Handelshøyskolen BI

GRA 19703 Master Thesis

Thesis Master of Science 100% - W

Predefinert informasjon

Startdato:	09-01-2023 09:00 CET	**Termin:**	202310
Sluttdato:	03-07-2023 12:00 CEST	**Vurderingsform:**	Norsk 6-trinns skala (A-F)
Eksamensform:	T		
Flowkode:	202310||11184||IN00||W||T		
Intern sensor:	(Anonymisert)		

Deltaker

Navn:	Sindre Bratli og Emilie Bostad Borg

Informasjon fra deltaker

Tittel *:	Leon Bogdan Stacescu
Navn på veileder *:	Does the gender of the CEO have a significant impact on firms' financial performance?

Inneholder besvarelsen konfidensielt materiale?:	Nei	**Kan besvarelsen offentliggjøres?:**	Ja

Gruppe

Gruppenavn:	(Anonymisert)
Gruppenummer:	105
Andre medlemmer i gruppen:	

Sindre Bratli
Emilie Bostad Borg

Does the gender of the CEO have a significant impact on firms' financial performance?

Master Thesis

Hand-in date:

03.07.2023

Programme:

MSc in Business with Major in Finance

Supervisor:

Leon Bogdan Stacescu

Abstract

We examine the impact of CEO gender on the financial performance of Norwegian firms using panel data analysis from 2000 to 2020. Our study includes a comprehensive dataset of 160 091 firms and controls for variables such as firm size, industry, and time. We find a significant, but not necessarily a causal, relationship between CEO gender and financial performance. One possible explanation is a selection effect, where companies with lower profitability are more likely to appoint female CEOs. However, female CEOs are found to have a positive effect on firms' profit margin. By expanding the generalizability of findings and considering the external validity of existing research, our study contributes to a more nuanced understanding of the impact of gender diversity on financial performance. It provides insights for policymakers and practitioners to promote workplace gender diversity and foster inclusive and prosperous economies.

Acknowledgements

We would like to express our thanks to our supervisor, Leon Bogdan Stacescu, for his guidance and support during our research and writing. His helpful feedback and input have been greatly valuable in enhancing our work. We are also grateful to Centre for Corporate Governance Research for making available the necessary data for our research. Through this study, we have delved into the relationship between gender diversity and corporate performance, a truly engaging and rewarding experience. Our aim is to add a useful perspective to the ongoing dialogue in this important area of study.

Table of Contents

1.0 Introduction and background

The gender of a CEO has long been a topic of discussion and debate within the business world. Some argue that the gender of a CEO can have a significant impact on the financial performance of a company, while others believe that it has no bearing on a company's success. In recent years, there has been an increasing push for gender diversity in leadership positions, particularly in the CEO role. However, leadership is still largely dominated by men. Every second year, The CORE Norwegian Gender Balance Scorecard maps the status of gender equality at the top of the 200 largest Norwegian companies. Numbers from 2022 states that proportion of female CEOs is only 15.5% (CORE - Centre for Research on Gender Equality, 2022, p. 5). The data sample underlying this study shows a proportion of 16.20% when considering all private companies in Norway. Despite this disappointing number, The Global Gender Gap Report published by the World Economic Forum (2022) states that Norway is ranked as the third most gender equal country in the world.

The report "Women in the Workplace 2021" from McKinsey (2021) highlights differences in how female leaders, compared to males at the same level, responded to the COVID-19 pandemic in terms of supporting their employees' well-being, inclusion, and equity. This suggests that there may be differences in leadership styles between genders, and it is therefore interesting to explore the potential effect of this gender-based difference in leadership on financial performance. A number of studies have already been conducted, and several suggest that diversity in leadership has a positive impact on companies' financial performance. However, little is known about the specific effects of having a female CEO in the context of Norwegian firms. Previous studies have been carried out in countries with, among other things, a significantly lower degree of gender equality, and have focused on the largest industries, such as fortune 500 companies.

This difference in gender equality between countries, such as Norway and the United States, can be attributed to various factors such as cultural norms, policies, and social attitudes towards gender roles. For instance, Norway has implemented polices to promote gender equality in the workspace, such as mandatory quotas for women on

corporate boards, which have helped to increase the number of women in top executive positions (Allmennaksjeloven, 2003). In contrast, the United States has less explicit policies and has relied more on voluntary measures to increase gender diversity in leadership roles, and they are ranked as the 27th most gender equal country in the world (World Economic Forum, 2022, p. 10). This means that Norway, ranked as number three, is considered significantly more gender equal than the United States.

We want to contribute with research based on firms in Norway which are characterized by a high degree of gender equality compared to past studies. This allows for a more nuanced understanding of the relationship between gender diversity and financial performance in organizations operating in an environment characterized by a higher degree of gender equality. Also, it can contribute to external validity of existing research, expanding the generalizability of findings, and strengthening the understanding of the relationship between gender diversity and financial performance. Gender diversity may directly affect a company's bottom line if there is a significant difference in financial performance between companies with female versus male CEO.

If female CEOs are found to be associated with lower profitability, this could suggest that female CEOs themselves contribute to this performance outcome. However, one potential explanation could be a selection effect, indicating that companies with lower profitability are more likely to appoint female CEOs. Thus, it might imply that the gender of the CEO may not be the cause of lower profitability, but rather a consequence of this possible preference for female CEOs. Anyway, the study can provide insight into the efficacy of regulations intended to promote gender equality in leadership positions. If our findings reveal that businesses with female CEOs have superior financial results, it may provide evidence in favor of enacting laws like gender quotas. On the other hand, if the study finds no proof for a significant difference, it may imply that additional factors, such as unconscious bias or structural barriers, prevents women from reaching leadership positions. As a result, the study can provide a basis for further studies identifying the barriers to gender diversity in leadership positions and inform strategies to overcome them.

To address this gap in the literature, we conducted a study to determine whether there is a significant difference in the financial performance of Norwegian firms with female

CEOs compared to those with a male CEO. Thus, our research question is the following: *Does the gender of the CEO have a significant impact on firms' financial performance?* This is tested in our main hypothesis. Also, we looked at some supplementary hypotheses, investigating the same question but restricting the sample to family firms and new firms. Furthermore, we tested whether there is a significant change in firm performance when changing from a male CEO to a female CEO, as well as the effect of board composition on CEO gender. The statistical analysis techniques employed include logistic regressions for binary dependent variable regressions (gender), and ordinary least squares (OLS) regressions for continuous dependent variable regressions (ROA). Our sample consists of all private owned (independent) Norwegian firms.

Our study reveals mixed results regarding the influence of CEO gender on financial outcomes. Female-led firms exhibit lower performance in terms of return on assets (ROA) and return on equity (ROE), indicating a gender performance gap. However, these differences, while statistically significant, are relatively modest. Interestingly, female CEOs demonstrate a slightly higher profit margin, challenging the notion that they are inherently less profitable. Further, the transition from a male to a female CEO does not significantly impact ROA, suggesting that a change in gender at the CEO level does not lead to a drastic shift in overall financial performance. This suggests that the negative relationship between female CEOs and profitability may not be causal but could reflect a preference for female CEOs in companies with lower profitability. Our findings highlight the correlation between female CEOs and lower profitability, suggesting their potential contribution to this outcome, while considering the possibility of alternative factors at play.

This paper is organized into six sections to investigate the relationship between gender diversity and financial performance in Norwegian firms. The first part comprises a comprehensive literature review that explores existing studies on gender diversity and financial performance. In the second part, theory, we present the hypotheses. In the data collection part, we present the databases used, sample selection criteria, data filtering techniques and the specific variables employed. Descriptive statistics are also provided to give an overview of the sample characteristics. In the methodology part,

we explain the estimation of the statistical regression model used to examine the relationship. Thereafter we address the validity of the results, fixed effects, and firm characteristics, before presenting the results and discuss our findings. We will analyze the statistical outcomes in relation to the main and supplementary hypotheses, offering insights into the implications and significance of the results. Lastly, the conclusion summarizes the main findings of the study, discusses their implications for corporate governance practices in Norwegian firms, and suggests avenues for future research. The thesis aims to contribute to the understanding of the relationship between the gender of the CEO and financial performance, providing valuable insights for practitioners, policymakers, and scholars in the field of corporate governance.

Notably, there are some possible limitations to our study. Firstly, causality. We might face limitations in determining whether the gender of the CEO directly impacts financial performance or if other factors are at play. Regarding reverse causality, the issue may be less prominent as we do examine the effect of gender on ROA, our measure of financial performance. However, there may be other factors that could influence both the gender of CEO and ROA simultaneously. It is advisable to acknowledge that there may still be limitations related to endogeneity in our study. We have excluded some companies from our data set, further explained in the methodology part of this paper. Thus, endogeneity must be considered a limitation to our study.

2.0 Literature review

In recent years, there has been growing interest in the relationship between gender and leadership in the business world. While numerous studies have examined the effects of gender diversity in leadership positions on financial performance in publicly traded companies, research on this topic in the context of private firms, particularly in Norway, is more limited.

The objective of this paper is to determine whether there is a significant impact on the financial performance of private Norwegian firms when the CEO is a woman. To answer this question, we will examine the existing literature on the relationship between CEO gender and firm performance in order to assess the potential impact of

having a female CEO on financial outcomes. Through this literature review, we aim to shed light on the topic of female leadership and identify areas for further research.

2.1 The impact of gender on financial performance

The composition of a company's Board of Directors has been the focus of the majority of the research on the relationship between gender diversity and financial performance. According to a study on the impact of board gender diversity on firms' accounting and market-based performance, there are no statistically significant relationships between gender diversity and ROA, but the number and proportion of women on the board have a positive impact on price-to-earnings ratio (Simionescu et al., 2021).

However, some studies have studied the effects of CEO gender, saying that the performance of the company, on average, is influenced by the CEO's gender. A study by Khan & Vieito (2013) supports this finding, and further concludes that businesses with female CEOs typically have lower levels of risk than those with male CEOs. Additionally, it appears that when boards create CEO remuneration packages, particularly when it comes to equity-based incentives, they do not take into account the different risk preferences of male and female CEOs (Khan & Vieito, 2013). According to Krishnan and Parsons (2008), companies with gender diversity in senior management had higher-quality earnings. Additionally, they discover that after the IPO process, businesses with more women in senior management are more successful and have greater stock returns than businesses with less women in management.

Additional research supporting a positive relationship between gender diversity on boards and firm performance is a study by Adams and Ferreira (2009). It is based on companies from various countries and uses multiple measures of firm performance, such as ROA and ROE. The study suggests that increased female representation at the highest level of corporate governance tend to exhibit better financial performance across different countries and industries. Research by Bilimoria (2006) supports these findings, examining the impact of women in corporate director roles on firms' performance across a range of countries. The study includes evidence from Norway as well.

A different study found that female CEOs taking over male-led businesses with a minimum of 25% female employees resulted in a 3.25% increase in sales per employee. This indicates that the presence of female leaders and a substantial female workforce has a noteworthy and statistically significant effect on firm performance. According to the study, organizations with significant female employee populations may profit by appointing women to leadership positions because there may be significant costs associated with the underrepresentation of women in these positions (Flabbi et al., 2019).

While the majority of studies tend to indicate a positive relationship between female CEOS and gender diversity in boards with firm performance, there are some studies that present different perspectives. A study by Carter et al. (2003) explores the relationship between board diversity and firm value across a sample of U.S. firms and found no significant correlation between gender diversity on boards and firm value. A later study analyzing a large sample of U.S. firms support this finding, concluding that while an increase in female representation in top management is associated with better accounting performance, it does not lead to improved market performance (Dezsö & Ross, 2012).

2.1.1 Norwegian based studies

Although the presented literature does not exclusively focus on Norwegian firms, it contributes to the broader understanding of the relationship between gender diversity and firm performance. To gain a more comprehensive understanding of the specific relationship, we will in the following present some studies which focus specifically on Norwegian firms. Although limited research specifically focuses on the direct effect of CEOs gender on the financial performance of Norwegian firms, numeral studies examine the effects of implementation of the gender balance law (GBL). The GBL was introduced in 2006 and mandates a minimum of 40% women on corporate boards in Norway (Allmennaksjeloven, 2003).

Bertrand et al. (2014) have done research on the effects of board quotas on female labor market outcomes in Norway. While the study includes a significant focus on Norwegian firms, it also examines the broader context of gender diversity and labor

market outcomes in multiple countries. The study indicates that the introduction of board quotas led to a substantial increase in the representation of women on corporate boards in Norway. It also suggests that the policy had spillover effects, positively impacting female labor market outcomes beyond boardroom representation.

Bøhren and Staubo (2014) have done a similar study, investigating how firms respond to stricter gender balance in Norwegian boardrooms. The study finds that when the law mandated a minimum of 40% representation of both genders, half of the firms chose to exit into organizational forms not subject to the regulation. This response varied based on firm characteristics. The findings suggest that firms adapt their organizational structure to mitigate the costs of regulatory shocks, and the option to exit into non-exposed forms can help reduce the disruptive impact of gender balance regulations.

Matsa and Miller (2013) examines the effects of the Norwegian gender quota in corporate decision making. They compared Norwegian listed firms with unlisted Norwegian firms as well as listed and unlisted firms in other Nordic countries. Matsa and Miller found that while the quotas increased the representation of women on boards by more than 20 percentage points at the average affected firm, it had no significant impact on firm valuation. This finding is supported by Ahern and Dittmar (2012) who did a similar study. Additionally, the latter suggests that the implementation of the GBL had a substantial and surprising shock to the stockholder's ability to optimize the composition of their firm's boards. They also found that the firms affected by the gender quota implemented fewer workspace reductions compared to the firms used for comparison, which led to an increase in relative labor costs and employment levels, while reducing short-term profits.

2.2 Gender disparities across industries

There is some evidence to suggest that female CEOs are more likely to be present in the retail trade sector than in male-dominated industries like construction. These results are in line with earlier studies that found women are more likely to hold managerial positions in the service industry (Brady et al., 2011). Often, these are sectors which are considered to be less likely to perform financially at the level of e.g., technology companies, construction and oil and gas. The effect is although small from the previous

research, as a result of the study being on fortune 500 companies, which all to some extant have female executives, and the research focuses on large-scale industries, where both sexes are represented in the management.

