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The Female Boards of Norway: Empirical Research on Whether Norwegian Private Firms Changed Their Governance as a Result of the Gender Quota.

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Abstract

This study evaluates the changes in the governance of Norwegian private limited firms as a result of the gender quota implemented in 2008. We analyze whether the mechanism of the quota corresponds to its intention, and how gender diversity in executive positions developed in the years between 2000 and 2015. Further, we analyze how gender diversity on boards and in CEO positions affects financial performance. We do not find any evidence for changes having been made in the governance of Norwegian private firms. However, we find a positive relationship between the portion of women in executive positions today and the portion of women in studies with lengthy curricula twenty years ago, and a natural trend that points towards a gender-equal top executive Norway in the future.

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1 Introduction

On February 22, 2002, Ansgar Gabrielsen, Minister of Trade and Industry, made headlines with his proposal in the fight for gender equality in Norwegian corporations. “Sick and Tired of the Old Men’s Club,” Gabrielsen wrote, and declared that the government wanted to introduce a new law that forces all public companies to meet a 40 percent gender quota. He said, “I am willing to use all my available assets to enforce total gender equality in Norwegian companies.” (Johnsen, 2002). With that, Gabrielsen intended to create a ladder through the glass ceiling by first increasing female representation on boards. He hoped for a positive spillover effect and intended for the trend to spread through industries. Women would gradually start filling executive positions, paving the way for further seats at the directors' table being reserved for women. Eventually, women and men would be represented equally throughout all executive levels.

Subsequently, in December 2003, the Norwegian Parliament passed a voluntary mandate requiring all boards of public limited firms to be represented by at least 40 percent of each gender by July 2005. A handful of firms did not comply with the new law, and by 2005, only 14 percent of board members were female. As a result, the government made the law compulsory on January 1, 2006, with a two-year deadline to fully comply. Firms that did not fulfill the requirements by January 2008 would be forced to dissolve. Some companies went from being public limited to private limited solely to avoid the quota. Ultimately, all Norwegian public limited companies registered per January 2008 managed to meet the new requirements. However, the quota proved to have dramatic effects for various board and company characteristics (Ahern & Dittmar, 2012).

The Norwegian gender quota was first-of-its-kind, and researchers have been eager to study this unique law and its effects. Previous studies have focused mainly on the effects of the quota in relation to firm performance, while our study aims to investigate whether the non-affected private firms changed their governance as a result of the quota, or if there are other factors driving diversity in executive positions. Instead of the effects of the quota – which can be characterized as a shock

– in relation to performance, we will analyze how diversity among executives affects firm performance.

Board gender diversity is a characteristic well studied by researchers. The majority of board seats and CEO positions are occupied by men. The glass ceiling is hard to break through, and many countries have discussed and/or introduced legislation to secure a heterogeneous board composition (Goergen, 2018). Norway was the first country to implement a gender quota that applies to all public limited firms (Storvik & Teigen, 2010). The minimum requirement of 40 percent gender representation has received criticism for being an ambitious goal, where critics have been concerned with the fairness of the quota in terms of how many or few available and qualified candidates there might have been in the workforce at the time of implementation.

A lack of qualified female directors may lead to female directors serving on multiple boards. The problem of busy boards arises, and one may end up with a suboptimal board (Goergen, 2018). We believe the reason behind the then low portion of female board members may have lain in educational levels. The increase in women in studies with lengthy curricula implies that more women will qualify for a directorship in the future. However, with a legal obligation of 40 percent representation by one gender, a company may have to turn down a more qualified candidate for a less qualified candidate of the opposite gender to fill the quota. On the other hand, the quota positions Norway at the forefront of global progression.
We are interested in finding justification for the quota's enforcement by identifying key drivers of diversity. Hence, we will look at whether the pool of qualified candidates can explain gender diversity in private Norwegian firms left unaffected by the quota. We will also take a look at how gender diversity affects board turnover and vice versa.

As seen in Figure 1, there is a clear difference in the rate of increase in female board members between public and private companies. Therefore, we will analyze the appointing of female executives in private limited firms and whether it changed after the quota, and if the rate of change can be justified by the number of qualified candidates.

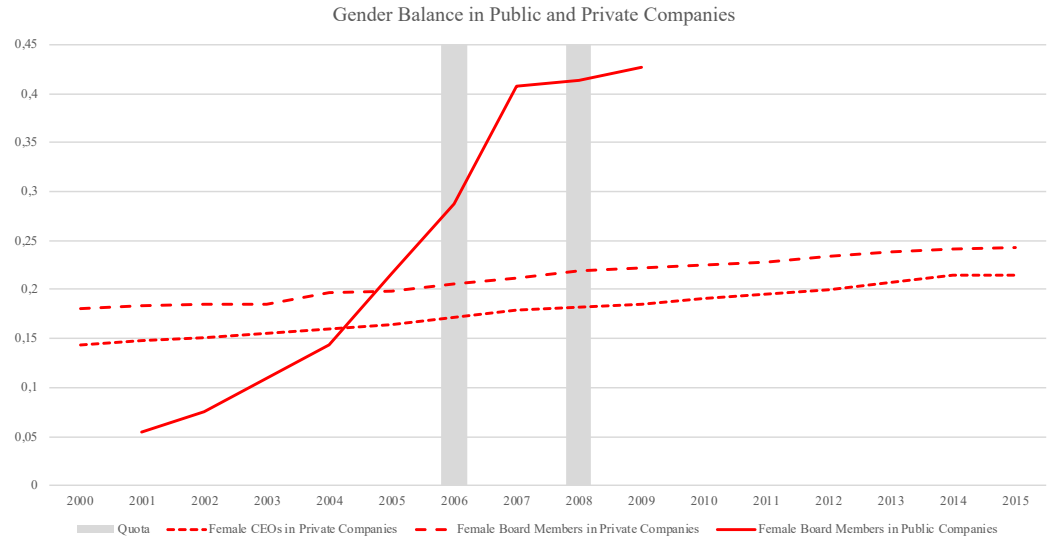

Figure 1: This figure presents the development of female CEOs and female board members in private companies as well as the development of female board members in public companies. The bars represent the start and end of the quota period. All numbers are reported in percentages where the portion of men and women together equals 100%.

The question of discrimination based on gender is a hot topic in Norway today, and the main question is whether discrimination has changed to consist of discrimination of men as well as women. We want to explore this twist on the traditional gender equality question and see whether a governmental involvement was necessary.

