequently, expensing items in the year of dismissal can improve the future Return on Assets. If we look at this in relation to the changes in Return on Assets, we can see in table 3 above that from the same year to one year after dismissal Return on Assets has a slight increase. This increase could be because of the relatively smaller increase in total assets compared to other years. However, we do not have sufficient evidence to conclude that “Big Bath” actions have taken place, but we still think it is an important and noteworthy finding.

6. Summary of findings

6.1. Results prior to dismissal

Our analysis of the entire dataset gives a clear indication of decreasing performance in Return on Equity and Return on Assets in the period prior to dismissal. We find this result to be in line with the results of previous research; that poor financial performance is a triggering cause for CEO dismissal. Further, we find evidence that the companies in the job performance subset had a decrease in operating profit of almost 400 million dollars on average. Considering these decreases and the board's roles could present several reasons for the decision to dismiss the CEOs. As mentioned earlier in the paper, according to different theories within corporate governance, the board has a role of monitoring management and controlling that shareholders get sufficient returns. From this perspective, it is easy to understand that the board feels a need to act when the performance is poor and therefore decides to dismiss the CEO to show accountability. The decision to dismiss the CEO can be explained by the scapegoat theory, that the board uses the CEO to shift the blame away from themselves when performance is poor, even if the CEO is not the main problem. Another explanation could be that boards dismiss CEOs because "everyone else does it", making it an act legitimized by the environment.

6.2. Results in the entire period

We find that for Return on Equity, there is a substantial increase after dismissal. This increase could indicate that the dismissals had a positive effect, helping the companies turn the negative trend and return to their initial performance level.

However, we cannot determine how much of this increase is due to the new CEO. In contrast, the results for Return on Assets show no positive effect post dismissal.

However, looking at the changes over the entire research period, we find that Return on Equity is at almost the same level three years after dismissal compared to two years before, and Return on Assets is slightly worse. From this, we see that despite dismissing their CEO, the companies have not improved their overall performance. We find similar results for operating profit that despite an improvement right after dismissal, it never reaches the initial level it was two years before. Further, since the Return on Equity seems to get back to around the same level as it was at the starting point of our analysis, it looks like this is the usual level. If this is the case, the dip during the period might have been inevitable due to factors outside the CEO's control. Therefore it is not unreasonable to assume that the companies would perform on the same level if they did not dismiss the CEO. Further, the slight decline in Return on Assets substantiates that changing the CEO does not improve the overall financial performance.

6.3 Differences between the types of dismissals

We find that there are considerable differences in Return on Equity between the companies with a dismissal based on job performance and the companies with a dismissal based on personal issues. The job performance subset had a significant decrease in performance prior to dismissal and a significant increase after dismissal, similar to the overall dataset. On the other hand, the personal issues subset had no significant change, which we find natural as the CEO was dismissed based on factors unrelated to the firm's performance. The difference in performance between the two subsets shows that companies dismissing their CEO based on job performance, in fact perform significantly worse before dismissal. Our results for Return on Assets confirm our findings from previous analyses. The job performance group is very similar to the overall dataset, and the results for the personal issues group show no clear pattern, similar to the analysis of Return on Equity.

Further, we find two critical differences between the two groups. Firstly, there is a significantly higher frequency of dismissals based on job performance. Secondly,

the Return on Equity and Return on Assets are substantially higher for the companies with dismissal based on personal issues compared to those with dismissal based on job performance. This dissimilarity shows that companies with poor performance are performing way worse than the other companies in the dataset, not only in the period leading up to dismissal but also in general. Suppose the performance of the companies in the personal issues subset can be used as a benchmark. In that case, we can assume that companies that dismiss their CEO based on job performance, in general, are poorly performing companies.

6.4. "Big Bath"

We find patterns that might indicate "Big Bath" actions directly after the dismissal. In our analysis we find that operating has a 200 million dollar decrease in the year of dismissal. Further, the changes in assets values shows a steady increase in assets for the companies, with the only exception being one year after the CEO dismissals, where the increase is only 0.06% on average, see table 7. In the same year Return on Assets had a slight increase, which could be due to this low increase in total assets. However, the change in Return on Assets is insignificant, and we can not draw any conclusions about "Big bath" actions.

6.5. Validity

To determine the validity of our results, we must look at our analysis in terms of the three measures of validity we mentioned previously: measurement validity, internal validity, and external validity.