At the same time, recent research on the subject of whether or not female-owned businesses perform worse than male-owned businesses, have come to the conclusion that they do not. Robb and Watson (2012) showed no gender performance differences for newly established US firms when using performance measures that simultaneously control for size, risk, and demographic characteristics like industry, experience, and hours worked. These findings are supported by several studies, among them a replication study by Zolin et al (2013) who aimed to see if Robb and Watson's study could be generalized to another geographical location, namely Australia.

2.3 Research on gender-based behavioral variations

Some research focuses more on aspects of economic psychology. The classical paper, "CEO Overconfidence and Corporate Investment" argue that corporate investment policies in large corporations is affected by its personal characteristics of CEOs (Malmendier & Tate, 2005). Thus, if one argues that female and male CEOs in general possess different characteristics, there is reason to assume that gender of the CEO may have an impact on firms' financial performance. In a research done by Huang and Kisgen (2013) they find that female executives works with wider bounds on earnings estimates, and are more likely to exercise stock options early. This suggest that men exhibit relative overconfidence in significant corporate decisions compared with women.

Looking at the male overconfidence when making corporate decisions, research has also focused on the risk aversion differences between female and male CEOs. According to research by Palvia et al. (2015), gender-based behavioral variations may have an impact on business decisions. The report examined banks' risk tolerance as well as their likelihood of collapse during times of market stress. Using a sizable panel of US commercial banks, they discovered that, after adjusting for asset risk, banks with female CEOs kept more conservative levels of capital. According to the study, smaller banks with female CEOs were often shown to have lower failure rates during the

financial crisis. This may suggest that other behavioral psychology plays a bigger role in the financial performance of the firms.

3.0 Theory

We will conduct a study to determine whether there is a significant difference in the financial performance of firms with female CEOs compared to those with a male CEO. Thus, our research question is the following: "*Does the gender of the CEO have a significant impact on firms' financial performance?".*

3.1 Main hypothesis

Hypothesis 1: Difference in financial performance based on CEOs gender

The main hypothesis we test is the following: *There is a significant difference in the financial performance of firms with female CEOs compared to those with male CEOs.* This proposes that the gender of a firm's CEO has a significant impact on its financial performance. From this, we can further examine whether the presence of a female CEO has a beneficial effect on a company's financial outcomes.

3.2 Supplementary hypothesis

Hypothesis 2: Change in CEO genders' impact on firms' financial performance

The second hypothesis we test is the following: *A change in the CEO's gender from male to female significantly impacts the firm's Return on Assets (ROA).* This hypothesis proposes that the transition from a male CEO to a female CEO can notably influence a company's ROA, one of our measures for financial performance.

By examining changes, we account for both observable and unobservable firm characteristics that remain constant over time, such as industry, firm size, or geographical location. This analysis enables us to isolate the specific impact of a gender transition within the CEO position and assess its significance on the firm's ROA. By focusing on CEO transitions, we can gain deeper insights into the causal relationship between CEO gender and financial outcomes.

Hypothesis 3: Female CEOs impact on new firms' financial performance

The third hypothesis we test is the following: *Female CEOs significantly improve the financial performance of new firms*. This hypothesis suggests that the presence of a female CEO can distinctly enhance the financial outcomes of a firm in its early stages of existence. Therefore, H3 implies that female leadership at the helm of new firms is associated with improved financial performance.

By examining the impact of female CEOs within the context of new firms, we can strengthen the overall argument of our thesis. It expands the scope of our research by not only considering the effect of CEO gender on the entire sample but also delving deeper into the unique dynamics of new firms. By comparing the effects of female CEOs in both the entire sample and new firms exclusively, we provide a more comprehensive understanding of the relationship between CEO gender and financial performance. This enables us to uncover potential nuances and differences in the effects of female leadership, thereby strengthening the overall argument of our thesis.

Hypothesis 4: Female CEOs impact on family firms' financial performance

The fourth hypothesis we test is the following: *Female CEOs significantly improve the financial performance of family firms.* This proposition indicates that when a female is leading a family-owned business, it can boost the financial outcomes of the firm. Hence, H4 puts forth that female leadership within family firms is linked with improved financial performance.

By examining the impact of female CEOs within the context of family firms, we can strengthen the overall argument of our thesis. Family firms often possess distinct characteristics, such as intergenerational dynamics, complex ownership structures and family values, which can significantly influence decision-making and performance. By exploring the relationship between female CEOs and financial performance within family firms, we expand the scope of our analysis and gain deeper insights into the interplay between gender diversity and these unique organizational dynamics.

Hypothesis 5: Boards compositions effect on financial performance

The fifth hypothesis we test is the following: *The proportion of female directors on a company's board significantly impact the firm's Return on Assets (ROA).* This implies that the gender composition of the board could play a vital role in influencing the company's financial performance. By investigating this, we aim to understand whether a higher proportion of female directors on the board is associated with changes in the firm's ROA. Factors such as board composition can shape the overall organizational environment and impact financial performance. Thus, a better understanding of this impact can contribute to a more nuanced understanding of the relationship between gender diversity and financial performance.

4.0 Data collection

4.1 Databases and sample selection

The data is obtained from the Centre for Corporate Governance Research (CCGR). The CCGR has a strong focus on non-listed companies, family businesses and the Norwegian corporate environment. As we will base our study solely on Norwegian firms, we have access to all necessary and relevant information through this data base.

Our study will be based on the 20 variables listed in Table 1 in the appendix. The variables selected captures various aspects of the companies under investigation and provide valuable insights into their characteristics and performance. They ensure that we have a comprehensive and robust foundation for our study, enabling us to examine and analyze the factors related to gender diversity, CEO appointments, and financial performance in Norwegian firms.

4.2 Data filtering

From the CCGR database we retrieved a sizable panel data set comprising 2.6 million firm-year data from 2000 to 2020. The data set includes multiple observations for every single firm, organized by accounting year. In this study, we combine panel regression analysis with theory to create our model. To ensure a comprehensive analysis, we

eliminate observations with missing data. This ensures that the regression numbers provide the most accurate overall view of the complete dataset.

The first step in filtering our data was to exclude observations with missing values for the CEO gender variable, which serves as our independent variable. Next, we remove inactive companies by excluding observations where total equity is zero or less, as well as values for total current assets and total fixed assets. To ensure that inactive companies have been eliminated, a filter is applied which removes all observations for a company if its sum of revenues equals zero. We also exclude observations with missing industry code, and those where board size equal zero, to analyze the proportion of female directors relative to board size. Lastly, we excluded observations where total other long-term liabilities were negative.

This screening process has been crucial to ensure accuracy of key performance metrics such as ROE and ROA, as well as other relevant metrics as leverage ratio and profit margin. It enables us to focus our analysis on active companies and explore the impact of CEO gender on the various financial and organizational metrics. The resulting data set compromises an unbalanced panel of 921 682 observation from a total of 160 091 individual companies.

4.3 Data variables

The purpose of this chapter is to provide a comprehensive understanding of the key variables selected which form the foundation of our study. Each variable has been selected based on its relevance to our research objectives and its potential to shed light on the impact of gender diversity in top leadership positions. These variables involve a range of dimensions, allowing us to examine the relationship between female CEOs and firm financial performance in Norwegian firms from 2000 to 2020. It will be important to control for variables to mitigate the risk of omitted variable bias, which may lead to bias in the regression analysis.

4.3.1 Firm Performance

The variable Firm Performance can be measured using financial ratios such as ROA, ROE and profit margin. In our master thesis we will mainly use ROA, as this is a widely

accepted and commonly used metric by investors and analysts to evaluate firms' financial performance. ROA provides insight into how effectively a company uses its assets to generate profits. While ROE only measures a company's profitability relative to its equity, ROA considers both its profitability and its asset utilization, which makes it a more robust measure of performance. Also, ROA is less influenced by a firm's leverage. Using ROA allows for comparability between companies regardless of size and industry. We define ROA as:

$$ROA_t = \frac{Net\ income_t}{Total\ assets_t}$$

However, we also recognize the significance of including ROE in our analysis. ROE offers a different perspective on the financial performance of a company by providing valuable insights into the profitability generated per unit of shareholder equity invested. By including ROE as an additional measure, we aim to gain a more comprehensive understanding of the relationship between gender and financial performance across multiple dimensions. We define ROE as:

$$ROE_t = \frac{Net\ income_t}{Total\ equity_t}$$

When measuring firm performance, it is important to consider not only the current state of financial indicators, but also their growth over time. To do so, we will use the Compounded Annual Growth Rate (CAGR) between the years 2000 and 2020. We define CAGR as:

$$CAGR_t = \left(\frac{Ending\ value}{Starting\ value}\right)^{\frac{1}{n}} - 1$$

In our study, we will use CAGR as a measure of growth for several key financial indicators: ROA, profit margin, and total operating revenues. By incorporating CAGR, we can account the compounding impact of growth, allowing for a more comprehensive analysis of how these financial metrics have evolved over time. This helps us understand how companies led by females perform and if they are sustainable in the long run, compared to companies led by men.

4.3.2 Capital structure

Capital structure's effect on companies' business choices is one of the most examined issues in corporate finance. It may affect both investment activity and corporate strategy (Parsons & Titman, 2008). Exploring differences in capital structure can provide insights into the financial risk profiles and funding strategies of the firms, contributing to a comprehensive understanding of the variables influencing firm performance and profitability.

The use of debt financing can provide tax benefits as interest payments on debt are tax-deductible. However, excessive use of debt financing can increase financial risk and interest expense, which may have a negative impact on financial performance. Also, the use of equity financing can help a company raise funds without incurring debt or interest expense, but it can also dilute the value of existing shares and reduce earnings per share which can negatively impact its financial performance.

Examining the capital structure, we will consider the debt-to-equity ratio, which we define as:

$$Leverage\ Ratio = \frac{Total\ Debt}{Total\ Equity}$$

where total debt is the sum of short-term and long-term liabilities. By considering this ratio, we can assess whether gender influences financial decision-making and capital structure choices.

4.3.3 Board of Directors composition

The composition of the board size of directors will be essential to control for as board diversity may be found to have an impact on firms' financial performance. Previous studies have found evidence that companies with more diverse boards tend to have better financial performance as they are more responsive to the needs of stakeholders and are better able to adapt to changing market conditions. A study done by Carter et al. conclude that there is "significant positive relationships between the fraction of women or minorities on the board and firm value" and that "the proportion of women and minorities on boards increases with firm size and board size but decreases as the

number of insiders increases (Carter et al., 2003). Also, a research report by McKinsey & Company, "Diversity Matters", found that companies with more diverse boards outperformed their peers in terms of financial performance. They found that those in the top quartile of boards diversity reported a 53% higher return than those in the bottom quartile (McKinsey&Company, 2015). Thus, it is essential to control for this variable in our study.

4.3.4 Company size

The variable "Company size" is measured by revenues. Larger firms in terms of revenues may have access to greater resources and economies of scale that could impact financial performance. Thus, accounting for this allows us to control for the impact of this important factor on financial performance and to examine whether there are any differences in the effect of the gender of the CEO on financial performance based on the size of the firm.

4.3.5 Capital intensity

Capital intensity refers to total assets over total number of employees. Hence, we define it as:

$$Capital\ intensity = \frac{Total\ assets}{Total\ number\ of\ employees}$$

This ratio provides valuable information about the structure and operational characteristics of a company. It indicates that a significant portion of the company's recourses is invested in assets such as equipment, property, and technology. A higher ratio implies that the company utilizes its assets effectively and maximizes the productivity of its workforce. It is important to note that this ratio can vary significantly across different industries, but it offers valuable insights into a company's efficiency and resource allocation.

4.3.6 Industry

The industry in which a firm operates can have a significant impact on its financial performance. Thus, it will be essential to control for to help ensure that any observed differences in performance are not simply due to differences in industry conditions.

The composition of industries and the distribution of CEOs within them play a crucial role in understanding the dynamics of gender diversity and leadership in organizations. Table 2 (see appendix) provides a comprehensive overview of the industry composition and CEO gender distribution in our data sample. As industry characteristics can influence dynamics and outcomes of gender diversity initiatives, it is crucial to have this understanding to explore the relationship between female CEOs and firm financial performance. Understanding the distribution of female and male CEOs within industries enables us to identify industries where female CEOs are more prevalent and assess whether these industries demonstrate different financial outcomes compared to those with a higher representation of male CEOs.

By presenting these industry-specific statistics, we aim to provide a comprehensive overview of the landscape in which our study is situated. This information serves as a foundation for our subsequent analysis and discussions, contributing to a more comprehensive understanding of the interplay between gender, leadership, and firm performance.

4.3.7 Ownership structure

We look into ownership structure to assess the effect of the CEO's gender more accurately on financial performance. The define ownership structure as family vs. non-family firms and is characterized as family firm if a single family holds the majority, meaning minimum of 50%, of the shares. Several studies suggest that family firms differ from non-family firms in ways that could impact their financial performance. For instance, some studies have found that family firms tend to prioritize long-term stability over short-term growth. A study by Gómez-Mejía et al. found that family-owned firms are more likely to prioritize socioeconomical wealth, such as preserving family control and maintaining the family's reputation, over financial wealth. (Gómez-Mejía et al.,

2007). Thus, this suggests that it is important to take into account ownership structure to assess the effect of CEO gender on financial performance.

4.4 Descriptive Statistics

The previous chapter presented an overview of the data variables used in this study, providing a comprehensive understanding of the relevant factors. In this chapter, to better understand the relationship between CEO gender and financial performance of the firms, we conduct a descriptive analysis of the data sample that offers insights into the characteristics and distribution of these variables. This chapter aims to provide a detailed summary of the data collected, enabling a comprehensive understanding of the sample, and setting the stage of the subsequent analysis. In the data sample including firm-year data for 160 091 different firms we find that the fraction of female CEOs was 16.20% and 83.80% male CEOs. See Table 3 in appendix for overview.

4.4.1 Proportion female CEOs

Figure 1 presents a visual representation of the percentage of female CEOs from 2000 to 2020. In 2000, the proportion of female CEOs was 12.89%, increasing to 18.57% by 2020. Notably, the presence of an unbalanced panel may impact these numbers to some extent, as some companies are excluded from the sample.