In the context of our model, we argue that a higher portion of female board members is likely to increase the probability of appointing a female CEO. Moreover, we find evidence between poor financial performance and board turnover, indicating that the board is blamed when management underperforms. In line with previous studies, we find no relationship between board diversity and firm performance. Moreover, we find a positive and significant association between the portion of female board members and financial performance. However, we argue that other factors, like increased monitoring, may drive these results.

This study contributes to the economic literature on gender diversity in executive positions in Norway. Most studies on this topic focus on public limited firms and the effect of the gender quota. In contrast, this study is mainly concerned with understanding the level of gender diversity in private limited companies. Our primary contribution is to present evidence on the reluctance expressed by private

limited companies to change their governance in relation to the appointing of female executives after the quota was introduced. Moreover, we argue that the portion of female executives is related to the portion of female students in studies with lengthy curricula and that the level of diversity follows a natural trend towards a gender-equal top executive Norway.

2 Literature Review

The introduction of the quota has most likely fundamentally changed the composition of the boards in Norway, as the change in female representation increased dramatically in only two years. The underlying changes may, for instance, have affected company characteristics and performance, among other things. Therefore, we shall cross-reference current findings within board alterations and their direct and indirect effect on the organization.

The quota works as a constraint for compiling the optimal board composition. As a result, characteristics directly affected by the quota most likely include: Average age, experience, independence, number of busy board members, how many boards each board member is engaged in, turnover rate of board members, tenure, level of education, board experience, CEO experience, size, diversity, and of course the gender balance as a direct effect of the amendment. As each board member has a selection of individual traits that have both negative and positive impacts on strategy and performance, we wish to compare and contrast the changes in boards in terms of traits represented in private firms when the quota was implemented, and more women became present on the boards of public firms.

2.1.1 The Role of the Board of Directors

As one of the legal requirements, every corporation needs to have a board of directors[1]. The board of directors is supposed to reduce the agency problems arising in an organization with separation of ownership and control (Hermalin & Weisbach, 2003). The board's primary responsibility is often defined as governing the relationship between management and stakeholders. In practice, it manifests in minimizing potential conflicts of interest, also known as principal-agent problems.

The principal-agent problems stem from the presence of asymmetric information. Given that shareholders cannot monitor every aspect of managers' work, the manager has an incentive not to do her best. When an agent acts on these incentives, we have a situation of moral hazard. These actions are not only limited to shirking

[1] Allmennaksjeloven §6-1(1) / Aksjeloven §6-1(1)

but can involve taking advantage of the personal perquisites the manager possesses or investing heavily in many uncertain projects – i.e., empire building.

A well discussed possible solution to the principal-agent problem is to design so-called perfect contracts explaining what the manager is to do in every possible situation (Goergen, 2018). However, a significant drawback with this solution is that not all situations are possible to predict, and writing these contracts would be exceedingly costly.

Therefore, the board steps in as the entity which aligns management's interests with those of the shareholders.

2.1.2 Effects of Regulation

Demsetz and Lehn (1985) argue that any regulation or forced change on the board composition will have a negative impact on firm performance. A value maximizing board composition may not be feasible in a constrained board composition that lacks freedom of choice in picking candidates. Ferreira (2014) supports this argument, and states that adding a constraint on board composition will reduce profitability unless "(1) managerial talent is in excess supply, or (2) most firms engage in Beckerian taste-based discrimination (Becker, 1957), and are thus willing to sacrifice profits just to avoid employing women."

Neither scenario is overwhelmingly likely in Norway as it is one of the most egalitarian and equality driven nations in the world (WEF, 2017). On the other hand, if a regulation on the board composition reduces the benefit packages of managers, it may lead to a positive effect on firm performance (Bebchuk & Fried, 2005). If a regulation on the board composition only leads to window dressing, the adding of women will most likely not affect firm performance (Helland & Sykuta, 2004).

2.1.3 Board Independence

Since the 60s, boards have commonly become more independent from the management than the traditional family-enterprise allowed. Largely, shareholders

have viewed this as a positive development, but academia has struggled with connecting board independence to company performance.

When studying the effect of board independence, we face the challenge of measuring the level of independence of each board member in relation to the management. The director of a company might be independent on paper but have affiliations to the management through past colleagueship and/or friendship. The director may have been appointed the directorship due to a relationship to the CEO or management and is therefore not truly independent.

Now, this is not necessarily a bad thing. Researchers have studied the effects of board independence with various results. Baysinger and Butler (1985) find a positive relationship between board independence and firm performance.

However, the research of Bhagat and Black (2002) suggests that the norm of a "supermajority independent" board, is not necessarily the optimal composition. They argue that a board dominated by independent members combined with inside directors and members with affiliations to the company might bring a level of insight that translates to benefits for the shareholders – at least no obvious harm to investors could be detected.

Finally, we expect the board executives of private limited firms to be less independent compared to public limited firms, as many private firms are assumed to be family owned.

2.1.4 Outside Board Members

An outside board member is defined as a member of a company's board who is not a stakeholder or an employee in the company. The number of outside board members is a central variable in the matrix of changes resulting from the Norwegian quota. Will companies search for female candidates within the firm, or will they look for an outside director?

Weisbach (1988) argues that boards dominated by outside directors are more likely to force a CEO turnover after poor company stock performance. The effect of the

replacement if a CEO in such a situation, is found to have a positive effect on performance measures.

Rosenstein and Wyatt (1990) support the idea of a positive relation between outside directors and performance. They find that the addition of an outside director, even though the board is already outside dominated, is associated with an increase in firm value.

There is no one consensus in academia regarding inside and outside board members and their effect on firm performance, but there is considerable support for the positive relationship between outside board members and performance.

2.1.5 Size of Board

The quota specifies that at least 40 percent of the board has to be represented by each gender. This begs the question of Beckerian taste-based selection: Will the public companies opposed to women choose smaller boards for the benefit of fewer women, or will they keep the size of the board unchanged, and will this affect the board size of private firms as well?

The academic research in the field is largely focused on finding the optimal board size and how changes in the number of board members affect performance. Yermack (1996) finds an inverse association between board size and firm value. O'Connell and Cramer (2010) find a negative relationship between board size and financial performance, while Cheng (2008) claims that performance measures and firm value are less volatile in companies with large boards. Again, the results show both positive and negative effects of increased board size.

2.1.6 Busy Board Members

Historically, busy board members have been associated with inadequate monitoring as the servicing of multiple boards may result in overstretched directors who do not employ their full potential in each firm.

Fich and Shivdasani (2006) confirm this popular view. They find that companies, where the majority of board members are busy outside directors, have significantly

lower market-to-book ratios and operating performance. However, they also find that busy outside directors are more likely to leave the boards of underperforming firms. As a result, they suggest that the potential of endogeneity is present in their conclusions. Regardless, they conclude that boards which rely heavily on busy outside directors are likely to experience a decline in the quality of their corporate governance.