6.5.1 Measurement validity

Our research investigates the effects on the financial performance of a CEO dismissal, primarily using two financial metrics: Return on Equity and Return on Assets. Both metrics are based on accounting data and measure a company's profitability. The Return on Assets metric is calculated with operating profit instead of net income and can give different indications compared to Return on Equity. However, our analysis focuses mainly on Return on Equity and includes Return on Assets for a broader and deeper understanding. The metrics' change

over time gives a clear and reliable illustration of the change in a firm's performance. Hence, our analysis fulfills the criteria of measurement validity.

6.5.2. Internal validity

Further, for our research to be of internal validity, there must be a causal relationship between CEO dismissal and firm performance. Our analysis indicates a causal relationship between a firm's performance and CEO dismissal before and after dismissal. However, we have also pointed out that several other factors could influence this relationship, leading to lower internal validity.

6.5.3 External validity

Our dataset consists of a large sample of 1500 US companies of different sizes within all industries, with the only criteria being that a dismissal occurred between 2010 and 2018. Since the dataset is based on the S&P 1500 Index, we do not include companies outside the US in our analysis. However, a substantial number of the companies in the index have operations outside the US. Consequently, our results can be generalized for different company sizes across industries and countries.

7. Conclusion

In this paper, we have investigated the research question *"Does CEO dismissal improve financial performance?"* by conducting a quantitative analysis of companies' Return on Equity and Return on Assets in the S&P 1500 index. We investigated the topic in light of theories of corporate governance and the role of the board of directors. Similar to much of the existing research on CEO dismissals, we find that there, on average, is a significant decrease in financial performance leading up to dismissal. This decrease can pressure the board of directors to act on behalf of the shareholders or even on their own behalf, leading to a dismissal. Further, the companies that dismiss their CEO tend to struggle with poor financial performance, particularly those with dismissals based on job performance, where the Return on Equity and Return on Assets are substantially worse compared to the other companies in the dataset. On average, the companies improve Return on Equity right after dismissal, indicating that the dismissal was

beneficial short-term. However, they do not improve overall but merely get back to around the same level as before dismissal. Additionally, the Return on Assets does not improve after dismissal, and we even see a slight decrease. From these results, we can conclude that CEO dismissals do not seem to improve financial performance. Implications of our findings are that the decision to dismiss a CEO when financial performance is poor seems to be an irrational act by the board of directors of making the CEO the scapegoat to illustrate control.

7.1. Contribution

This paper contributes to the field of CEO dismissals in primarily two ways. Firstly we provide updated research on the matter. Secondly, because of the lack of research on the effects post dismissal, our finding that there does not seem to be an improvement in financial performance from a CEO dismissal provides a new contribution to the field. Further, our results provide a general understanding of CEO dismissal's effects. They can be a good foundation for future research and the decision-making process of companies and boards.

7.2. Limitations

Our research is conducted through a relatively general analysis of financial performance to see how a CEO dismissal affects financial performance. Our analysis indicates that a CEO dismissal does not seem to improve financial performance. However, this result is not necessarily applicable to every industry or company size. Categorizing the companies based on these factors could show that the effects differ across industries and company sizes. We have not used benchmarks in our analysis. Including benchmarks for performance could show that a dismissal's actual effect is larger or smaller than what we find. Further, our data is only based on US companies. Even though we find our results generalizable, it is still possible that including data from other countries could give different results. Moreover, we have been forced to exclude companies with missing data for some years. This exclusion could create a bias by removing companies that go bankrupt, are involved in mergers and acquisitions, and similar cases.

7.3. Future research

Although we find that CEO dismissals do not seem to improve financial performance, we suggest that there is a need for research with more in-depth analyses. Firstly, we find that categorizing the companies based on size and industry could allow for interesting results about how different companies are affected by dismissal. Secondly, we think that including benchmarks for financial performance could give a greater insight into the effects of dismissal. Lastly, a greater focus on aspects related to the board of directors, like board composition, in relation to the financial performance could help better understand the reasons for dismissal and the board's impact on performance.