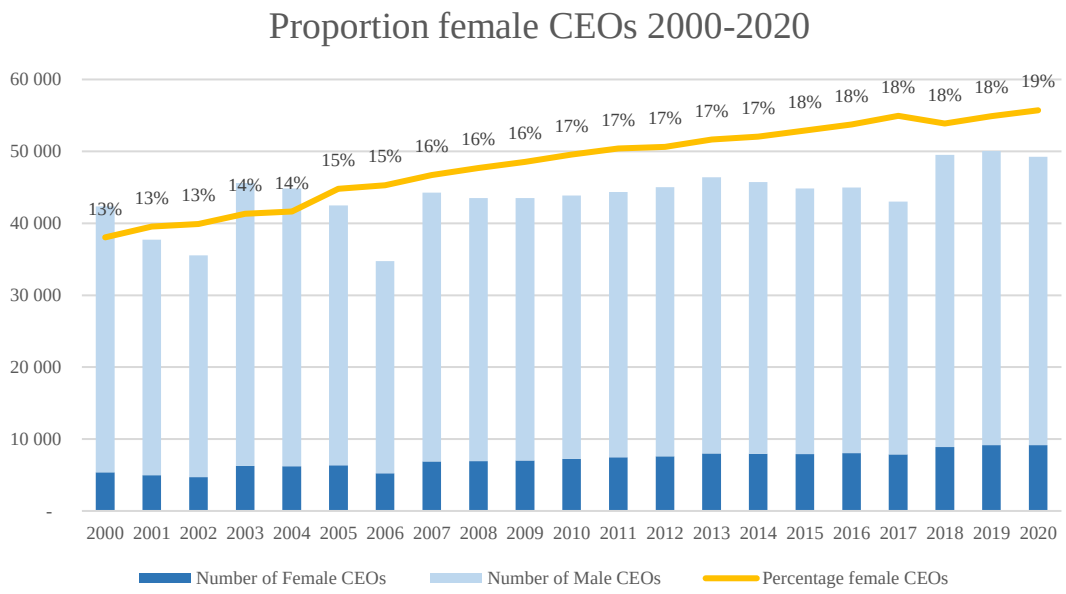

Figure 1 presents the proportion of female versus male CEOs in the total sample between the years 2000 and 2020.

In 2005 we observe the most significant increase in the proportion of female CEOs, with a rise of 1.05%. This could potentially be an effect of the Gender Quota Law Legislation, which may have had a positive effect on promoting gender diversity in executive positions. However, in 2018, there was a decrease of 0.38%. While the dip could potentially be explained by the presence of the unbalanced panel, such variations might naturally occur within the dataset. Multiple factors, such as random fluctuations or unique circumstances within specific industries, could account for this decrease.

4.4.2 Proportion female CEOs in new firms

New firms refer to firms that have been in operation for three years or less. This classification provides insight into representation of female CEOs among new firms. In the year 2000, approximately 15.02% of such firms were led by female CEOs. The proportion reaches a peak in 2017, with an increase to 22.20%. In 2018, this declines and remains relatively stable until 2020, with 19.86% of new companies having a female CEO. The significant dip we observe in 2017 is due to unbalanced panel and missing values.

While these findings indicate progress in gender diversity within the leadership of new Norwegian companies, the reasons behind the fluctuations and stabilization of these

proportions warrant further investigation. Factors such as changes in social attitudes, advancements in gender equality initiatives, or specific economic conditions during those years may have influenced the observed patterns.

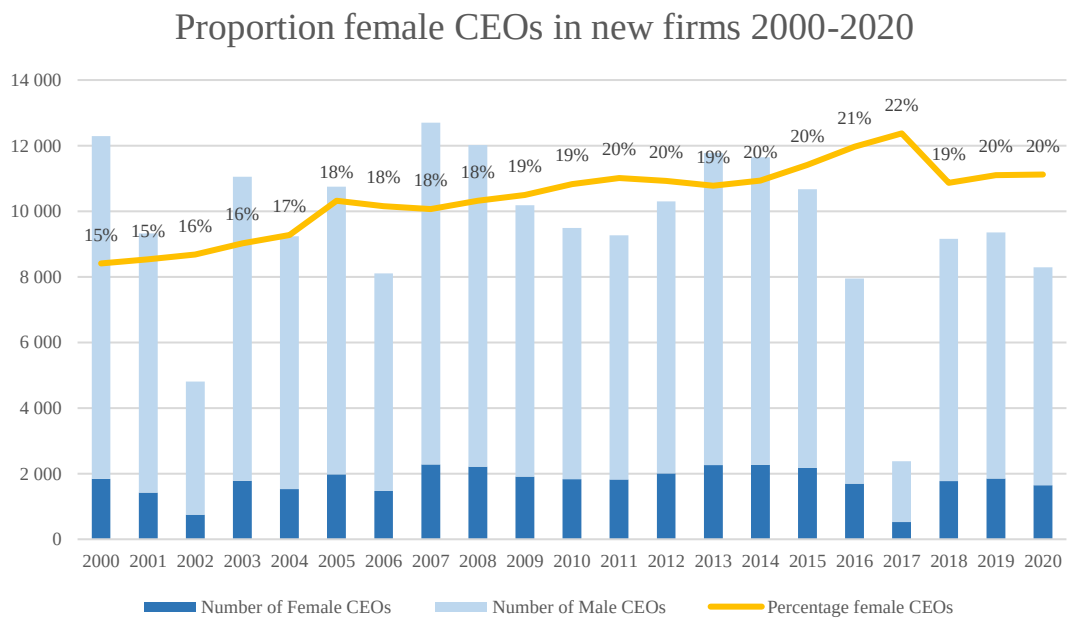

Figure 2 presents the proportion of female versus male CEOs in new firms between the years 2000 and 2020.

Compared to the proportion of female CEOs when looking at the entire sample, the proportion is consistently higher when we only consider new companies. There could be several reasons for this. The observed difference in the proportion of female CEOs between new and older companies can be attributed to the established leadership in older companies and the opportunity for gender diversity in the selection process of new companies. The proportion in older companies may increase at a slower pace compared to new companies because older companies already have established male CEOs, and therefore the transition to a new leader, as well as a potential change in gender, occurs less frequently.

Additionally, new companies start with a clean slate, and when it comes to considerations of legislation and gender balance, there is a greater opportunity for more women to be appointed as CEOs. The selection process for leadership roles in new companies provides a chance to prioritize gender diversity, leading to a higher

proportion of female CEOs. As a result, the proportion of female CEOs in older companies may experience a slower growth rate.

4.4.3 CEO proportion family firms vs. non-family firms

Figure 3 presents the development of proportion of female CEOs in family firms versus non-family firms. In 2000, the percentage of female CEOs in non-family firms was recorded at 11.67%, which experienced an increase to 18.73% by 2020. From 2000 until 2011, we observe a slightly higher proportion of female CEOs in family firms, starting at 13.06% in 2000. However, from 2012 and until 2020, non-family firms actually have a slightly higher proportion of female CEOs, except in the years 2016 and 2018. Yet, this difference is minimal.

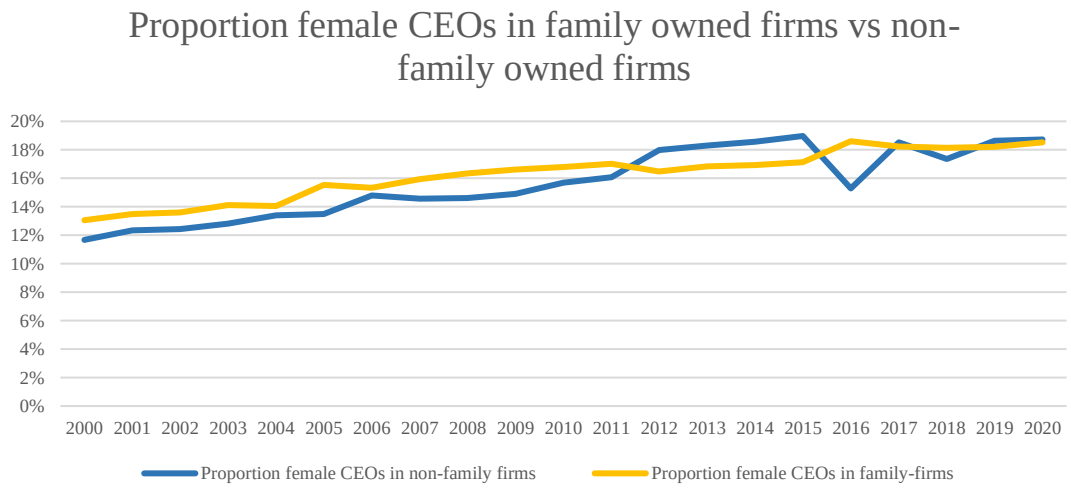

Figure 3 presents the development in proportion of female CEOs in Norwegian family firms versus non-family firms between year 2000 and 2020.

Notably, the sudden dips we observe, may be explained by the presence of an unbalance panel, which might have influenced the representation of female CEOs. Another potential explanation for these findings is that the emphasis on gender diversity and its influence on CEO appointments may have had a relatively lesser impact on family firms compared to non-family firms. As social attitudes have shifted, non-family firms may have stronger incentive to prioritize the hiring of female CEOs in order to align with evolving social expectations. On the other hand, family firms, which often operate

within their own unique dynamics and traditions, might be less influenced by this broader trend, and therefore exhibit a lower proportion of female CEOs.

Similar to observations from the whole sample, looking at only new firms, we observe a higher proportion of female CEOs in family firms compared to non-family firms. The proportions are illustrated in Figure 4.

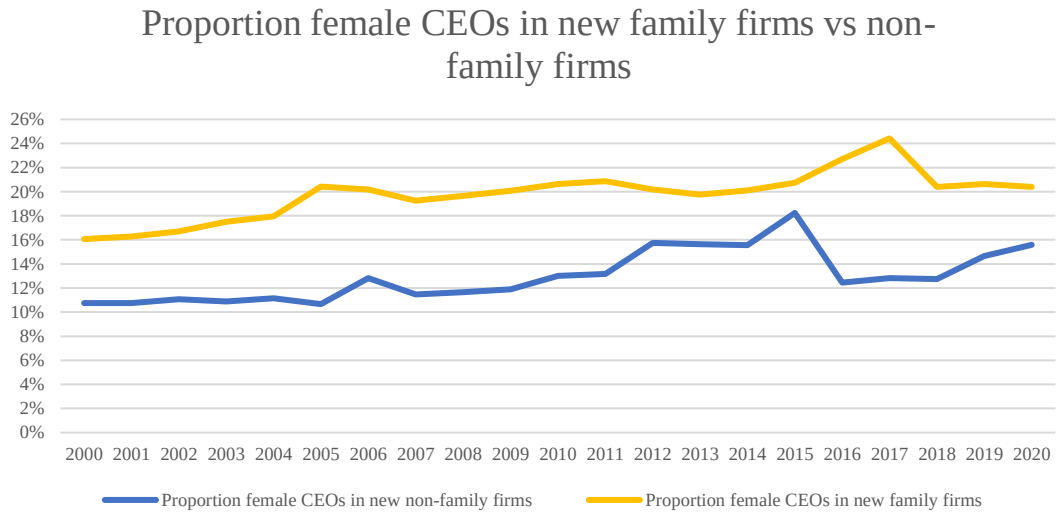

Figure 4 presents the development in proportion of female CEOs in new Norwegian family firms versus non-family firms between year 2000 and 2020.

Notably, the proportion of female CEOs is higher in new family firms compared to the overall sample of family firms. Conversely, in the case of new non-family firms, the proportion of female CEOs is lower compared to the overall sample of non-family firms. Intuitively, one may expect that the proportion of female CEOs in new firms would be higher regardless of ownership structure. However, this is not observed in the data.

One potential explanation for the lower proportion of female CEOs in new non-family firms compared to the overall sample of non-family firms could be related to the role of CEO as entrepreneur. In new firms, compared to old firms, it is more common for the CEO to be the entrepreneur themselves. If we assume that there are factors that tend to favor male entrepreneurs, such as access to sources, likelihood to find outside investors, or social biases, this may result in a lower proportion of female CEOs in new non-family firm compared to the overall sample of non-family firm. However, this

explanation is not aligned with what we observe in new family firms versus total sample of family firms. The inconsistency may be explained by factors such as family dynamics a succession planning, trends, and generational shifts. The underlying dynamics influencing the proportion of female CEOs in different firm types should be examined conducting further analysis.

4.4.4 Board size

The number of board directors in a firm is represented by the variable "Board size". The average board size and the median value in our sample is 2.08 and 2, respectively. This indicates that 50% of the companies have either 2 or less board directors. We find that both male and female CEOs have firms with a maximum board size of 14 members. Moreover, companies led by female CEOs have an average of 2.14 board members, whereas those led by male CEOs have an average of 2.08. This suggests that, on average, firms with female CEOs tend to have slightly larger boards compared to those with male CEOs. The reason for this observation is not clear, however, it might indicate a preference among larger boards for selecting female CEOs.

4.4.5 Number of employees

The average number of employees for the entire data sample is 5.24, while the median reveals that 50% of the companies have 2 or less employees. The largest male led company in the dataset has 4 477 employees, while the largest led by a female CEO has only 608 employees. However, we find that on average, firms with female CEO's have slightly higher number of employees than firms with male CEO's, with 5.27 compared to 5.23, respectively. Also, there are a lot more male CEOs in the data sample. In our entire dataset, only 16.20% of the CEO's are female. This indicates that there is a significantly larger number of firms where the only employee is the male CEO, as 50% of the firms has 2 or less than to employees.

Solely looking at data from companies founded after 2015, we observe that these new companies have an average of 3.92 number of employees, with 50% of the firms having 1 or less employees. Compared to the average of the entire data sample, the proportion of female led companies have increased to 19.82%. Companies with female CEO's still

have a slightly higher average number of employees, 4.43, than firms with male CEOs, 3.79. The higher prevalence of male entrepreneurs and their firms' smaller employee count may contribute to the slightly larger average number of employees in companies with female CEOs. Also, larger firms may be more likely to choose female CEOs. To conclude, we observe that female-led companies in general have a slightly larger company size, measured in number of employees.

4.4.6 Company size

Company size in terms of "total operating revenue" results in, on average for the whole sample, operating revenues of 8.20 MNOK. The median is 2.93 MNOK, meaning that 50% of the companies have less or equal total operating revenues of 2.93 MNOK. On average, companies with male CEOs have a total operating revenue of 8.67 MNOK while companies with a female CEOs have 5.75 MNOK. There are several factors that play a role in this, both the amount of equity in the firm, total assets, and which industry the firm operates in.