Field, Lowry, and Mkrtchyan (2013) find that the effect of busy board members depends on the maturity of the firm. They argue that busy directors have broader experience and are therefore able to provide better advisory. As younger firms – or firms that have recently gone public – lack experience, they have a higher demand for advisors in the early stages of the firm. The evidence supports a positive relationship between busy boards and firm performance for newly listed firms. As firms mature, this positive effect wears off.

We expect the female board executives of a private firm to be busier after the quota implementation, as public firms are likely to recruit from the non-affected private firms.

2.1.7 Board Diversity

Female board representation in public firms increased from 18 to over 40 percent in Norway between 2006 and 2008 (Matsa & Miller, 2013), while only minor changes were seen in board diversity of companies included in Fortune 500. The female representation in these companies has only increased from 14.7 to 16.1 percent in the years between 2001 and 2011 (Johns, 2013).

While a woman is a relatively rare sight on the board of a Fortune 500 company, Adams and Ferreira (2009) suggest that diversity has a positive impact on performance in firms that otherwise have weak governance. However, in companies with strong governance, enforcing gender quotas could have an over-monitoring effect on the board's work, leading to restricted decisive impact and decreased shareholder value. Evidence does not support the claim that such policies would improve firm performance on average, and the authors claim that including women on boards must be motivated by other reasons than the ones mentioned previously.

Empirical evidence suggests that women are on average, more risk-averse than men (Sapienza, Zingales, & Maestripieri, 2009). However, a study from Sweden finds that female directors are on average more risk-loving than their male counterparts (Adams & Funk, 2012), making their input on the board more ambiguous for shareholders in terms of risk-taking.

An increased number of female board members appears to have a positive impact on performance measures, according to multiple studies (Carter, Simpson, & Simkins, 2003; Erhardt, Werbel, & Shrader, 2003; Schwartz-Ziv, 2013). Other researchers found no relationship and even a negative relationship between gender diversity and performance (Dobbin & Jung, 2011; Siciliano, 1996). These findings suggest that there are both positive and negative sides of gender diversity on boards.

Additionally, Ali, Ng, and Kulik (2014) find a positive relationship between low levels of board age diversity and firm performance. However, they also find that companies with high levels of board age diversity experience high levels of employee productivity.

2.1.8 Executive Age

Henry Ford once said, "Anyone who stops learning is old, whether at twenty or eighty. Anyone who keeps learning stays young. The greatest thing in life is to keep your mind young.". Age is often seen in the context of experience and knowledge. However, does the age of company executives affect firm performance?

Firstly, Davis (1979) finds no relationship between executive age and corporate performance. This result is also found by Peni (2014), who finds no significant association between CEO age and Tobin's Q. However, he finds a positive and significant association between CEO age and return on assets. Secondly, he finds a negative relationship between the age of the board's chairperson and Tobin's Q. Thirdly, Bertrand and Scholar (2003) argue that older executives are more conservative in their work, which may affect corporate performance. However, the impact can be either positive or negative.

Lastly, both younger and more mature CEOs may have a tendency to focus on short term goals; More mature CEOs are prone to prioritizing projects that pay off before they retire (Gibbons & Murphy, 1992), while younger CEOs tend to prioritize fast results in order to build their network and reputation (Hirshleifer, 1993).

2.1.9 Effects of the Norwegian Gender Quota

There are already existing findings regarding the gender quota's effect on public firms. We will focus on three studies that use differing approaches. The first two argue that the quota had a negative effect, and the last paper finds the quota to have a positive effect on firm performance.

The most acknowledged paper on this topic is Ahern and Dittmar (2012). They examine how the new regulation affected both short- and long-term performance. They also gather and analyze how various board characteristics changed as a result of the Norwegian quota.

To analyze the short-term effect, they observe the stock price reactions after Ansgar Gabrielsen's public announcement. They found that his statement had a negative and significant effect on the stock price of the companies affected by the new law. When analyzing the long-run effect of the quota, they study how board characteristics changed in the years between 2001 and 2009. They argue that the limited pool of new female candidates led to changes in board characteristics for the firms affected. These firms also had a substantial decline in Tobin's Q.

Another valuable paper on the topic is Matsa and Miller (2013). They study the quota's impact on corporate decisions by comparing the firms affected by the quota to other Nordic public and private companies. Their findings show that the quota had a significant effect on employment and accounting variables like return on assets. They argue that the firms affected had declining profits in the period between 2006 and 2009. This result was found both when comparing affected to non-affected firms within Norway, and Norwegian firms to Nordic firms, as well as public and private firms in Norway and other Nordic countries (triple-difference estimate). Matsa and Miller (2013) also find that the labor cost increased as

employment rose and argues that the decline in profits is due to the increased labor cost. As a result, they claim that gender quotas can affect corporate strategy.

Finally, Nygaard (2011) claims that the most critical date to study is December 9, 2005, the day the government announced that the law would be compulsory and fully implemented by January 2008. Therefore, Nygaard studies the abnormal stock returns on December 9, 2005, and finds a positive reaction. He argues that firms with high information asymmetry and/or few female directors had a positive reaction to the quota, whereas companies with low information asymmetry and many female directors were not affected.

Ferreira (2014) has criticized the existing literature and brings up five challenges that are common for all research papers that measure the effect of female directors on firm performance.

The first issue is timing. As there have been several announcements about the new regulation, there is not one date where you find the "true market reaction" to the introduction of the quota. Ahern and Dittmar (2012) and Nygaard (2011) have studied different dates and found opposite stock price reactions. This illustrates the difficulties faced when studying the market reactions of the quota.

The second and third issues Ferreira discusses is the choices of the control group and sample selection. He argues that there is no natural control group to the affected Norwegian public limited firms and that the organizational changes made by many exposed firms also can affect the results found.

The fourth issue he brings up is a multitude of confounding effects due to other regulation changes during the sample periods. Both the change in the Norwegian Code of Practice for Corporate Governance and the adoption of IFRS accounting rule might have an impact on the findings.

The last issue discussed in Ferreira (2014) is mechanism. Ahern and Dittmar (2012) find that the female directors appointed were younger and thus less experienced,

whereas Matsa and Miller (2013) argue that the gender quota affected corporate strategy.

As illustrated by Ferreira's discussions, there are areas in existing research that can be improved. As our study focuses on long-run effects, we will use the advantage of more and newer data, to see if we can find evidence and effects of a higher female representation in private limited firms both in terms of board representation and CEO positions.