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Appendix

Appendix 1

Return on Assets	roa	Profitability	Operating Income Before Depreciation as a fraction of average Total Assets based on most recent two periods

Return on Assets definition. Source: (WRDS research team, 2016)

Appendix 2

Return on Equity	roe	Profitability	Net Income as a fraction of average Book Equity based on most recent two periods, where Book Equity is defined as the sum of Total Parent Stockholders' Equity and Deferred Taxes and Investment Tax Credit

Return on Equity definition. Source: (WRDS research team, 2016)

Appendix 3

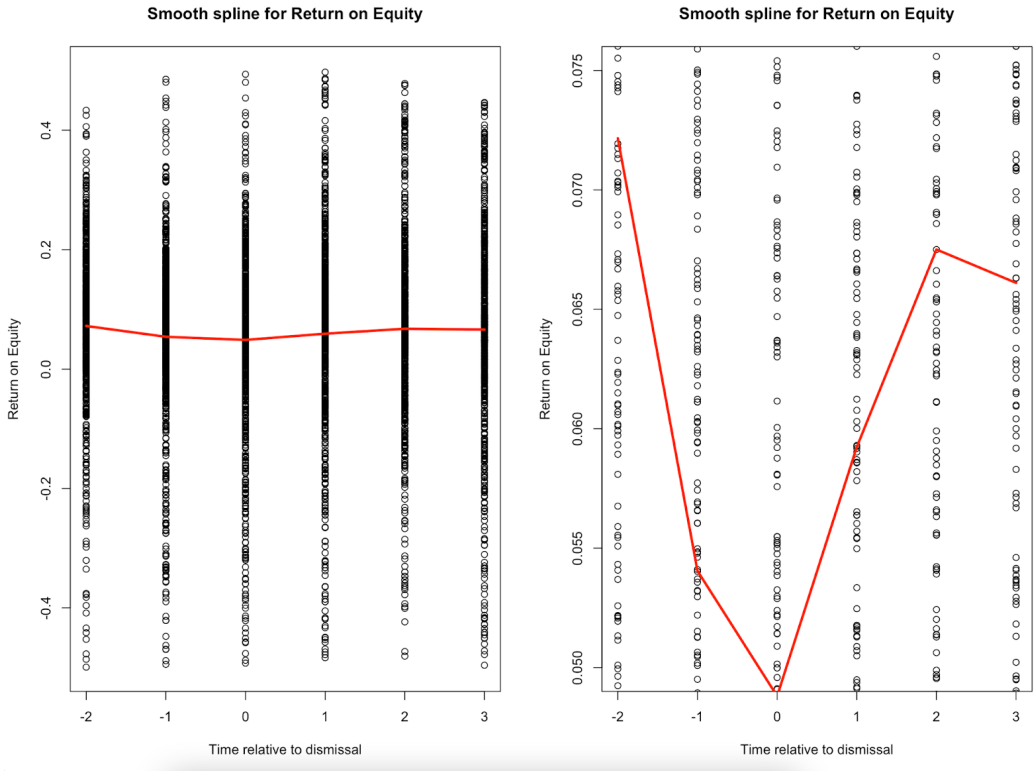
S&P Global
Market Intelligence

Assets - Total

Mnemonic	Category	Periodicity	Format	Units
AT	Balance Sheet	Annual	Number	Millions
ATQ	Balance Sheet	Quarterly	Number	Millions

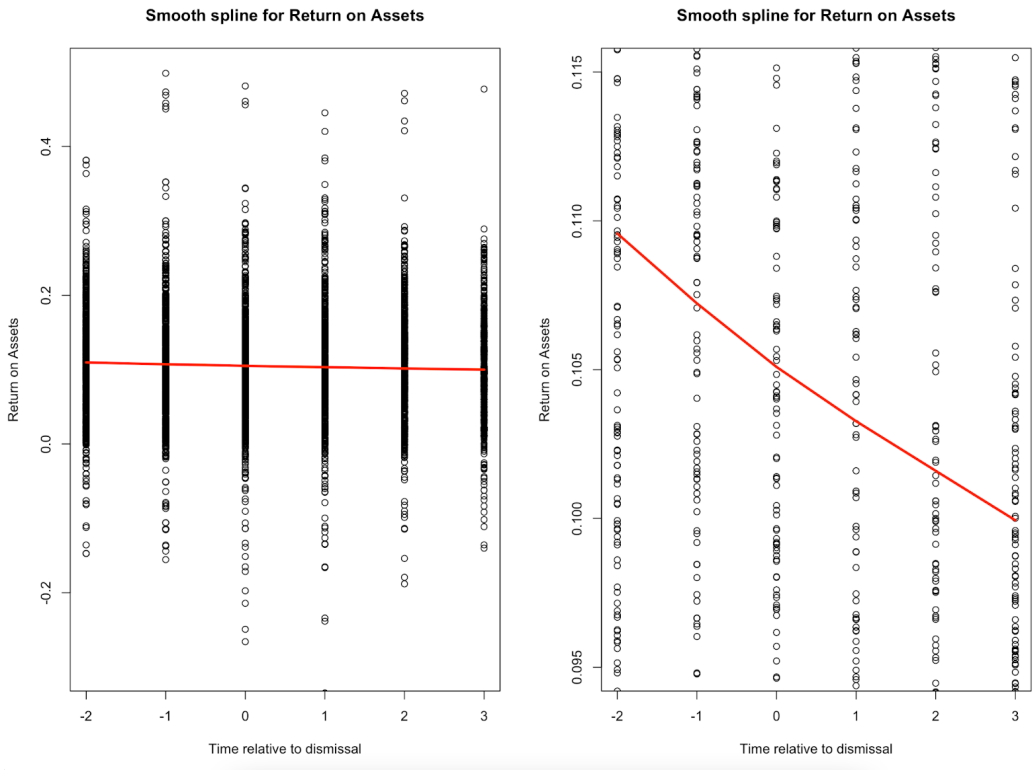
Total Assets definition. Source: (S&P Global Market Intelligence, 2021)