4.4.7 Total assets

The variable "total assets" for the whole data sample shows an average of 6.98 MNOK, and a median of 2.22 MNOK. This means that 50% of the companies have assets of 2.22 MNOK or less. For a male CEO the average amount of assets the company holds is 7.48 MNOK and for female CEOs the average is 4.43 MNOK, which is 40% less than the male average. Conducting a t-test, we find that there is a significant difference on the average assets of the firm when the CEO is a female versus male. When we control for company size in terms of number of employees and total equity, female CEOs has a positive effect on total assets. See appendix, table 3.

4.4.8 Firm Performance

The industry accounting for the greatest ROA is the Public administration, health and education sector with a ROA equal 14.33%. When we analyze companies within industries based on gender and calculate ROA separately, this sector still maintains its position as the industry with highest ROA for both male-led and female-led companies, with 16.16% and 11.74%, respectively.

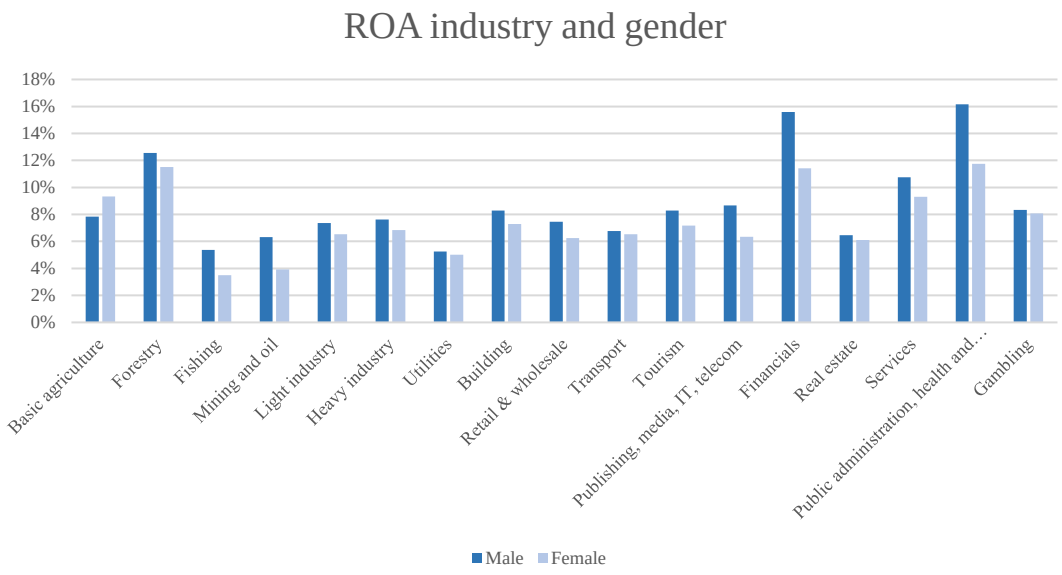

Figure 5 presents the average ROA withing each industry, highlighting the gender-based distinctions.

To examine trends in financial performance, such as ROA, profit margin and total operating revenues, we look at the CAGR. The observed CAGR (2000-2020) for ROA of 3.57% for female-led companies and 2.77% for male-led companies suggest that, on average, female-led companies have experienced a higher growth rate in profitability compared to male-led companies. This indicates a potential positive association between having a female CEO and financial performance, as measured by ROA.

When considering the profit margin, both female and male CEOs experienced positive growth rates. The mean CAGR for profit margin is 4.02% for female CEOs and 4.07% for male CEOs, suggesting that male CEOs have a slightly higher average growth rate. Regarding total operating revenue, male CEOs exhibited a higher mean CAGR of 6.60% compared to female CEOs with a mean CAGR of 5.97%. This indicates that male-led companies, on average, experienced a slightly stronger growth in their total operating revenue during this period. See Table 4 in appendix for overview.

4.4.9 Industry

Table 2 in the appendix provides a comprehensive overview of the industry composition and CEO gender distribution in our data sample. We observe significant variations in the proportion of female CEOs across industries, such as Public

administration, health and education (41.48%), Publishing, Media, IT, Telecom (11.56%), and Mining and oil (3.84%). This suggests that certain industries may have made more progress in promoting and appointing female CEOs, while others still exhibit a notable gender imbalance at the executive level. The information about the portion of each industry within the total sample can be relevant for assessing the general representation and influence on different industries in the overall analysis of gender diversity and its impact on firm performance.

Public administration, health and education (41.48%), Gambling (39.08%), Tourism (32.97%) and Services (25.55%) are the industries with the greatest proportion of female CEOs. While these industries showcase a notable presence of women in leadership positions, it is important to note that they do not represent a sizable portion of the overall sample.

Light industry (11.12%), Retail & Wholesale (12.51%), Services (11.04%), and Building (25.16%) accounts for the largest portions of the industries. Among these, the proportion of female CEOs are 20.12%, 21.54%, 25.55% and 6.21%, respectively. The average proportion of female CEOs for all industries, is 17.52%. Thus, apart from the latter (Building), these stands out as some of the industries with higher proportion of female CEOs.

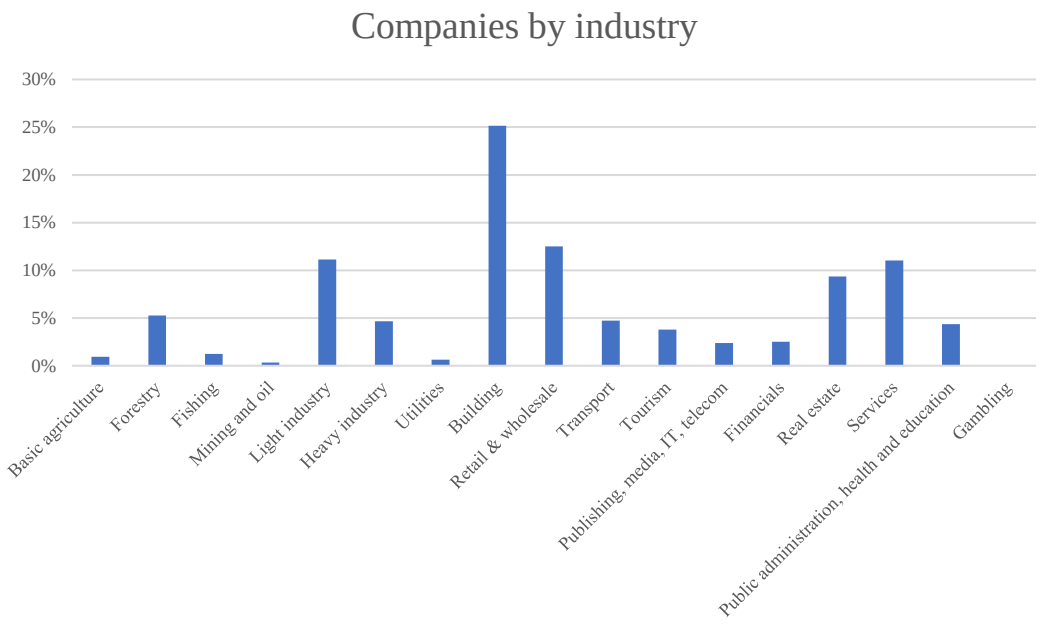

Figure 6 presents the proportion of each industry in the total sample.

5.0 Methodology

This thesis aims to examine the association between CEO gender and a company's financial performance using an OLS model in RStudio. For this investigation, several regression analyses are used to analyze the data. In our study we use existing data collected from the CCGR database, making the thesis a quantitative study. We are working with panel data, as our data set combines both cross-sectional and time-series data in a single data set. This way we can study the relationship between our variables and how they change over time. It enables us to control for time-invariant individual characteristics.

Further, we have specified a statistical model that represents the relationships between our variables. We have created dummy variables for categorical variables such as CEO gender, year, and industry. The year dummy allows us to control for firm-invariant time effects. Additionally, we include industry fixed effects to adjust for inherent, constant characteristics of each firm's specific industry. In our research, we utilized a logistic regression model to analyze whether a CEO is female based on various company attributes. This approach provides more than just a binary result; it estimates the

probability, enabling us to better understand the blend of factors that influence the likelihood of a CEO being female.

A variety of models are analyzed, each with distinct dependent variables, and different subsets of the original data. This includes different models from the whole sample, and what we have defined as new firms, and family firms. The dependent variables used in the models is different representation of financial performance, such as ROA, ROE, CAGR, Profit Margin, and ΔROA. Based on the estimates we got from our statistical model we have tested our hypothesis about the relationship between CEO gender and financial performance. We use a t-test to determine whether there is a significant difference in firms' financial performance with female CEOs compared to those with male CEOs. This is an appropriate method as it allows us to compare the means of the two groups and determine whether there is a significant difference between them.

5.1 Validity of results

In the process of ensuring the robustness of our panel data analysis, we have taken diligent measures to address potential issues, one of which being multicollinearity among predictors. If the variables are highly correlated it increases the standard errors of regressors and might cause bias in their significance. In the correlation matrix which is presented in Table 5 (see appendix) we observe that there is no high correlation between the variables of interest. The observed correlation between total assets and total liabilities is the highest among the variables, with a value of 0.94. However, it is important to note that since we will not include both variables as independent variables in the same regression model, the correlation between them is not directly problematic.

Further, we assessed multicollinearity in our model through the calculation of Variance Inflation Factors (VIFs). Generally, VIF values below 5 are deemed satisfactory (Brooks, 2019), and our primary variables of interest fall within this range, further confirming the absence of serious multicollinearity in these components of our model. However, it is important to note that the VIF values for our industry dummy variables exceeded 10, indicating high multicollinearity. This is not uncommon or necessarily problematic, as it can be expected that industry variables will share certain characteristics and thus be correlated. The high VIF values observed signify shared

variance among these industry variables, which doesn't bias the overall model fit or prediction, but could complicate interpretation of individual coefficients. Therefore, despite the high VIF values for industry variables, our analysis indicates that the overall model is well-specified, and any issues of multicollinearity have been sufficiently addressed. We have taken necessary precautions to ensure the reliability and validity of our findings.

Also, we check for heteroscedasticity. If the variance of the error term is not constant across all observations, we risk invalid statistical inferences and incorrect confidence intervals. To check for heteroscedasticity, we applied the White test. By examining the pattern of the residuals, we could assess if their variance remained constant or if it differed at different levels of our independent variables, including CEO gender, capital intensity, company age, leverage ratio, total equity, revenue volatility, and total operating revenue. The spread of the residuals remained about the same across all levels of these variables and we can be confident that our model meets the assumption of homoscedasticity.

Endogeneity is one of the most important and persistent issues one confronts in empirical studies in corporate finance. This is defined as a correlation between the explanatory variable and the error term in a regression. Endogeneity leads to biased estimates. One potential source to endogeneity is omitted variables, which are variables that should be amongst the explanatory variables but are not included. These variables show up in the error term, u. If these are uncorrelated with the included variables in the model, there is no problem. However, if they do correlate, it leads to an endogeneity problem (Roberts & Whited, 2013). In our attempt to address the endogeneity concern, we have carefully selected several control variables to be included across the models. These control variables will help account for potentially omitted variables, thereby minimizing the risk endogeneity and ensuring more reliable and valid results.

Table 3: *This table shows descripitve statistics for variables describing different firm caracteristics The population is private owned Norwegian firms. Each section shows the number of obseravtions (N), the estimated mean, and median values. ROA winsorized is income before extraordinary times divided by total assets then winsorized to remove outliers. Leverage ratio winsorized is total liabilities devided by total equity and then winsorized to remove outliers. Profit margin winsorized is total operating revenue devided by is income before extraordinary times and then winsorized to remove outliers. ROE winsorized is income before extraordinary times devided by total equity and den winsorized to remove outliers. Log total operating revnue is the natural logarithm of total operating revenue. ROA, leverage ratio, profit margin, ROE, Log total operating revenue are winsozired at 1% and 99%.*

Whole sample			Male CEO		Female CEO		Male CEO's-Female CEO's		
Variable	Mean	Median	Mean	Median	Mean	Median	Mean	t test	Median
Total Operating Revenue	8 200 017	2 936 000	8 673 768.12	3 018 000	5 748 780	2 641 000	2 924 988	<.0001	377 000
Total Current Assets	4 719 909	1 184 000	5 075 796.94	1 253 000	2 878 508	924 000	2 197 289	<.0001	329 000
Total Equity	2 722 000	628 000	2 867 104.21	676 000	1 971 215	429 000	895 889	<.0001	247 000
Total other Long term liabilities	1 760 138	82 000	1 880 079.85	101 000	1 139 545	-	740 535	<.0001	101 000
Total Current Liabilities	3 210 830	751 000	3 486 658.99	796 000	1 783 666	582 000	1 702 993	<.0001	214 000
CEO Salary	315 382	273 000	320 724.46	279 000	287 740	247 000	32 984	<.0001	32 000
Board Size	2	2	2.08	2.00	2.14	2.00	- 0.06	<.0001	-
Number of female directors	0	-	0.26	-	1.18	1.00	- 0.92	<.0001	- 1.00
Total fixed assets (Tangible)	2 264 464	358 000	2 402 488.46	402 000	1 550 309	188 000	852 180	<.0001	214 000
Share owned by CEO (Direct ownership)	60	52	60.94	58	56	50	5.30	<.0001	8.33
Dividens payable	201 765	-	213 091.90	-	143 156	-	69 935	<.0001	-
Number of Employees	5.24	2.00	5.23	2.00	5.27	3.00	- 0.04	<.0001	- 1.00
Company Age	12.2	9.0	12.29	9.00	11.66	8.00	0.63	<.0001	1.00
Aggregated Fraction held by Female Owners (Ultmate ownership)	-	-	-	-	-	-	-		-
Income before extraordinary times	458 781	133 000	478 183.99	143 000	358 391	92 000	119 793	<.0001	51 000
Is independent (ultmate ownership)	1	1	1.00	1	1	1	-		-
Largest family sum ult ownership	80	100	79.38	100	82	100	- 2.98	<.0001	-
Total Liabilities	4 970 968	1 358 000	5 366 738.84	1 468 000	2 923 211	941 000	2 443 528	<.0001	527 000
Total Assets	6 984 372	2 217 000	7 478 285.40	2 387 000	4 428 817	1 528 000	3 049 469	<.0001	859 000
ROA winsorized	0.08529	0.0666	0.0862	0.0670	0.0806	0.0641	0.0056	<.0001	0.0030
Leverage Ratio winsorized	5.33	2.14	5.3246	2.1417	5.3836	2.1048	- 0.0589	>0.05	0.0369
Profit margin winsorized	0.08	0.04	0.0775	0.0457	0.0665	0.0357	0.0110	<.0001	0.0101
ROE winsorized	0.27	0.19	0.2773	0.1944	0.2391	0.1833	0.0382	<.0001	0.0111
Log Total operating revenue	15	15	14.80	15	15	15	0.1561	<.0001	0.1334
CEO Age	49	49	49.81	50	47	47	2.4884	<.0001	3.0000
Number of observations	921 682		772 400		149 282		921 682		