The diverse findings and drivers of firm performance demonstrate some of the challenges that corporate governance research faces and that we have to deal with in this paper.

3 Methodology

3.1 Hypotheses

3.1.1 Research Questions

To see whether private companies in Norway changed their governance as a result of the imposed quota, we will analyze whether there are any changes in their appointment of female candidates before and after 2008. To get a better understanding of different drivers of gender diversity, we analyze how different company- and board characteristics can affect board diversity. Furthermore, we will test whether CEO turnover is characterized by alternating from female to male held positions.

To better understand the levels of diversity in executive positions, we will compare the levels of female executives to the portion of females in studies with lengthy curricula to see whether the current levels and its developments can be justified by the level of diversity in the workforce.

Finally, according to Barry, Hatfield, and Kominers (2014), increased monitoring of diversity should – in the absence of empty voters[2] – improve the performance of the firm. Therefore, we will analyze how diversity in boards and CEO positions affect firm performance.

From these results, we will discuss to what extent the quota had the effect it was intended to have on the Norwegian private firms and whether or not it was a justified decision to impose such a quota at the time.

To analyze the above questions, we have constructed the following hypotheses:

$H_{0,1}$: The average increase in the portion of female board members and CEOs did not change after the quota implementation.

> *Rejection of the null hypothesis implies that the average increase in the portion of female board members and CEOs changed after the quota implementation. This may suggest that Norwegian companies changed their*

[2]An actor's voting rights exceed her economic interests in the firm (Barry et al., 2014)

governance in terms of appointment of female executives. However, we must compare the rate of increase in the portion of female executives to the portion of qualified female candidates in the workforce. Moreover, we expect an increased demand for female executives in Norwegian public firms. As a result, we must be careful when concluding.

$H_{0,2}$: Company- and board characteristics do not affect the gender balance in the boardroom.

Rejection of the null hypothesis implies that company- and board characteristics affect the gender diversity of Norwegian boards. The sign of the coefficient estimates will tell us which characteristics are positively and negatively associated with a higher level of board diversity.

$H_{0,3}$: The portion of female board members is not related to the gender of the CEO

We will divide the companies into groups based on the portion of female board members. Then, we will analyze if we are more likely to observe female CEOs in companies with higher portions of female board members.

$H_{0,4}$: Board turnover is not associated with increased board diversity.

Rejection of the null hypothesis implies that board turnover is associated with increased board diversity. This implies that the board's level of diversity is likely to increase when a company replaces one or multiple members of the board. This, in turn, suggests that there is a higher frequency of male to female board member replacements than from female to male.

$H_{0,5}$: The pool of qualified candidates does not affect the gender balance in the board of directors.

We will compare the portion of female board members and CEOs with educational data collected from Statistics Norway.

$H_{0,6}$: Financial performance is unaffected by the gender diversity of the company's board of directors.

Rejection of the null hypothesis implies that financial performance is affected by the gender diversity of the company's board of directors. The sign of the coefficient estimates will tell us whether gender diversity is positively or negatively associated with firm performance.

$H_{0,7}$: Financial performance is unaffected by the gender of the CEO.

Rejection of the null hypothesis implies that the gender of the CEO affects firm performance. The sign of the coefficient estimate will tell us if female CEOs are positively or negatively associated with firm performance.

3.2 Data

The data set is retrieved from the Centre for Corporate Governance Research (CCGR) in December 2018 and consists of 1,769,989 observations of Norwegian private companies throughout 2000-2015. By construction, a board size lower than two cannot represent diversity, and as one of our objectives is to see how board composition affects firm value, we dropped all companies with average board size less than two. The same applies to companies where the average board size is missing. Moreover, we dropped all companies with only one observation and average assets less than 100,000 NOK. We also wanted to rule out inactive companies, so all companies with average revenues less than NOK 1.00 were dropped. Finally, we removed companies with gap years in the data as this would create errors in the calculation of turnovers and return on assets. After these alterations, the data sample consisted of 559,906 observations of 76,867 companies.

3.3 Model Estimation

A panel data model analysis is used to test our hypotheses. STATA is used to construct the analyzes. Panel data regression models are appropriate for data sets containing multiple companies across multiple periods (Woolridge, 2010). Our data set is an unbalanced, as the number of periods available varies between companies.

To test the hypotheses, we will run the following regressions and test:

Two-sample t-statistic to test the difference in means.

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sigma_{\bar{X}_1 - \bar{X}_2}} \tag{1}$$

$$\begin{aligned} Female\ Board\ Members_{it} &= \alpha + Female\ CEO_{it} + Board\ Size_{it} + Firm\ Age_{it} \\ &+ Firm\ Size_{it}(+Family\ Firm_{it}) \\ &+ After\ Quota_{it}\left(+D_{industry} + D_{time}\right) \end{aligned} \tag{2}$$

$$\begin{aligned} Board\ Turnover_{it} &= \alpha + Diversity\ Measure_{it} + ROA_{it-1} + Firm\ Size_{it} \\ &+ Firm\ Age_{it} + Family\ Firm_{it} + Firm\ Risk_{it} \\ &+ Board\ Size_{it} + After\ Quota_{it} \end{aligned} \tag{3}$$

$$\begin{aligned} ROA_{it} = \alpha &+ Diversity\ Measure_{it} + CEO\ Age_{it} + Chair\ Age_{it} \\ &+ Board\ Age_{it} + Board\ Size_{it} + Firm\ Age_{it} \\ &+ Firm\ Size_{it}(+Family\ Firm_{it}) + Firm\ Risk_{it} \\ &+ After\ Quota_{it}\left(+D_{industry} + D_{time}\right) \end{aligned} \tag{4}$$

$$\begin{aligned} ROA_{it} = \alpha &+ CEO\ Gender_{it} + CEO\ Age_{it} + Chair\ Age_{it} \\ &+ Board\ Age_{it} + Board\ Size_{it} + Firm\ Age_{it} \\ &+ Firm\ Size_{it}(+Family\ Firm_{it}) + Firm\ Risk \\ &+ After\ Quota_{it}\left(+D_{industry} + D_{time}\right) \end{aligned} \tag{5}$$

3.3.1 Definitions of Variables

'Female CEO' is a dummy variable which takes on the value 1 if the CEO is female, and 0 otherwise. We believe the gender of the CEO will have an impact on the diversity of the board in two ways. Firstly, the CEO may have some influence on the election of board members. Secondly, if a female CEO has performed well, the shareholders and other stakeholders may obtain an increased belief in women in general, hence be more likely to elect female candidates to the board.