Appendix 4



Plot for relationship between Return on Equity and DiffLeftOffice&DataYearEnd

Appendix 5



Plot for relationship between Return on Assets and DiffLeftOffice&DataYearEnd

Appendix 6

t Table

cum. prob	$t_{.50}$	$t_{.75}$	$t_{.80}$	$t_{.85}$	$t_{.90}$	$t_{.95}$	$t_{.975}$	$t_{.99}$	$t_{.995}$	$t_{.999}$	$t_{.9995}$
one-tail	0.50	0.25	0.20	0.15	0.10	0.05	0.025	0.01	0.005	0.001	0.0005
two-tails	1.00	0.50	0.40	0.30	0.20	0.10	0.05	0.02	0.01	0.002	0.001
df											
1	0.000	1.000	1.376	1.963	3.078	6.314	12.71	31.82	63.66	318.31	636.62
2	0.000	0.816	1.061	1.386	1.886	2.920	4.303	6.965	9.925	22.327	31.599
3	0.000	0.765	0.978	1.250	1.638	2.353	3.182	4.541	5.841	10.215	12.924
4	0.000	0.741	0.941	1.190	1.533	2.132	2.776	3.747	4.604	7.173	8.610
5	0.000	0.727	0.920	1.156	1.476	2.015	2.571	3.365	4.032	5.893	6.869
6	0.000	0.718	0.906	1.134	1.440	1.943	2.447	3.143	3.707	5.208	5.959
7	0.000	0.711	0.896	1.119	1.415	1.895	2.365	2.998	3.499	4.785	5.408
8	0.000	0.706	0.889	1.108	1.397	1.860	2.306	2.896	3.355	4.501	5.041
9	0.000	0.703	0.883	1.100	1.383	1.833	2.262	2.821	3.250	4.297	4.781
10	0.000	0.700	0.879	1.093	1.372	1.812	2.228	2.764	3.169	4.144	4.587
11	0.000	0.697	0.876	1.088	1.363	1.796	2.201	2.718	3.106	4.025	4.437
12	0.000	0.695	0.873	1.083	1.356	1.782	2.179	2.681	3.055	3.930	4.318
13	0.000	0.694	0.870	1.079	1.350	1.771	2.160	2.650	3.012	3.852	4.221
14	0.000	0.692	0.868	1.076	1.345	1.761	2.145	2.624	2.977	3.787	4.140
15	0.000	0.691	0.866	1.074	1.341	1.753	2.131	2.602	2.947	3.733	4.073
16	0.000	0.690	0.865	1.071	1.337	1.746	2.120	2.583	2.921	3.686	4.015
17	0.000	0.689	0.863	1.069	1.333	1.740	2.110	2.567	2.898	3.646	3.965
18	0.000	0.688	0.862	1.067	1.330	1.734	2.101	2.552	2.878	3.610	3.922
19	0.000	0.688	0.861	1.066	1.328	1.729	2.093	2.539	2.861	3.579	3.883
20	0.000	0.687	0.860	1.064	1.325	1.725	2.086	2.528	2.845	3.552	3.850
21	0.000	0.686	0.859	1.063	1.323	1.721	2.080	2.518	2.831	3.527	3.819
22	0.000	0.686	0.858	1.061	1.321	1.717	2.074	2.508	2.819	3.505	3.792
23	0.000	0.685	0.858	1.060	1.319	1.714	2.069	2.500	2.807	3.485	3.768
24	0.000	0.685	0.857	1.059	1.318	1.711	2.064	2.492	2.797	3.467	3.745
25	0.000	0.684	0.856	1.058	1.316	1.708	2.060	2.485	2.787	3.450	3.725
26	0.000	0.684	0.856	1.058	1.315	1.706	2.056	2.479	2.779	3.435	3.707
27	0.000	0.684	0.855	1.057	1.314	1.703	2.052	2.473	2.771	3.421	3.690
28	0.000	0.683	0.855	1.056	1.313	1.701	2.048	2.467	2.763	3.408	3.674
29	0.000	0.683	0.854	1.055	1.311	1.699	2.045	2.462	2.756	3.396	3.659
30	0.000	0.683	0.854	1.055	1.310	1.697	2.042	2.457	2.750	3.385	3.646
40	0.000	0.681	0.851	1.050	1.303	1.684	2.021	2.423	2.704	3.307	3.551
60	0.000	0.679	0.848	1.045	1.296	1.671	2.000	2.390	2.660	3.232	3.460
80	0.000	0.678	0.846	1.043	1.292	1.664	1.990	2.374	2.639	3.195	3.416
100	0.000	0.677	0.845	1.042	1.290	1.660	1.984	2.364	2.626	3.174	3.390
1000	0.000	0.675	0.842	1.037	1.282	1.646	1.962	2.330	2.581	3.098	3.300
z	0.000	0.674	0.842	1.036	1.282	1.645	1.960	2.326	2.576	3.090	3.291
	0%	50%	60%	70%	80%	90%	95%	98%	99%	99.8%	99.9%
	Confidence Level										