Hypothesis 1: Difference in financial performance based on CEOs gender

There is a significant difference in the financial performance of firms with female top CEOs compared to those with male CEOs.

$$Dependent\ variables_{i,t} = \beta_0 + \beta_1 Female\ CEO_{i,t} + \beta_2 X_{i,t} + u_i + \epsilon_{i,t}$$

$Where$:

$Dependent\ variables_{i,t}$	$ROA, ROE, Profit\ margin, CAGR\ ROA\ of\ firm\ t\ at\ time\ t$
$Female\ CEO_i$	$Dummy\ variable. Value\ 1\ if\ CEO = female$
X_i	$Vector\ of\ control\ variables\ (Log\ Capital\ intensity, Company\ age, Log\ total\ equity, Log\ total\ operating\ revenue, Revenue\ volatility, Leverage\ ratio, Year\ effects\ and\ industry\ fixed\ effects)$
u_i	$Unobserved\ random\ effects$
$\epsilon_{i,t}$	$Error\ terms$

Hypothesis 2: Change in CEO genders' impact on firms' financial performance

A change in the CEO's gender from male to female significantly impacts the firm's Return on Assets (ROA).

$$Dependent\ variables_{i,t} = \beta_0 + \beta_1 Female\ CEO_{i,t} + \beta_2 X_{i,t} + u_i + \epsilon_{i,t}$$

$Where$:

$Dependent\ variables_{i,t}$	$\Delta ROA\ of\ firm\ t\ at\ time\ t$
$Female\ CEO_i$	$Dummy\ variable. Value\ 1\ if\ CEO = female$
X_i	$Vector\ of\ control\ variables\ (Log\ Capital\ intensity, Company\ age, Log\ total\ equity, Log\ total\ operating\ revenue, Revenue\ volatility, Year\ effects\ and\ industry\ fixed\ effects)$
u_i	$Unobserved\ random\ effects$
$\epsilon_{i,t}$	$Error\ term$

Hypothesis 3: Female CEOs impact on new firms' financial performance

Female CEOs significantly improve the financial performance of new firms.

$$Dependent\ variables_{i,t} = \beta_0 + \beta_1 Female\ CEO_{i,t} + \beta_2 X_{i,t} + u_i + \epsilon_{i,t}$$

$Where$:

$Dependent\ variables_{i,t}$	$ROA\ of\ firm\ t\ at\ time\ t$
$Female\ CEO_i$	$Dummy\ variable. Value\ 1\ if\ CEO = female$
X_i	$Vector\ of\ control\ variables\ (Log\ Capital\ intensity, Company\ age, Log\ total\ equity, Log\ total\ operating\ revenue, Year\ effects\ and\ industry\ fixed\ effects)$
u_i	$Unobserved\ random\ effects$
$\epsilon_{i,t}$	$Error\ term$

Hypothesis 4: Female CEOs impact on family firms' financial performance

Female CEOs significantly improve the financial performance of family firms.

$$Dependent\ variables_{i,t} = \beta_0 + \beta_1 Female\ CEO_{i,t} + \beta_2 X_{i,t} + u_i + \epsilon_{i,t}$$

$Where$:

$Dependent\ variables_{i,t}$	$ROA\ of\ firm\ t\ at\ time\ t$
$Female\ CEO_i$	$Dummy\ variable. Value\ 1\ if\ CEO = female$
X_i	$Vector\ of\ control\ variables$ ($Log\ Capital\ intensity, Company\ age, Log\ total\ equity, Log\ total\ operating\ revenue, Revenue\ volatility, Year\ effects\ and\ industry\ fixed\ effects$)
u_i	$Unobserved\ random\ effects$
$\epsilon_{i,t}$	$Error\ term$

Hypothesis 5: Boards compositions effect on financial performance

The proportion of female directors on a company's board significantly impact the firm's Return on Assets (ROA).

$$Dependent\ variables_{i,t} = \beta_0 + \beta_1 Proportion\ female\ directors_{i,t} + \beta_2 X_{i,t} + u_i + \epsilon_{i,t}$$

$Where$:

$Dependent\ variables_{i,t}$	$ROA\ of\ firm\ t\ at\ time\ t$
X_i	$Vector\ of\ control\ variables\ (Log\ Capital\ intensity, Company\ age, Log\ total\ equity, Log\ total\ operating\ revenue, Revenue\ volatility, Year\ effects\ and\ industry\ fixed\ effects)$
u_i	$Unobserved\ random\ effects$
$\epsilon_{i,t}$	$Error\ term$

5.2 Fixed effects and firm characteristics

In Table 3 above, we observe various characteristics of firms that have a female or male CEO. Noting the differences in firm attributes, we have selected several control variables. This allows us to compare firms with similar characteristics and understand how the gender of the CEO influences financial performance. The variables we have included in the regression, which could potentially affect financial performance, are: capital intensity, company age, log total equity, log total operating revenues, revenue volatility, and leverage ratio.

Capital intensity is included as a control variable to account for the amount of assets a firm possesses relative to its employees. By controlling for capital intensity, we can better comprehend the relationship between the CEO's gender and the firm's financial performance, without the influence of how capital-intensive the business operations are.

Company age is controlled for as the age of a firm can influence its financial performance. The firm's age can affect several aspects of its operations and performance, including financial stability, reputation, consumer loyalty, and market share. Furthermore, we use log-total equity as a control variable to account for the firm's financial standing. The total equity can impact the firm's ability to invest, borrow, and manage risk. Log total operating revenues are utilized as a control variable in the regressions to account for the size of the company in terms of its operations. Larger companies, measured in total operating revenue, might have larger resources at their disposal, which can influence financial performance. Thus, by controlling for log total operating revenue, we ensure that any observed differences in financial performance can be attributed more accurately to the CEO's gender, rather than the differences in size.

Revenue volatility is used as a control variable since high revenue volatility often implies greater uncertainty and risk. Finally, we use the leverage ratio as a control variable to help us account for the proportion of debt a firm has relative to its assets. High leverage can signify greater risk as the firm relies more on borrowed money to

operate and grow, but it can also enhance returns in successful operations. Notably, the leverage ratio is only included in regression 6.3.

In our analysis, we also consider the potential influence of broader economic and industry-specific factors. Thus, we integrate year fixed effects into our statistical model. By controlling for the year, we account for any shifts in the economic climate and the business cycle. This could include periods of economic growth or contraction, or other time-specific events that could impact a firm's financial performance regardless of the CEO's gender.

Furthermore, we use industry fixed effects to adjust for the inherent and consistent characteristics tied to each firm's specific industry. Each industry has its own unique features and challenges, including varying levels of competitiveness, profitability, growth rates, and exposure to market volatility. For example, technology firms may face different business dynamics compared to those operating in the manufacturing or retail industry. By controlling for industry fixed effects, we ensure that the impact of these industry-specific characteristics is accounted for in our analysis.

By incorporating both year and industry fixed effects, our study aims to isolate the effects of the CEO's gender on financial performance. This methodology ensures that the observed differences in financial performance are not simply due to changes in the economic environment over time or inherent differences across industries but are more accurately associated with the CEO’s gender.

6.0 Results and discussion

In this part we will present, analyze, and interpret our findings. We will delve into key results and provide a comprehensive discussion of their implications, contributing to the understanding of the relationship between gender of CEO and firm performance. This includes both the main hypothesis, that *There is a significant difference in the financial performance of firms with female CEOs compared to those with male CEOs*, in addition to the supplementary hypotheses presented initially. We begin by presenting the logistic regression to give a better understanding of what types of firms possess a

female CEO. All regressions are conducted using RStudio. The procedure is described in the methodology part.

6.1 Logistic regression on gender – whole sample

Table 6.1: The table exhibits results from a logistic regression, where CEO gender (1 for female, 0 for male) is the dependent variable predicted by an array of firm characteristics, along with year and industry controls. The interpretation follows the standard logistic regression interpretation, where coefficients represent the change in the log odds of having a female CEO per unit change in the predictor, holding all other variables constant. The model includes company size, age, equity, revenue metrics, revenue volatility, and proportion of female directors as predictors. The coefficients that are statistically significant at the 0.01, 0.05, and 0.1 levels are marked with ***, **, *, and ", respectively.

Dependent variable: Gender

Independent variable			
	Estimate	Std. Error	z value
(Intercept)	1.2278 ***	0.0901	13.6268
Female directors proportion	4.7351 ***	0.0141	336.1977
Log Capital intensity	-0.0560 ***	0.0014	-39.4996
Company Age	-0.0062 ***	0.0004	-14.6274
Log Total Equity	-0.0383 ***	0.0039	-9.8519
Log Total operating revenue	-0.2109 ***	0.0055	-38.1851
Revenue Volatility	-0.4384 ***	0.0197	-22.2395
Year fixed effects	Yes		
Industry fixed effects	Yes		
Number of observations	630 886		

From the significant predictors at the 1% significant level, female directors' proportion has a positive coefficient of 4.7351. This translates to a 49.13% increase in the probability of the firm having a female CEO and tells us that firms that have a bigger proportion of female directors on the board tend to choose female CEOs. Further, we observe a negative coefficient of -0.0560 for the log capital intensity. This means that a one-unit increase in log capital intensity decreases the probability of the CEO being female by 1.40%. Thus, it indicates that it is less likely to observe a female CEO in more capital intense firms.

The variable for Company age also shows a negative coefficient of -0.0062, which translates to a 0.16% decrease in the probability of the CEO being female. This tells us that firms with male CEOs are slightly older than those with a female CEO. Furthermore, the natural logarithm of total equity has a negative coefficient of -0.0383. This implies that an increase in log total equity decreases the probability of the CEO being female by 0.97%. It indicates that female CEOs tend to control firms with less

equity compared to firms with male CEOs. Similarly, the coefficient for log total operating revenue is negative as well, with a value of -0.2109. This suggests that a one-unit increase in log total operating revenues deceases the probability of the CEO being female by 5.25%.

Finally, the coefficient for revenue volatility is -0.4384, indicating that a one-unit increase in revenue volatility leads to an 10.79% decrease in the probability of the firm having a female CEO. This result suggests that firms with female CEO have lower revenue volatility than firms with male CEOs.

6.2 Effect on ROA, OLS regression – whole sample

Table 6.2: The table exhibits the result of an OLS regression with ROA as the dependent variable. The independent variables are CEO gender (1 if female and 0 if male), log capital intensity (natural logarithm of assets to employees), company age, the natural logarithm of total equity, the volatility of the revenues, the natural logarithm of total operating revenues, and controlling for year, and industry. The table illustrates the coefficient, the significance level, standard error, and the t-value. The significance levels are *=10%, **=5%, ***=1%.

Dependent variable: ROA

Independent variable			
	Estimate	Std. Error	t value
(Intercept)	-0.5249 ***	0.0043	-121.7633
gender	-0.0038 ***	0.0006	-6.3054
Log Capital intensity	0.0059 ***	0.0001	93.4443
Company Age	-0.0011 ***	0.0000	-56.6260
Log Total Equity	0.0131 ***	0.0002	70.0225
Revenue Volatility	-0.0357 ***	0.0009	-40.9889
Log Total operating revenue	0.0288 ***	0.0003	111.2382
Year fixed effects	Yes		
Industry fixed effects	Yes		
Adj. R-squared	0.0743		
Number of observations	630 886		
Number of firms	160 091		

Examining the regression results, all coefficients are significant at the 1% level. The gender variable exhibits a negative coefficient, indicating that female-led firms underperform slightly in terms of ROA by 0.38%. This suggests that male-led firms perform better, even when controlling for company size, industry, and years. On the other hand, log capital intensity shows a positive coefficient, indicating that an increase in capital intensity leads to a 0.59% increase in ROA. Additionally, a one-year change in company age decreases the ROA by 0.11%. This suggests that older and more mature

companies struggle to generate the same return on their assets as newer companies, often due to slower growth.

Moreover, log total equity exhibits a positive coefficient, indicating that firms with a larger equity base generate, on average, a 1.31% higher ROA given a one-unit change in log total equity. This could be attributed to having more capital and the ability to invest in projects that other firms may be constrained from pursuing due to financial limitations. For firms with more volatile revenues, the ROA decreases by 3.57% with a one unit increase in revenue volatility. Lastly, a one unit increase in log total operating revenues is associated with a 2.88% increase in ROA. This suggests that larger firms in terms of revenues have the capacity to generate higher returns given their assets.

6.3 Effect on ROE, OLS regression – whole sample

Table 6.3: The table exhibits the result of an OLS regression with ROE as the dependent variable. The predictors include CEO gender (1 if female and 0 if male), log capital intensity (natural logarithm of assets per employee), company age, the natural logarithm of total operating revenues, volatility of revenues, and leverage ratio. The regression also accommodates control variables for year and industry. The output displayed entails the estimated coefficients, their standard errors, t-values, and the significance levels, marked as *=10%, **=5%, ***=1%.

Dependent variable: ROE

Independent variable			
	Estimate	Std. Error	t value
(Intercept)	-2.4684 ***	0.0268	-92.2541
gender	-0.0283 ***	0.0038	-7.5066
Log Capital intensity	0.0197 ***	0.0004	50.7044
Company Age	-0.0045 ***	0.0001	-37.1366
Leverage Ratio	-0.0154 ***	0.0001	-109.6380
Log Total operating revenue	0.1856 ***	0.0014	133.3376
Revenue Volatility	-0.1133 ***	0.0054	-21.1137
Year fixed effects	Yes		
Industry fixed effects	Yes		
Adj. R-squared	0.0695		
Number of observations	630 886		
Number of firms	160 091		

When examining ROE, similar to the correlation observed with ROA, we find that gender exhibits a negative association with ROE. Also, if the CEO is female, it indicated a 2.83% decrease in ROE. This negative association is more pronounced compared to the effect on ROA, suggesting that female CEOs may find it more challenging to generate the same level of ROE as their male counterparts. On the other

hand, log capital intensity shows a positive coefficient, indicating that ROE increases by 1.97%, when firms can efficiently utilize their assets to generate profits.