'Board Age' is the average age of the board members. As male board members are believed to be older than their female counterparts Ahern and Dittmar (2012),we believe a higher board age will reflect a lower degree of gender diversity in the board. On the other hand, age can proxy for experience, and an experienced board is assumed to create value for the company.

'Board Size' is the number of seats at the board of each company each year. Larger boards are likely to have more room for diversity and are believed to have a positive impact on female recruitment in directorship. Nevertheless, a board too sizeable may become unfocused, and it can become confusing and time-consuming to reach consensus. Hence, a large board can have a negative impact on financial performance.

'Board Turnover' is a dummy variable which takes on the value 1 if there has been a change in the board composition, and 0 otherwise. This variable will help us analyze whether turnover is associated with the appointment of female or male directors. We will also use it to study in which direction gender diversity moved when the size of the board increased.

'Family Firm' is a dummy variable which takes on the value 1 if a family holds more than 50 percent of the company's shares, and 0 otherwise. Due to the desire to keep the company in the family and the natural 50/50 probability of giving birth to a male or a female child, we believe family firms to be more gender diverse than non-family firms. However, to analyze the difference between family firms and non-family firms, rather than the companies that switch between the two, this variable will mostly be included when running the regression with random effects.

We calculate the natural logarithm of the book value of assets and use it as a proxy for 'Firm Size'. We expect to find a positive association between firm size and diversity. This because larger firms often are associated with larger boards, which again is associated with higher diversity. Larger firms are also expected to be more focused on diversity as external factors like media attention more frequently pressure them. Besides, we expect the firm size to be positively related to financial

performance as they are more likely to produce with the benefit of economies of scale.

'Firm Age' is constructed such that all firms with observations in the year 2000 were assumed to be 13 years old (due to the average firm age in Norway being 13), all other given the value 1 at their first observation. We believe more mature firms to have more stable cash flows and thus better results than younger firms.
Our data set does not include any measure of experience. A more mature person is also likely to be more experience, hence; 'CEO Age' and 'Chair Age' proxies for the experience of the CEO and chairman. We do believe that an experienced CEO or chairman is more likely to make good decisions and therefore expect a positive relationship with respect to financial performance. However, if the CEO or chairman is close to retirement, his time horizon will likely be short, and the decisions may not be in the best interests of the company in the long run.

'Firm Risk' is the recursive standard deviation of growth in revenue and is created to risk-adjust financial performance. Risky firms are more likely to experience high returns, commonly known as the "risk-return tradeoff" (Hull, 2018).

'After Quota' is a dummy variable which takes the value 1 if the observation took place in the year 2008 or later, and 0 otherwise. We expect this variable to be statistically insignificant as we do not expect any dramatic changes in company- or board characteristics in the unaffected private firms.

The variable 'ROA' (return on assets) measures financial performance. Return on assets is calculated by dividing operating income in a given period by the total value of assets.

$$ROA_{it} = \frac{Operating\ income_{it}}{(Assets_{it-1} + Assets_{it})/2} \tag{6}$$

We will measure diversity in three different ways, to be sure to cover all aspects of gender diversity. 'Female Board Members' is a variable displaying the level of

gender diversity and is constructed by dividing the number of female board members by the total number of board members.

$$Female\ Board\ Members_{it} = \frac{Female\ Directors_{it}}{Total\ Number\ of\ Directors_{it}} \tag{7}$$

'Blau's Index' is used as a second measure of diversity. This is an index that takes on values between 0 and 0.5, where 0.5 will occur when there is an equal number of men and women on the board.

$$Blau's\ Index = 1 - \sum_{i=1}^{n} p_i^2 \tag{8}$$

Here, p_i is the proportion of board members in each of the i categories, and n is the total number of board members.

Lastly, 'Diversity' is a dummy variable which measured the presence of diversity, but not the level. It allows us to observe differences between companies with heterogeneous and homogeneous boards, without considering the level of diversity.

$$Diversity \begin{cases} 1\ if\ both\ genders\ are\ represented \\ 0\ otherwise \end{cases} \tag{9}$$

3.3.2 Fixed versus Random Effects

If sources of unobserved heterogeneity vary cross-sectionally, but not over time, one can estimate industry fixed effects. We divided the companies into industries using the industry code already implemented in the CCGR database.

The Hausman procedure is widely used to empirically test whether an explanatory variable is endogenous or not. A random effects model is appropriate under the null hypothesis and a fixed effects model under the alternative hypothesis. The p-values for all our regressions are zero; hence, we reject the null hypothesis of no correlation between the explanatory variables is found (Table A, Appendix 1). Consequently, we use a fixed effects model for most of our panel data models.

However, if we want to analyze how family firms act compared to non-family firms, we cannot use fixed effects. The use of fixed effects will allow us to analyze those companies switching between being a non-family firm and a family firm. As such changes are rare in our sample, most of the information in the 'Family Firm' variable will be absorbed by the fixed effects. Henceforth, we do run some regressions with random effects to be able to analyze the effect it has to be a family firm compared to a non-family firm.

3.3.3 Correlation

The Pearson correlation matrix between the regression variables is displayed in table 1. The correlation between return on assets and gender diversity is close to zero. Firm size is negatively correlated with gender diversity, which implies that larger firms have a lower degree of diversity in their boards. Nevertheless, board size is negatively correlated to the proportion of female board members (-0.05) but positively correlated to diversity (0.16) and Blau's Index (0.09). This suggests that diversity, in general, is higher across larger boards, yet the proportion of female board members are not increasing at the same pace. Firm size and board size are positively correlated (0.24), indicating that larger companies also have larger boards.

Pearson Correlation Matrix

	Firm Age	Firm Risk	Firm Size	Family Firm (D)	Female CEO (D)	CEO Age	Chair Age	Board Age	Board Size	Female Board Members	ROA	Blau's Index	Diversity (D)
Firm Age	1.0000												
Firm Risk	-0.0141	1.0000											
Firm Size	0.1261	0.0107	1.0000										
Family Firm (D)	0.0782	-0.0170	-0.1449	1.0000									
Female CEO (D)	-0.0417	-0.0039	-0.1514	0.0644	1.0000								
CEO Age	0.2659	0.0018	0.0249	0.0483	-0.0972	1.0000							
Chair Age	0.2707	-0.0040	0.1099	0.0260	-0.0492	0.5299	1.0000						
Board Age	0.3234	-0.0017	0.0875	0.0032	-0.0388	0.6046	0.6906	1.0000					
Board Size	-0.0311	0.0069	0.2365	-0.4252	-0.0185	-0.0338	0.0587	-0.0272	1.0000				
Female Board Members	0.0169	-0.0075	-0.1690	0.1987	0.5633	0.0496	0.0077	0.0000	-0.0502	1.0000			
ROA	0.0137	-0.0029	0.0818	0.0138	-0.0069	-0.0014	-0.0036	-0.0089	-0.0158	-0.0009	1.0000		
Blau's Index	0.0402	-0.0073	-0.0748	0.1832	0.2869	0.0995	0.0887	0.0783	0.0904	0.6594	0.0006	1.0000	
Diversity (D)	0.0418	-0.0070	-0.0536	0.1538	0.2793	0.0943	0.0931	0.0731	0.1580	0.6408	-0.0007	0.9881	1.0000

Table 1: This table presents the Pearson correlation matrix between the dependent-, independent-, and control variables.