Appendix 7

```
        Welch Two Sample t-test

data:  Two_years_before$ROA and Same_year$ROA
t = 2.4937, df = 1384.7, p-value = 0.01276
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 0.002258366 0.018912926
sample estimates:
mean of x mean of y
0.1119164 0.1013307
```

t-test for Return on Assets in TwoYearsBefore and SameYear

Appendix 8

```
        Welch Two Sample t-test

data:  Three_years_after$ROA and Same_year$ROA
t = -0.41405, df = 1350, p-value = 0.6789
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -0.009905748  0.006452976
sample estimates:
 mean of x  mean of y
0.09960434 0.10133073
```

t-test for Return on Assets in SameYear and ThreeYearsAfter

Appendix 9

```
        Welch Two Sample t-test

data:  Two_years_before.JP$ROE and Same_year.JP$ROE
t = 3.8686, df = 1202.6, p-value = 0.0001154
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 0.01646018 0.05033574
sample estimates:
 mean of x  mean of y
0.06841991 0.03502194
```

t-test for Return on Equity in TwoYearsBefore and SameYear for Job Performance

Appendix 10

```
        Welch Two Sample t-test

data:  Three_years_after.JP$ROE and Same_year.JP$ROE
t = 2.5193, df = 1231.6, p-value = 0.01188
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 0.005439466 0.043729143
sample estimates:
 mean of x  mean of y
0.05960625 0.03502194
```

t-test for Return on Equity in SameYear and ThreeYearsAfter for Job Performance

Appendix 11

```
        Welch Two Sample t-test

data:  Two_years_before.JP$ROA and Same_year.JP$ROA
t = 2.6999, df = 1234.2, p-value = 0.00703
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 0.00333008 0.02103404
sample estimates:
 mean of x  mean of y
0.10984420 0.09766214
```

t-test for Return on Assets in TwoYearsBefore and SameYear for Job Performance

Appendix 12

```
        Welch Two Sample t-test

data:  Three_years_after.JP$ROA and Same_year.JP$ROA
t = -0.023366, df = 1198.7, p-value = 0.9814
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -0.008784796  0.008578009
sample estimates:
 mean of x  mean of y
0.09755875 0.09766214
```

t-test for Return on Assets in SameYear and ThreeYearsAfter for Job Performance

Appendix 13

See our full R-script in the attached file “CEO-Dismissals-Analysis.R”.

Appendix 14

See our dataset in the attached files “CEO-Dismissals-Dataset.excl” and “CEO-Dismissals-Dataset.csv”.