Company age also has a slight negative effect on ROE, by 0.45% per unit increase. Furthermore, a one-unit increase in leverage ratio is associated with a 1.97% decrease in ROE. A higher leverage ratio suggests a higher degree of indebtedness and therefore higher financial risk. The negative association between leverage ratio and ROE suggests that as firms take on more debt relative to their equity, the returns provided to the equity holders decrease.

In contrast, log total operating revenue appears to have a more substantial impact on ROE, with a one-unit increase in log total operating revenue leading to an 18.56% increase in ROE. This suggests that firms with higher operating revenues also tend to perform better in terms of ROE. Additionally, revenue volatility has a negative coefficient, resulting in an 11.33% decrease in ROE for a one-unit increase in volatility. This emphasizes that a higher volatile stream of revenues can impact financial performance.

6.4 Effect on Profit Margin, OLS regression – whole sample

Table 6.4: The table exhibits the result of an OLS regression with Profit Margin as the dependent variable. The predictors encompass CEO gender (1 if female and 0 if male), log capital intensity (natural logarithm of assets per employee), company age, the natural logarithm of total equity, the natural logarithm of total operating revenues, and the volatility of revenues. The regression also incorporates control variables for year and industry. The displayed output includes the estimated coefficients, their standard errors, t-values, and the significance levels, marked as *=10%, **=5%, ***=1%.

Dependent variable: Profit Margin

Independent variable			
	Estimate	Std. Error	t value
(Intercept)	-0.7616 ***	0.0073	-104.0558
gender	0.0097 ***	0.0010	9.3958
Log Capital intensity	0.0122 ***	0.0001	113.9340
Company Age	0.0004 ***	0.0000	10.5694
Log Total Equity	0.0191 ***	0.0003	60.2400
Log Total operating revenue	0.0348 ***	0.0004	79.0966
Revenue Volatility	-0.0828 ***	0.0015	-56.0029
Year fixed effects	Yes		
Industry fixed effects	Yes		
Adj. R-squared	0.0513		
Number of observations	630 886		
Number of firms	160 091		

Differing from ROA, the coefficient for gender demonstrates a positive value in relation to profit margin. This implies that having a female CEO is associated with a 0.97% increase in the profit margin, meaning that firms led by female CEOs tend to convert a higher proportion of their revenues into profits. One possible explanation for this could be that female CEOs may prioritize profitability over aggressive growth.

Furthermore, log capital intensity exhibits a positive effect on the profit margin, indicating that firms which efficiently utilize their asset per employee achieve better profit margins. Our results find that a one-unit increase in log capital intensity is associated with a 1.22% increase in profit margin. Also, company age seems to have a minor effect, increasing the profit margin by 0.04%. Although the impact is small, this suggests that more mature firms have enhanced cost management capabilities. Furthermore, a one-unit increase in log total equity is associated with a 1.91% increase in the profit margin. This could imply that firms with a larger equity base have reduced

debt, leading to a higher profit margin. Larger companies in terms of equity can benefit from economies of scale, reducing unit costs and boosting the profit margin.

Log total operating revenue exhibits a positive effect, increasing the profit margin by 3.48%. This could be attributed to economies of scale and larger market power, allowing larger companies in terms of operating revenues to charge higher prices and achieve higher profit margins. Once again, revenue volatility emerges as a significant variable influencing financial performance. A one-unit increase in revenue volatility indicates greater uncertainty for companies with a larger portion of fixed costs, negatively impacting the profit margin by 8.28%. Higher revenue volatility indicates greater uncertainty for companies with larger portion of fixed costs, negatively impacting the profit margin. Effective cost management is crucial for maintaining a sustainable profit margin.

6.5 Effect on ROA CAGR, OLS regression – whole sample

Table 6.5: The table exhibits the result of an OLS regression with CAGR of ROA as the dependent variable. The predictors encompass CEO gender (1 if female and 0 if male), log capital intensity (natural logarithm of assets per employee), company age, the natural logarithm of total equity, the natural logarithm of total operating revenues, and the volatility of revenues. The regression also incorporates control variables for year and industry. The displayed output includes the estimated coefficients, their standard errors, t-values, and the significance levels, marked as *=10%, **=5%, ***=1%.

Dependent variable: ROA CAGR

Independent variable			
	Estimate	Std. Error	t value
(Intercept)	0.1507 ***	0.0116	12.9437
gender	0.0068 ***	0.0016	4.1370
Log Capital intensity	-0.0008 ***	0.0002	-4.6624
Company Age	0.0000	0.0001	0.0237
Log Total Equity	-0.0159 ***	0.0005	-31.5684
Log Total operating revenue	0.0089 ***	0.0007	12.6453
Revenue Volatility	0.0530 ***	0.0024	22.2533
Year fixed effects	Yes		
Industry fixed effects	Yes		
Adj. R-squared	0.0067		
Number of observations	423 185		
Number of firms	160 091		

In the regression analysis with ROA CAGR as the dependent variable, we observe a positive coefficient for the gender variable. This indicates that if the CEO is female, the ROA CAGR increases by 0.68% Further, the coefficient of log capital intensity is

negative, indicating that an increase in capital intensity is linked to a decrease in CAGR ROA by 0.08%. Although this effect is small, it remains statistically significant at the 1% level. This finding aligns with the results of the logistic regression which suggested that female CEOs tend to lead less capital-intensive firms. It could also be an indication that female leaders prioritize achieving stable growth.

The company's age is found to be insignificant and has no impact on CAGR ROA. In contrast, log total equity is negatively associated with ROA CAGR, results indicating a 1.59% decrease given a one-unit increase in log total equity. This suggests that companies with larger equity bases may not be as efficient in generating increased return on their assets over time. Moreover, log total operating revenue has a positive coefficient, indicating that companies with higher operating revenue can achieve a higher growth rate in their ROA.

Additionally, revenue volatility demonstrates a positive effect on the CAGR of ROA, suggesting that companies experiencing fluctuating revenues may achieve a higher growth rate in their assets returns. This could be a result of volatile markets offering more opportunities for high-return investments.

6.6 Effect on Δ ROA, OLS regression – whole sample

Table 6.6: The table exhibits the result of an OLS regression with ΔROA as the dependent variable. ΔROA is created using the ROA for the given year – the lagged ROA. The predictors encompass CEO gender (1 if CEO changes gender from male to female, and 0 otherwise), log capital intensity (natural logarithm of assets per employee), company age, the natural logarithm of total equity, the natural logarithm of total operating revenues, and the volatility of revenues. The regression also incorporates control variables for year and industry. The displayed output includes the estimated coefficients, their standard errors, t-values, and the significance levels, marked as *=10%, **=5%, ***=1%.

Dependent variable: ΔROA

Independent variable			
	Estimate	Std. Error	t value
(Intercept)	-0.1864 ***	0.0284	-6.5632
CEO Gender Change	0.0059	0.0042	1.4088
Log Capital intensity	0.0049 ***	0.0005	9.8703
Log Total Equity	-0.0022	0.0012	-1.8578
Company Age	0.0002	0.0001	1.4766
Log Total operating revenue	0.0130 ***	0.0017	7.7541
Year fixed effects	Yes		
Industry fixed effects	Yes		
Adj. R-squared	0.0087		
Number of observations	22 067		
Number of firms	160 091		

This OLS regression analyzes ΔROA as the dependent variable to examine whether the change in CEO, specifically transitioning from male to female, affects ROA. We narrow down the sample to CEO transitions and analyze the change in profitability during the CEO transition period. Our method involves assigning a value of 1 in situations where a CEO transition has occurred from a male to female, and 0 in all other cases. This approach facilitates a targeted examination of how ROA shifts in response to a CEO gender change. Moreover, we introduce a lagged variable for ROA into our model. By using the lagged ROA, we can determine the change in ROA that occurs during the year of the CEO transition. This approach helps distinguishing the impact of a female CEO's leadership from ongoing trends or other factors that could influence the firm's profitability.

The coefficient for the gender variable is not statistically significant at any of the significant levels, and we cannot conclude that the change in gender has an impact on ROA. Thus, our results suggests that male CEOs may not really increase profitability

as implied in the previous regressions. However, one of the significant variables in the regression is log capital intensity, which has a positive coefficient. This suggests that a change in log capital intensity is associated with a 0.49% increase in delta ROA. This finding could be attributed to companies investing more in asset per employee, for instance more equipment and advanced technology, potentially leading to greater efficiency, productivity, and therefore an increase in ROA.

Additionally, log total operating revenue exhibits a positive and significant coefficient the 1% level. A one-unit increase in log total operating revenue implies an increase in delta ROA of 1.30%. This indicates that higher operating revenue may result from increased sales of products or services, leading to a greater change in ROA.

6.7 Logistic regression on gender – new firms

Table 6.7: The table exhibits the logistic regression results for a subset of the original data frame containing firms that are 3 years old or younger. In the model, CEO Gender (1 for female, 0 for male) is the dependent variable. Independent variables are log capital intensity (assets per employee), company age, log total equity, and log total operating revenues, with year and industry as control variables. The results showcase coefficient estimates, standard errors, z-values, and significance levels, marked as *=10%, **=5%, ***=1%.

Dependent variable: Gender

Independent variable			
	Estimate	Std. Error	z value
(Intercept)	6.1656 ***	0.1412	43.6526
Log Capital intensity	-0.0785 ***	0.0021	-36.9954
Company Age	0.0217 **	0.0076	2.8638
Log Total Equity	-0.1464 ***	0.0065	-22.6550
Log Total operating revenue	-0.3594 ***	0.0088	-40.9344
Year fixed effects	Yes		
Industry fixed effects	Yes		
Number of observations	133 359		
Number of firms	94 585		

The logistic regression for gender is employed to examine the characteristics of new firms with female CEOs. The regression is using data exclusively from firms that are three years old or younger. Log capital intensity exhibits a negative coefficient, indicating that a one-unit increase in log capital intensity corresponds to a 1.96% decrease in the probability of the CEO being female. Although slightly lower, this finding is aligned with our findings from the overall sample, suggesting a higher occurrence of female CEOs in newer firms as log capital intensity increases.

Furthermore, company age shows significant at the 5% level with a positive coefficient. This implies that a one-unit increase in company age is associated with a 0.54% increase in the probability of the CEO being female. Holding other factors constant, this could be an indication that firms with female CEO have slightly higher survival rates compared to those with male CEOs. Log total equity demonstrates a negative coefficient, indicating that a one-unit increase in log total equity is associated with a 3.65% decrease in the probability of the CEO being female. On average, this suggests that among new firms, female CEOs possess a smaller equity base than their male counterparts. Similarly, log total operating revenue revels that a one-unit increase indicates an 8.89% decrease in the probability of the CEO being female. This further emphasizes that, on average, female CEOs tend to lead smaller companies in terms of operating revenue.

6.8 Effect on ROA, OLS regression – new firms

Table 6.8: The table exhibits the result of an OLS regression results for a subset of the original data frame containing firms that are 3 years old or younger, with ROA as the dependent variable. The independent variables are CEO gender (1 if female and 0 if male), log capital intensity (natural logarithm of assets to employees), company age, the natural logarithm of total equity, the volatility of the revenues, the natural logarithm of total operating revenues, and controlling for year, and industry. The table illustrates the coefficient, the significance level, standard error, and the t value. The significance levels are *=10%, **=5%, ***=1%.

Dependent variable: ROA

Independent variable			
	Estimate	Std. Error	t value
(Intercept)	-0.8422 ***	0.0102	-82.7101
gender	-0.0020	0.0014	-1.3990
Log Capital intensity	0.0074 ***	0.0001	52.3215
Company Age	-0.0131 ***	0.0005	-24.2072
Log Total Equity	0.0301 ***	0.0005	64.7787
Log Total operating revenue	0.0355 ***	0.0006	56.6096
Year fixed effects	Yes		
Industry fixed effects	Yes		
Adj. R-squared	0.1157		
Number of observations	133 359		
Number of firms	94 585		

Gender is found to be insignificant in this regression analysis of ROA, indicating that we cannot observe a significant impact of female CEOs on ROA in new firms. This aligns with the findings where ΔROA is the dependent variable. However, log capital

intensity exhibits a positive coefficient, suggesting that a one-unit increase corresponds to an increase in ROA for new firms by 0.74%. This implies that firms that allocate more assets per employee tend to achieve higher returns on their assets, assuming other factors remain constant. The impact of log capital intensity on ROA can also be influenced by the industries in which the firms operate, as higher capital investments often generate higher returns.

Surprisingly, company age demonstrates a negative coefficient, indicating a 1.31% decrease in ROA for new firms per unit-change. This may seem counterintuitive, but one possible explanation in the context of very young firms, could be early success. High initial returns may be achieved in the first year or two due to early accomplishments. However, as these firms progress beyond their initial launch phase and begin to scale up, they may face challenges that affect their efficiency and profitability, leading to a decline in ROA.

On the other hand, a one-unit increase in log total equity is associated with a 3.01% increase in ROA for new firms. This may be explained by firms with a higher equity base experiencing lower financing cost, as they rely primarily on equity financing. This can result in increased net income, and consequently higher ROA. Additionally, having access to financing for profitable investments early on can also contribute to the positive effect of equity on ROA.

Furthermore, log total operating revenue exhibits a positive effect on ROA for new firms. A one-unit increase in log total operating revenue is linked to a 3.55% increase in ROA. Higher operating revenue indicates a higher sales volume or sales prices, suggesting that the firm is operating effectively and is generating profits, which in turn may contribute to a higher ROA.

6.9 Logistic regression on gender – family firms

Table 6.9: The table exhibits the logistic regression results for a subset of the original data frame containing firms that are defined that one family has ownership majority > 50%. In the model, CEO Gender (1 for female, 0 for male) is the dependent variable. Independent variables are log capital intensity (assets per employee), company age, log total equity, log total operating revenues, and revenue volatility, with year and industry as control variables. The results showcase coefficient estimates, standard errors, z-values, and significance levels, marked as *=10%, **=5%, ***=1%.