4 Results and Discussion

4.1 Summary Statistics

The mean, standard deviation, and median of each variable are presented in table 2.

Female Board Members Regression			
	Mean	Std. Dev.	Median
Dependent Variable			
Female Board Members	21.58 %	0.272	0.000
Independent Variable			
Female CEO (D)	0.180	0.384	0.000
Control Variables			
Board Size	3.046	1.187	3.000
Firm Age	12.522	8.606	14.000
Firm Size	14.548	1.615	14.529
Family Firm (D)	0.707	0.455	1.000
After Quota (D)	0.511	0.500	1.000

Board Turnover Regression			
	Mean	Std. Dev.	Median
Dependent Variable			
Board Turnover (D)	0.119	0.324	0.000
Independent Variable			
Female Board Members	21.58 %	0.272	0.000
Diversity (D)	0.424	0.494	0.000
Blau	0.191	0.225	0.000
Control Variables			
ROA	0.062	0.403	0.066
Firm Size	14.548	1.615	14.529
Firm Age	12.522	8.606	14.000
Family Firm (D)	0.707	0.455	1.000
Board Size	3.046	1.187	3.000
Firm Risk	1.118	4.652	0.255
After Quota (D)	0.511	0.500	1.000

ROA Regression			
	Mean	Std. Dev.	Median
Dependent Variables			
ROA	0.062	0.403	0.066
Independent Variables			
Female Board Members	21.58 %	0.272	0.000
Diversity (D)	0.424	0.494	0.000
Blau	0.191	0.225	0.000
Female CEO (D)	0.180	0.384	0.000
Control Variables			
CEO Age	47.985	11.028	48.000
Chair Age	51.214	11.447	51.000
Board Age	48.756	8.736	48.750
Board Size	3.046	1.187	3.000
Firm Age	12.522	8.606	14.000
Firm Size	14.548	1.615	14.529
Family Firm (D)	0.707	0.455	1.000
After Quota (D)	0.511	0.500	1.000

Table 2: This table presents the summary statistics for the regressions listed in the main text as equation (1) to (5).

4.1.1 Female Board Representation in Private Companies

Female board representation has monotonically increased through the sample period, both in terms of the number of female board members and the portion of female members. The total number of female board members increased with 9,712, from 16,084 in 2000 to 25,796 in 2015. Female board members, therefore, make up 58% of the total increase in the number of board seats of 16,806 over the same period.

The portion of female directors increased by 6.3% from 18% in 2000 to 24.3% in 2015 (Table B, Appendix 2). However, we find large deviations from the sample mean in different industries. Typical "male-dominated" industries such as fishing, mining, forestry, and building sectors had the lowest representation, whereas public administration, tourism, and agriculture had the highest female representation over the entire period. We also find that the industries with the highest level of female representation were among the industries with the highest increase in the portion of female directors and vice versa. After 2008, the portion of female board members in private firms was lower than the corresponding percentage in the public firms, which was affected by the quota. The overall sample average in the private firms at the end of 2008 was 22%, where fishing and forestry had the lowest average of 9% female representation, and public administration was closest to the quota's

requirements with an industry average of 36%. Seven years later, only two out of 18 industries were over 35%.

Moreover, industries with the largest portion of female directors had a lower average age than the sample average. The average age of board members in general also increased over the sample period. In 2000, the average age of a director was 46.7 years, and in 2015, the average director was 50.6 years old.

4.1.2 Female CEOs of Private Companies

We find the same pattern for female CEOs as for the previously discussed female directors. The total number of CEOs increased by 6,482, and the number of female CEOs increased by 3,249 over the sample period. The portion of female CEOs increased from 14% in 2000 to 22% in 2015 (Table C, Appendix 2). Here, as well as before, significant anomalies are found between industries. Forestry, fishing, and mining had a decrease in the portion of female CEOs with only 2-4% female representation in 2015. Public administration, agriculture, and tourism, however, had a substantial increase in the proportion of female CEOs with over 40% representation in 2015. The average age of CEOs, again, increased from 46.3 years to 50.5 years over the sample period.

4.2 Difference in Means

To analyze whether the quota affected private firms or not, we test the difference in means of female board representation before and after 2008. The test is defined in equation (1).

Average Portion of Female Executives Before and After Quota

	Pre-Quota	Post-Quota	Difference
Mean	0.1974 ***	0.2335 ***	-0.0361 ***
	(0.0005)	(0.0005)	(0.0007)
Std. Dev	0.2623	0.2798	
Observations	273,492	283,344	

Table 3: This table presents the results of the difference in means t-test. The test performed is defined in equation (1) in the main text. We report coefficient estimates, the standard errors (in parenthesis), as well as the standard deviation and the number of observations. The significance levels 1%, 5%, and 10% is denoted by ***, **, and *, respectively.

We find that the average female board representation was higher after 2008 compared to the levels before 2008 and that the mean difference is statistically significantly different from zero (Table 3). However, the difference in means can be driven by other factors, such as the changes in the gender diversity of the potential candidate workforce. Therefore, we calculate the annual changes in average female board representation and test if the average changes in means before 2008 are different from those after.

Average Change in Portion of Female Executives Before and After Quota

	Pre-Quota	Post-Quota	Difference
Mean	0.0036 ***	0.0020 ***	0.0016 ***
	(0.0002)	(0.0002)	(0.0002)
Std. Dev	0.0839	0.0798	
Observations	219,721	260,167	

Table 4: This table presents the results of the difference in means t-test. The test performed is defined in equation (1) in the main text. We report coefficient estimates, the standard errors (in parenthesis), as well as the standard deviation and the number of observations. The significance levels 1%, 5%, and 10% is denoted by ***, **, and *, respectively.