Dependent variable: Gender

Independent variable			
	Estimate	Std. Error	z value
(Intercept)	5.2897 ***	0.0832	63.5438
Log Capital intensity	-0.0832 ***	0.0013	-66.1120
Company Age	-0.0085 ***	0.0004	-20.5805
Log Total Equity	-0.0839 ***	0.0035	-24.0304
Log Total operating revenue	-0.3329 ***	0.0050	-65.9160
Revenue Volatility	-0.6857 ***	0.0188	-36.4997
Year fixed effects	Yes		
Industry fixed effects	Yes		
Number of observations	471 786		
Number of firms	123 908		

The logistic regression analysis on gender provides insights into what the characteristics of family firms with a female CEO looks like. All the variables of interest included in the regression are significant at the 1% level. Log capital intensity exhibits a negative coefficient, indicating that a one-unit increase in log capital intensity is linked to a 2.08% decrease in the probability of the CEO being female. This aligns with the trend observed in previous logistic regression on gender, suggesting that, on average, women tend to lead less capital intense companies, even within the context of family firms.

Similarly, company age also has a negative coefficient, however, the effect on probability is small. A unit increase in company age is associated with a 0.21% decrease in the likelihood of having a female CEO. This is aligned with the result considering the whole sample. This finding suggests that family firms may still have a male-dominated culture, where traditional gender roles persist, leading to a lower representation of female CEOs.

Log total equity exhibits a negative coefficient as well, and a one-unit increase is linked to a 2.1% decrease in the probability of the CEO being female. This emphasizes the

previous results, indicating that firms with female CEOs tend to have a smaller equity base. Additionally, log total operating revenue exhibits a negative effect on the probability of the CEO being female. It decreases by 8.25% with a one-unit increase in log total operating revenue. Furthermore, revenue volatility is the variable with the highest impact, associated with a 16.5% decrease in the probability of the CEO being female, given a one-unit increase. These two negative coefficients once again highlight the tendency for female-led companies to have a smaller and more stable stream of revenues.

6.10 Effect on ROA, OLS regression – family firms

Table 6.10: The table exhibits the result of an OLS regression results for a subset of the original data frame containing firms that are defined that one family has ownership majority > 50%, with ROA as the dependent variable. The independent variables are CEO gender (1 if female and 0 if male), log capital intensity (natural logarithm of assets to employees), company age, the natural logarithm of total equity, the volatility of the revenues, the natural logarithm of total operating revenues, and controlling for year, and industry. The table illustrates the coefficient, the significance level, standard error, and the t value. The significance levels are *=10%, **=5%, ***=1%.

Dependent variable: ROA

Independent variable			
	Estimate	Std. Error	t value
(Intercept)	-0.5640 ***	0.0050	-113.5788
gender	-0.0038 ***	0.0007	-5.5064
Log Capital intensity	0.0055 ***	0.0001	79.2878
Company Age	-0.0015 ***	0.0000	-63.7357
Log Total Equity	0.0187 ***	0.0002	88.6696
Log Total operating revenue	0.0267 ***	0.0003	89.7229
Revenue Volatility	-0.0272 ***	0.0010	-27.7854
Year fixed effects	Yes		
Industry fixed effects	Yes		
Adj. R-squared	0.0913		
Number of observations	471 786		
Number of firms	123 908		

In firms where a family holds the majority of shares, having a female CEO indicates a 0.38% reduction in ROA. Although the variable is significant, the differences observed are small. This suggests that all else being equal, having a female CEO may not necessarily lead to substantial changes in the firm's operations.

Log capital intensity indicates that firms with a larger asset base compared to the number of employees experience a 0.55% increase in ROA. This implies that these firms are able to utilize their assets more efficiently, resulting in higher profitability.

On the other hand, company age exhibits a negative coefficient, indicating that older family firms are not as capable of generating the same level ROA as younger firms. This could be attributed to the stability of growth becoming more stable in older firms, where a larger portion of their assets may be dedicated to maintaining their established operations. A one-unit increase in company age is linked to a 0.15% decrease in ROA, signifying a small yet highly significant effect.

Log total equity once again demonstrates that firms financed through a higher level of equity tend to be more able to create a higher ROA. A one-unit increase in log total equity corresponds to a 2.67% increase in ROA. Compared to the whole sample, regression 1 (Table 6.1), family-owned firms show an even greater change in ROA given a one-unit change in log total equity.

In family firms, results show a positive link between log total operating revenue and ROA, increasing ROA by 2.67% for a one-unit increase. This again suggests that firms with more operating revenues are also able to generate greater return on their assets compared to those with lower operating revenue.

Furthermore, an increase in revenue volatility is associated with a 2.73% decrease in ROA. However, compared to the whole sample, family-owned firms experience a relatively smaller decrease in ROA for a one-unit increase in revenue volatility. This may suggest that when the family owns the firm, the involvement of multiple decision-makers may lead to better control over volatile revenues.

6.11 Effect on ROA, OLS regression – whole sample (Proportion female directors on the board)

Table 6.11: The table exhibits the results of an OLS regression with ROA as the dependent variable. The independent variables are the proportion of female directors on the board, log capital intensity (natural logarithm of assets to employees), company age, the natural logarithm of total equity, the volatility of the revenues, and the natural logarithm of total operating revenues, with controls for year and industry. The table provides the coefficient, the significance level, standard error, and the t-value. The significance levels are denoted as follows: *=10%, **'=5%, and ***'=1%.

Dependent variable: ROA

Independent variable			
	Estimate	Std. Error	t value
(Intercept)	-0.5258 ***	0.0043	-121.9053
Female directors proportion	-0.0036 ***	0.0007	-4.9589
Log Capital intensity	0.0059 ***	0.0001	93.6281
Company Age	-0.0011 ***	0.0000	-56.4396
Log Total Equity	0.0131 ***	0.0002	70.1295
Revenue Volatility	-0.0356 ***	0.0009	-40.9052
Log Total operating revenue	0.0288 ***	0.0003	111.3743
Year fixed effects	Yes		
Industry fixed effects	Yes		
Adj. R-squared	0.0743		
Number of observations	630 886		
Number of firms	160 091		

This OLS regression, unlike the others, takes into account the composition of the board in terms of the proportion of female directors. We find that greater proportion of female directors on the board is associated with a lower ROA. A one-unit increase in the proportion of female directors implies a reduction in ROA by 0.36%. This finding echoes the results of the first logistic regression (6.1), where having a higher proportion of female directors was linked with higher likelihood of having a female CEO. Moreover, having a female CEO has also been consistently associated with a lower ROA.

Again, an increase in log capital intensity is linked with a higher ROA, suggesting that firms with higher assets to employees are achieving a higher return on their assets due to better utilization. Furthermore, we find that company age is negatively linked, which suggest that older firms are not able to generate the same type of return on their assets, as younger firms.

A one-unit increase in log total equity is associated with an 1.31% increase in ROA all else equal, which again underscores that firms with larger equity base are linked with a higher ROA. Revenue volatility is linked to more risky operations, and consequently is associated with a lower ROA. A one-unit increase in revenue volatility is allied with a decrease in ROA by 3.56%. Log total operating revenue seems to have a positive effect, and everything else equal, an increase by one-unit corresponds to an increase in ROA by 2.88%.

General discussion

The findings reveal a mixed picture regarding the influence of CEO gender on financial outcomes. Female-led firms tend to underperform in terms of ROA and ROE compared to their male-led counterparts, indicating a gender performance gap. This suggests that gender gaps may exist in areas such as asset utilization and return generation. However, it is important to note that these differences, although statistically significant, are relatively modest.

Interestingly, female CEOs demonstrate a slightly higher profit margin, implying that they may be better at converting revenues into profits more efficiently. This finding challenges the notion that female-led firms are less profitable and suggests that female CEOs may excel in specific aspects of financial performance. ROA and ROE are performance metrics that are influenced not only by a firm's operating efficiency, as captured by the profit margin, but also the way a firm manages its assets, equity, and debt structure. This suggest that male CEOs may be better at financial engineering.

Furthermore, the analysis reveals that female CEOs exhibit a higher CAGR of ROA, indicating their ability to prioritize stable growth and effectively manage firm assets. This finding highlights the potential long-term benefits of having a diverse leadership team, where different perspectives and approaches contribute to sustainable growth.

Importantly, the transition from a male to a female CEO does not significantly impact the change in ROA. This finding suggests that the overall financial performance of firms does not experience a drastic shift solely based on a change in gender at the CEO level. Thus, this suggest that the negative relationship between female CEOs and

profitability is not necessarily causal. A potential explanation could be a selection effect. It may imply that the gender of the CEO is not the cause of lower profitability, but rather that companies with lower profitability are more likely to appoint female CEOs. Instead, other factors, such as capital intensity and operating revenues, play a more significant role in driving changes in financial performance.

Furthermore, when focusing on new firms, it becomes evident that the gender gap in CEO representation persists, particularly in capital-intensive industries. While there has been progress in increasing the representation of female CEOs in newer firms, the study highlights the need for continued efforts to address gender gaps and promote equal opportunities across industries.

Lastly, our findings suggest a higher proportion of female directors correlates with a decrease in ROA. This complements our initial logistic regression, where a higher proportion of females on the board was linked with a higher probability of having a female CEO, which in turn was associated with lower a ROA.

7.0 Conclusion

In this study, we examined the potential impact of CEO gender on the financial performance of Norwegian firms. Our research question aimed to determine whether the gender of the CEO has a significant impact on firms' financial performance. Previous studies were carried out in countries considered less gender equal. Thus, our study is conducted to help extend existing literature, giving a more nuanced understanding of the relationship between gender diversity and financial performance in organizations operating in an environment characterized by a higher degree of gender equality.

To address this question, we conducted a comprehensive analysis using a dataset that included cross-sectional and time-series data from 160 091 Norwegian private firms between the years 2000 and 2020. Panel data analysis techniques were employed to examine the relationship between gender diversity and financial performance, while controlling for potential cofounding variables such as firm size, industry, and time. This ensures that the observed differences in financial performance are not simply due

to changes in the economic environment over time or inherent differences across industries but are more accurately associated with the CEO's gender.

Our findings, which we have discussed in detail in the results section, contribute to the growing body of literature on gender diversity and firm performance. The results suggest that the gender of the CEO, in most cases, has a significant effect on the financial performance, defined as ROA. Looking at the whole sample, we find that female-led firms actually underperform slightly in terms of ROA. Thus, our first hypothesis, stating that gender of CEO has a significant impact on firms' performance, is supported. Further, we limited our hypothesis to new firms and family firms. Solely looking at new firms, findings from our research suggests a slightly negative association between having a female CEO and ROA, align with results from the whole sample. However, this finding does not necessarily imply that firms founded by female CEOs are less profitable. Instead, it may suggest that they find it more difficult to raise capital. Yet, this is not proven statistically significant, and we cannot conclude either. Assessing only family firms, we found female CEOs to be associated with a decrease in ROA. Thus, hypothesis 3 saying female CEOs significantly improve financial performance of family firms, is disproven.

Additionally, we examined the effect of a change in gender of the CEO on change in financial performance. However, we could not find a significant effect on the change in ROA, and hypothesis 2 is disproven. Thus, these results suggests that the relationship is not causal, meaning female CEOs may not really decrease profitability despite our findings indicating a negative association between female CEOs and ROA. One possible explanation could be a selection effect, meaning female CEOs is not the reason themselves for this lower profitability, but companies with lower profitability are simply just more likely to appoint female CEOs. Thus, it may imply that the gender of the CEO may not be the cause of lower profitability, but rather a consequence of this possible preference for female CEOs. Although, the implication of fixed effects helps mitigating this causality problem.

One additional noteworthy finding, when examining the board composition, is the significant negative correlation between the proportion of female directors and ROA. One potential explanation is that higher representation of female directors increases the

likelihood of the CEO being female, meaning the negative association we observe might be explained by the CEO itself. Thus, this may be the reason we observe a similar effect on ROA, by having a female CEO and the proportion of female directors.

Firstly, to summarize, the results indicate that promoting gender diversity in top executive positions, meaning recruiting female CEOs, may not directly enhance the financial performance of Norwegian firms. However, it is essential to consider that other factors, such as unconscious bias or structural barriers, may be influencing the underrepresentation of women in leadership positions. Therefore, further research is needed to identify and address these barriers to gender diversity.

Secondly, the study highlights the importance of context when examining the relationship between gender diversity and firm performance. Norway, with its high degree of gender equality and policies promoting gender diversity, provides a unique setting to study this relationship. By expanding the generalizability of findings and considering the external validity of existing research, our study contributed to a more nuanced understanding of the impact of gender diversity on financial performance.

Overall, this research adds to the literature on gender diversity and firm performance by providing insights into the specific context of Norwegian firms. While the results do not show a significant positive effect in financial performance, having a female CEO, the study contributed to the ongoing discussion surrounding gender diversity and its implications for corporate governance and inclusive economies.

Future research should explore additional factors that may influence the relationship between gender diversity and firm performance. It is important to investigate the potential mechanisms through which gender diversity may impact financial outcomes and identify strategies to overcome barriers to gender equality in leadership positions. By continuing to expand our understanding in this area, we can work towards creating workplaces that are more inclusive and supportive of diverse leadership. In doing so, we can cultivate thriving economies that benefit everyone involved.

8.0 References

Adams, R. B., & Ferreira, D. (2009). Women in the boardroom and their impact on governance and performance. *Journal of Financial Economics*, *94*(2), 291–309. https://doi.org/10.1016/j.jfineco.2008.10.007

Ahern, K. R., & Dittmar, A. K. (2012). The Changing of the Boards: The Impact on Firm Valuation of Mandated Female Board Representation. *The Quarterly Journal of Economics*, *127*(1), 137–197.

Bertrand, M., Black, S. E., Jensen, S., & Lleras-Muney, A. (2014). *Breaking theGlass Ceiling? The Effect of Board Quotas on Female Labor Market Outcomes in Norway*.

Bilimoria, D. (2006). The Relationship between Women Corporate Directors and Women Corporate Officers. *Journal of Managerial Issues*, *18*, 47–61.

Brady, D., Isaacs, K., Reeves, M., Burroway, R., & Reynolds, M. (2011). Sector, size, stability, and scandal: Explaining the presence of female executives in Fortune500 firms. *Gender in Management: An International Journal*, *26*(1), 84–105.https://doi.org/10.1108/17542411111109327

Brooks, C. (2019). *Introductory Econometrics for Finance* (4th ed.). Cambridge University Press.

Bøhren, Ø., & Staubo, S. (2014). Does mandatory gender balance work? Changing organizational form to avoid board upheaval. *Journal of Corporate Finance*, *28*, 152–168. https://doi.org/10.1016/j.jcorpfin.2013.12.005

Carter, D. A., Simkins, B. J., & Simpson, W. G. (2003). Corporate Governance, Board Diversity, and Firm Value. *Financial Review*, *38*(1), 33–53.https://doi.org/10.1111/1540-6288.00034

Core-norwegian-balance-scorecard-selection-and-categorization-2022.pdf. (n.d.). Retrieved June 8, 2023, fromhttps://www.samfunnsforskning.no/core/english/publications/Infographics/core-norwegian-gender-balance-scorecard/selection/core-norwegian-balance-scorecard-selection-and-categorization-2022.pdf

Dezsö, C. L., & Ross, D. G. (2012). Does female representation in top management improve firm performance? A panel data investigation. *Strategic Management Journal*, *33*(9), 1072–1089. https://doi.org/10.1002/smj.1955

Flabbi, L., Macis, M., Moro, A., & Schivardi, F. (2019). Do Female Executives Make a Difference? The Impact of Female Leadership on Gender Gaps and Firm Performance. *The Economic Journal*, *129*. https://doi.org/10.1093/ej/uez012

Global Gender Gap Report 2022. (n.d.). World Economic Forum. Retrieved June 8, 2023, from https://www.weforum.org/reports/global-gender-gap-report-2022/

Gómez-Mejía, L. R., Haynes, K. T., Núñez-Nickel, M., Jacobson, K. J. L., & Moyano-Fuentes, J. (2007). Socioemotional Wealth and Business Risks in Family-controlled Firms: Evidence from Spanish Olive Oil Mills. *Administrative Science Quarterly*, *52*(1), 106–137. https://doi.org/10.2189/asqu.52.1.106

Huang, J., & Kisgen, D. J. (2013). Gender and corporate finance: Are male executives overconfident relative to female executives? *Journal of Financial Economics*, *108*(3), 822–839. https://doi.org/10.1016/j.jfineco.2012.12.005

Hunt, V., Layton, D., & Prince, S. (2015). Diversity matters. McKinsey & Company. https://www.mckinsey.com/capabilities/people-and-organizational-performance/our-insights/~/media/2497d4ae4b534ee89d929cc6e3aea485.ashx?fbclid=IwAR3du1FReiBHaN0fieqmciNKQVNWj8RHPOM4Muy6ByPOEZnhL1QanNKe3N4

Khan, W. A., & Vieito, J. P. (2013). Ceo gender and firm performance. *Journal of Economics and Business*, *67*, 55–66. https://doi.org/10.1016/j.jeconbus.2013.01.003

Krishnan, G. V., & Parsons, L. M. (2008). Getting to the Bottom Line: An Exploration of Gender and Earnings Quality. *Journal of Business Ethics*, *78*(1), 65–76. https://doi.org/10.1007/s10551-006-9314-z

Lov om allmennaksjeselskaper (allmennaksjeloven)—Lovdata. (n.d.). Retrieved June 6, 2023, from https://lovdata.no/dokument/NL/lov/1997-06-13-45/%C2%A76-11a(1)#%C2%A76-11a(1)

Malmendier, U., & Tate, G. (2005). CEO Overconfidence and Corporate Investment. *The Journal of Finance*, *60*(6), 2661–2700. https://doi.org/10.1111/j.1540-6261.2005.00813.x

Matsa, D. A., & Miller, A. R. (2013). A Female Style in Corporate Leadership? Evidence from Quotas. *American Economic Journal: Applied Economics*, *5*(3), 136–169.

Palvia, A., Vähämaa, E., & Vähämaa, S. (2015). Are Female CEOs and Chairwomen More Conservative and Risk Averse? Evidence from the Banking Industry During the Financial Crisis. *Journal of Business Ethics*, *131*(3), 577–594.https://doi.org/10.1007/s10551-014-2288-3

Parsons, C., & Titman, S. (2008). Chapter 13—Capital Structure and Corporate Strategy. In B. E. Eckbo (Ed.), *Handbook of Empirical Corporate Finance* (pp. 203–234). Elsevier. https://doi.org/10.1016/B978-0-444-53265-7.50005-6

Robb, A. M., & Watson, J. (2012). Gender differences in firm performance: Evidence from new ventures in the United States. *Journal of Business Venturing*, *27*(5), 544–558. https://doi.org/10.1016/j.jbusvent.2011.10.002

Roberts, M. R., & Whited, T. M. (2013). Chapter 7—Endogeneity in Empirical Corporate Finance1. In G. M. Constantinides, M. Harris, & R. M. Stulz

(Eds.),*Handbook of the Economics of Finance* (Vol. 2, pp. 493–572). Elsevier. https://doi.org/10.1016/B978-0-44-453594-8.00007-0

Simionescu, L. N., Gherghina, Ş. C., Tawil, H., & Sheikha, Z. (2021). Does board gender diversity affect firm performance? Empirical evidence from Standard &Poor's 500 Information Technology Sector. *Financial Innovation, 7*(1), 52.https://doi.org/10.1186/s40854-021-00265-x

Women in the Workplace 2022: The Full Report. (n.d.). Lean In. Retrieved January 2, 2023, from https://leanin.org/women-in-the-workplace/2022

Zolin, R., Stuetzer, M., & Watson, J. (2013). Challenging the female underperformancehypothesis. *International Journal of Gender and Entrepreneurship*, *5*, 1–18. https://doi.org/10.1108/17566261311328819

Appendix

Table 1: *This table present the different variables used in our study*

Variable	**Defenition**
item_2	CEO gender
item_11	Total operating revenue
item_78	Total current assets
item_87	Total equity
item_98	Total other long-term liabilities
item_109	Total current liabilities
item_114	CEO salary
item_602	Board size
item_605	Number of female directors
item_51	Total fixed assets (tangible)
item_13601	Share owned by CEO (direct ownership)
item_105	Dividends payable
item_15402	Company name
item_11103	Industry codes at level two
item_50109	Number of employees
item_13420	Company age
item_4	CEO birth year
item_14021	Aggregated Fraction held by Female Owner (ultimate ownership)
item_35	Income before extraordinary items
item_14507	Is independent (ultimate ownership)
item_15302	Largest family sum ult ownership

Table 2: *Summary Statistics by Industry – Table 2 presents the distribution across different industries. The table displays the count of CEOs in each industry, with data from a total of 921,682 observations. The column 'Portion Industry' represents the proportion of each industry within the total sample. Additionally, the table provides gender proportions for each industry. Instances where the number 1 is observed it illustrates the correlation of a variable with itself.*

Industry	Number of observations	Portion industry	Female CEO's	Portion female CEO's	Male CEO's	Portion male CEO's	
Basic agriculture	8 734	0.95 %	2 082	23.84 %	6652	76.16 %	100.00 %
Forestry	48 560	5.27 %	7 153	14.73 %	41407	85.27 %	100.00 %
Fishing	11 265	1.22 %	459	4.07 %	10806	95.93 %	100.00 %
Mining and oil	3 123	0.34 %	120	3.84 %	3003	96.16 %	100.00 %
Light industry	102 471	11.12 %	20 618	20.12 %	81853	79.88 %	100.00 %
Heavy industry	42 916	4.66 %	2 340	5.45 %	40576	94.55 %	100.00 %
Utilities	5 740	0.62 %	292	5.09 %	5448	94.91 %	100.00 %
Building	231 895	25.16 %	14 411	6.21 %	217484	93.79 %	100.00 %
Retail & wholesale	115 284	12.51 %	24 827	21.54 %	90457	78.46 %	100.00 %
Transport	43 507	4.72 %	2 693	6.19 %	40814	93.81 %	100.00 %
Tourism	34 872	3.78 %	11 499	32.97 %	23373	67.03 %	100.00 %
Publishing, media, IT, telecom	21 783	2.36 %	2 519	11.56 %	19264	88.44 %	100.00 %
Financials	23 141	2.51 %	4 984	21.54 %	18157	78.46 %	100.00 %
Real estate	86 273	9.36 %	12 539	14.53 %	73734	85.47 %	100.00 %
Services	101 735	11.04 %	25 998	25.55 %	75737	74.45 %	100.00 %
Public administration, health and education	40 209	4.36 %	16 680	41.48 %	23529	58.52 %	100.00 %
Gambling	174	0.02 %	68	39.08 %	106	60.92 %	100.00 %
Sum	**921 682**	**100.00 %**	**149 282**		**772 400**		

Table 3: *This table shows descripitve statistics for variables describing different firm caracteristics The population is private owned Norwegian firms. Each section shows the number of obseravtions (N), the estimated mean, and median values. ROA winsorized is income before extraordinary times divided by total assets then winsorized to remove outliers. Leverage ratio winsorized is total liabilities devided by total equity and then winsorized to remove outliers. Profit margin winsorized is total operating revenue devided by is income before extraordinary times and then winsorized to remove outliers. ROE winsorized is income before extraordinary times devided by total equity and den winsorized to remove outliers. Log total operating revnue is the natural logarithm of total operating revenue. ROA, leverage ratio, profit margin, ROE, Log total operating revenue are winsozired at 1% and 99%.*

Whole sample			Male CEO		Female CEO		Male CEO's-Female CEO's		
Variable	Mean	Median	Mean	Median	Mean	Median	Mean	t test	Median
Total Operating Revenue	8 200 017	2 936 000	8 673 768.12	3 018 000	5 748 780	2 641 000	2 924 988	<.0001	377 000
Total Current Assets	4 719 909	1 184 000	5 075 796.94	1 253 000	2 878 508	924 000	2 197 289	<.0001	329 000
Total Equity	2 722 000	628 000	2 867 104.21	676 000	1 971 215	429 000	895 889	<.0001	247 000
Total other Long term liabilities	1 760 138	82 000	1 880 079.85	101 000	1 139 545	-	740 535	<.0001	101 000
Total Current Liabilities	3 210 830	751 000	3 486 658.99	796 000	1 783 666	582 000	1 702 993	<.0001	214 000
CEO Salary	315 382	273 000	320 724.46	279 000	287 740	247 000	32 984	<.0001	32 000
Board Size	2	2	2.08	2.00	2.14	2.00	- 0.06	<.0001	-
Number of female directors	0	-	0.26	-	1.18	1.00	- 0.92	<.0001	- 1.00
Total fixed assets (Tangible)	2 264 464	358 000	2 402 488.46	402 000	1 550 309	188 000	852 180	<.0001	214 000
Share owned by CEO (Direct ownership)	60	52	60.94	58	56	50	5.30	<.0001	8.33
Dividens payable	201 765	-	213 091.90	-	143 156	-	69 935	<.0001	-
Number of Employees	5.24	2.00	5.23	2.00	5.27	3.00	- 0.04	<.0001	- 1.00
Company Age	12.2	9.0	12.29	9.00	11.66	8.00	0.63	<.0001	1.00
Aggregated Fraction held by Female Owners (Ultmate ownership)	-	-	-	-	-	-	-		-
Income before extraordinary times	458 781	133 000	478 183.99	143 000	358 391	92 000	119 793	<.0001	51 000
Is independent (ultmate ownership)	1	1	1.00	1	1	1	-		-
Largest family sum ult ownership	80	100	79.38	100	82	100	- 2.98	<.0001	-
Total Liabilities	4 970 968	1 358 000	5 366 738.84	1 468 000	2 923 211	941 000	2 443 528	<.0001	527 000
Total Assets	6 984 372	2 217 000	7 478 285.40	2 387 000	4 428 817	1 528 000	3 049 469	<.0001	859 000
ROA winsorized	0.08529	0.0666	0.0862	0.0670	0.0806	0.0641	0.0056	<.0001	0.0030
Leverage Ratio winsorized	5.33	2.14	5.3246	2.1417	5.3836	2.1048	- 0.0589	>0.05	0.0369
Profit margin winsorized	0.08	0.04	0.0775	0.0457	0.0665	0.0357	0.0110	<.0001	0.0101
ROE winsorized	0.27	0.19	0.2773	0.1944	0.2391	0.1833	0.0382	<.0001	0.0111
Log Total operating revenue	15	15	14.80	15	15	15	0.1561	<.0001	0.1334
CEO Age	49	49	49.81	50	47	47	2.4884	<.0001	3.0000
Number of observations	921 682		772 400		149 282		921 682		

Table 4: *This table presents the CAGR for the variables, namely, ROA, ROE, Profit Margin, and Total Operating Revenue*

Gender	Mean CAGR ROA	Mean CAGR ROE	Mean CAGR Profit Margin	Mean CAGR Total Operating Revenue
F	3.57 %	0.64 %	4.02 %	5.97 %
M	2.77 %	-0.08 %	4.07 %	6.60 %

Table 5: *This table presents the correlation matrix for the independent and dependent variables utilized in the analysis. The first column enumerates each variable, assigning it a specific numerical identifier. Subsequent columns mirror these variables and their respective identifiers, enabling the easy identification of correlation coefficients. When the number 1 is observed it shows the correlation between it self.*

Correlation Matrix	**1)**	**2)**	**3)**	**4)**	**5)**	**6)**	**7)**	**8)**	**9)**	**10)**	**11)**	**12)**	**13)**	**14)**
1) ROA	1													
2) ROE	0.694	1												
3) Profit margin	0.494	0.272	1											
4) Total Operating Revenue	0.022	0.029	-0.002	1										
5) Total Assets	-0.003	-0.001	0.018	0.292	1									
6) Total Equity	0.003	-0.011	0.061	0.306	0.653	1								
7) Total Liabilities	-0.005	0.001	0.007	0.251	0.939	0.660	1							
8) Leverage Ratio	-0.123	-0.146	-0.059	0.006	-0.001	-0.039	0.010	1						
9) Number of Employees	0.000	0.021	-0.020	0.358	0.098	0.122	0.085	0.021	1					
10) Largest family sum ult ownership	0.017	-0.020	0.051	-0.116	-0.044	-0.052	-0.041	-0.010	-0.121	1				
11) Log Total operating revenue	0.146	0.133	0.066	0.422	0.095	0.107	0.082	0.035	0.389	-0.217	1			
12) ROA Change	0.578	0.392	0.267	0.016	0.003	0.004	0.002	-0.037	0.006	-0.010	0.068	1		
13) Log Capital intensity	-0.004	-0.042	0.079	-0.184	-0.028	-0.021	-0.027	-0.048	-0.325	0.194	-0.612	-0.012	1	
14) Revenue Volatility	-0.046	-0.036	-0.045	0.010	0.018	0.057	0.014	-0.014	-0.019	-0.003	-0.150	0.006	0.171	1