The test of difference in means shows that the average change in female board representation is lower after 2008 compared to the average before 2008. The mean difference is also statistically significantly different from zero (Table 4). These findings suggest that private firms did not increase their appointment of female board members after the quota. Their rate of appointments of female directorship slowed down after the quota was introduced.

When analyzing the change in the portion of female CEOs, we find the same pattern (Table D and E, Appendix 3). Therefore, our findings suggest that private firms did not increase their hiring of female executives, which was the quota's intention. Moreover, this may imply that private companies did not change their governance regarding appointments of female executives. However, the reason for a lower increase in the portion of female executives in private firms may be explained by increased demand for female executives in public firms.

4.3 Female Board Members

To test whether the gender of the CEO affects the portion of female board members, we run the regression specified in equation (2).

Female Board Members Regression Results

	Model 2.1	Model 2.2	Model 2.3
Female CEO (D)	0.0863 ***	0.0863 ***	0.1673 ***
	(0.0011)	(0.0011)	(0.0011)
Board Size	0.0190 ***	0.0189 ***	0.0193 ***
	(0.0003)	(0.0003)	(0.0003)
Firm Age	0.0030 ***	0.0012	0.0003 ***
	(0.0000)	(0.0008)	(0.0001)
Firm Size	-0.0020 ***	-0.0020 ***	-0.0056 ***
	(0.0002)	(0.0002)	(0.0002)
Family Firm (D)			0.0406 ***
			(0.0007)
After Quota (D)		0.0267 **	
		(0.0111)	
Constant	0.1357 ***	0.1425 ***	0.1496 ***
	(0.0033)	(0.0050)	(0.0036)
Fixed Effects	Yes	Yes	No
Time Effects	No	Yes	Yes
Industry Effects	No	No	Yes
R^2	0.1604	0.2040	0.3412

Table 5: This table presents the estimated coefficients of the independent variables for Norwegian private companies. The regression model is specified in equation (2) in the main text. The dependent variable is 'Female Board Members'. We report coefficient estimates, the standard errors (in parenthesis), and the significance level (1%, 5%, and 10% level of significance is denoted by ***, **, and *, respectively). Section 3.3.1 in the main text defines the variables. The industries are defined in table L, appendix 10.

Table 5 presents the results of the regression with, and without, industry- and time effects. The coefficient for 'Female CEO' is positive and statistically significant at the 1% level for all variations of the regression. Such a positive relationship would imply that a female CEO will increase the probability for more women at the board. However, we know that 'Female CEO' and 'Female Board Members' are correlated (0.56), so we cannot with certainty say which way the causation goes. Nevertheless, the causation is likely to go from board to CEO, as the board elects the CEO.

'Board Size' is stable for all versions of the regression, as well as statistically significant at the 1% level and implies a positive relationship. This implies that larger boards are more likely to have a higher level of diversity than smaller boards. A reason can be due to more room for diversity in larger boards. However, this can apply not only to gender but diversity in general.

When it comes to 'Firm Age', the coefficient is also positive and statistically significant at the 1% level. It indicates that more mature firms have higher gender diversity in the board of directors. A natural reason is that younger firms require a different skill set compared to more mature companies. Women may be better monitors while young firms need board members who excel in strategic choices.

'Firm Size' reveals a negative and statistically significant relationship with 'Female Board Members'. We would expect larger firms to have larger boards as well as to care more about diversity than smaller firms and consequently, have more gender-diverse boards. However, we find a negative association between the portion of female board members and firm size. This implies that the level of diversity is higher in small companies compared to larger companies. One reason for this can be that smaller firms are more likely to be family firms.

To remain control over the company, a family firm needs to appoint family members to the board. It is statistically an equal chance of getting a female or male relative. Hence, family firms are expected to have a higher representation of women. The coefficient for 'Family Firm' is positive and statistically significant at the 1% level for model 2.3, thus supports this expectation.

The coefficient for 'After Quota' reveals a positive and statistically significant relationship with 'Female Board Members'. This implies that the portion of female board members is higher after the quota. There are more women on the board after the quota than before (Table B, Appendix 2). However, we showed in section 4.2, the average change in the portion of female board members have declined after the quota implementation. Henceforth, it is right that the portion of female board members is larger after the quota implementation, but this is likely to be due to the steady growth rather than the quota itself.

4.4 Portion of Female Board Members and CEO Gender

To further analyze the relationship between the portion of female board members and the gender of the CEO, we divide the companies into ten categories ranging from lowest to highest percentage of female board members. Then, we find the number of male and female CEOs and divide on the total number of CEOs in each group, each year (Table F, Appendix 4). When comparing the groups, we find that a higher percentage of female board members increases the portion of female CEOs in each group – or vice versa.

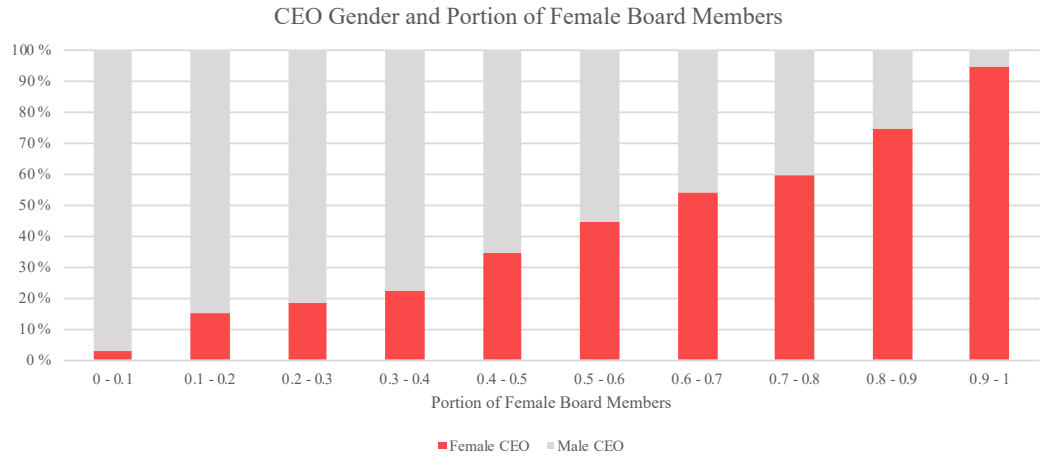

Figure 2: This figure presents the portion of female and male CEOs in Norwegian private companies. The companies are divided into groups depending on their portion of female board members.

Figure 2, shows that we are more likely to observe a male CEO in companies with a female board representation of less than 60 percent and that we are more likely to observe a female CEO in companies with more than 60 percent female board representation. These findings suggest that there is a relationship between the portion of female board members and the gender of the CEO, as we are more likely to observe a male CEO in companies with a low portion of female directors and more likely to observe a female CEO in companies with a high portion of female directors.

4.5 Board Turnover

To test the relationship between board diversity and board turnover, we run the regression specified in equation (3). The results are presented in table 6. We observe that the variables generally have a positive impact on board turnovers. Moreover, most of the variables are statistically significant.

Board Turnover Regression Results

	Model 3.1	Model 3.2	Model 3.3
Diversity (D)	0.2042 ***		
	(0.0269)		
Female Board Members		0.5477 ***	
		(0.0575)	
Blau's Index			0.3915 ***
			(0.0605)
ROA $_{t-1}$	-0.0283 **	-0.0279 **	-0.0284 **
	(0.0126)	(0.0125)	(0.0126)
Firm Size	0.0295 **	0.0322 **	0.0296 **
	(0.0134)	(0.0134)	(0.0134)
Firm Age	0.0137 ***	0.0129 ***	0.0139 ***
	(0.0037)	(0.0037)	(0.0037)
Firm Risk	0.0009 **	0.0009 *	0.0009 **
	(0.0005)	(0.0005)	(0.0005)
Family Firm (D)	-0.0096	-0.0089	-0.0073
	(0.0320)	(0.0320)	(0.0320)
Board Size	-0.1340 ***	-0.1152 ***	-0.1259 ***
	(0.0115)	(0.0109)	(0.0113)
After Quota (D)	-0.0488 *	-0.0496 *	-0.0485 *
	(0.0281)	(0.0281)	(0.0281)
Fixed Effects	Yes	Yes	Yes

Table 6: This table presents the estimated coefficients of the independent variables for Norwegian private companies. The regression model is specified in equation (3) in the main text. The dependent variable is 'Board Turnover'. We report coefficient estimates, the standard errors (in parenthesis), and the significance level (1%, 5%, and 10% level of significance is denoted by ***, **, and *, respectively). Section 3.3.1 in the main text defines the variables.

'Diversity' is statistically significant and indicates a positive impact on board turnover. The result implies that board turnover will increase when diversity is present. To discover whether the level of diversity in boards has an impact on board turnover, we have to look at the other diversity measures. The coefficient for 'Female Board Members' is also positive and statistically significant at the 1% level. The coefficient estimate for 'Blau's Index' reveals similar results. The three regression results imply that increasing gender diversity will increase board turnover.

The coefficient for 'ROA_{t-1}' is negative and statistically significant at the 5% level. This implies that there is a higher probability of board turnover following a year with poor financial performance. One reason can be that the shareholders feel the board has failed in its responsibility to supervise and guide the management. Another reason is that poor financial performance requires new knowledge and skills, hence a new member is appointed. Poor financial results are likely to affect both the board and the CEO. However, we find no significant relationship between 'ROA_{t-1}' and 'CEO Turnover' (Table G, Appendix 5).

The coefficient for 'Firm Size' is statistically significant at the 5% level and reveals a positive relationship to board turnover. Larger firms are more likely to have frequent turnovers than smaller firms. This can be due to a few large shareholders who contribute largely to the active governance of the firm.

Moreover, the regression results imply that more mature firms are more likely to have frequent turnovers than younger firms. The coefficient for 'Firm Age' is positive and statistically significant at the 1% level. Reasons for this may be that younger firms usually have fewer board members, and they are assumed less likely to be easily replaced. Most startups are run by people who have a relationship rather than an independent person elected for its knowledge.

'Firm Risk' reveals a positive relationship and is statistically significant. The result indicates that risky firms are more likely to have frequent board turnovers. Risky firms are more likely to experience poor performance, and the shareholders may blame the board and force a turnover.

The coefficient for 'Family Firm' is negatively related to board turnover. This implies that as a non-family firm becomes a family firm, it will observe less frequent turnovers. As board members of family firms are likely to be family members, it makes sense not to observe frequent turnovers. Doing such would make it difficult to keep control within the family. The coefficient is, however, not statistically significant, and the regression shows no evidence that new family firms observe another frequency in turnovers than non-family firms.

Our model reveals a negative and statistically significant relationship between 'Board Size' and 'Board Turnover'. As boards become larger, we observe less frequent turnovers. A reason for this may be that large boards are more likely to have people capable of handling different situations. Hence, there will be a reduced necessity for turnovers to handle demanding situations.

The coefficient for the variable 'After Quota' is negative and statistically significant at the 10% level. Such a relationship implies that private companies experienced less frequent turnovers after the quota implementation and in the years following.

4.5.1 Change in Gender Composition of Boards Following a Turnover

Diversity and board turnover are correlated, but it is likely that the causation goes the other way. More women may be appointed as a consequence of the turnover, hence diversity increases.

Change in Gender Composition in the Board of Directors

	Freq.	Percent
Increase in Portion of Women (Turnover)	12,402.00	23 %
Decrease in Portion of Women (Turnover)	9,310.00	17 %
Increase in Portion of Women (Board Size Decreased)	10,207.00	19 %
Decrease in Portion of Women (Board Size Increased)	8,487.00	16 %
Constant Level of Gender Diversity	13,799.00	25 %

Table 7: This table presents the change in the proportion of women represented on the boards of Norwegian private companies and the reason for the change.

To analyze the relationship between the level of diversity and board turnover we have divided the change of level of diversity in the board of directors to see whether the change was linked to board turnover or an increase – or decrease – in board size. As we can see from table 7, an increase in female board representation is more frequent than a decrease. When a turnover occurs, a woman gets appointed in 57% of the cases. Hence, we assume that turnovers increase the level of diversity, not the other way around, as assumed in the model explained in equation (6).

When turnovers, in general, are listed per year, there is a significant pattern in the frequency of the turnovers of the chairperson and the board of directors. There is an apparent increase in the rate of turnover around the period between 2008 and 2010 (Table H, Appendix 5). One reason may be the financial crisis ravaging in that

period. However, the turnovers for the CEOs do not follow the same pattern. These results assume that the gender quota is the main reason for frequent turnovers in this period. It is likely that the portion of female board members declines during this period if public firms indeed did appoint female board members from private firms to fulfill the quota requirements.

4.6 The pool of Qualified Candidates

To understand the low portion of female CEOs and board members, we analyze the gender representation at Norwegian universities across time. Assuming that the average student graduates when she is approximately 25 years old, we can compare the level of female representation in companies today, with the female representation at the university 20-25 years earlier ($46.7\text{-}25 \approx 20$). We find that the portion of female students at the university in 1980 was 40% and increased to 50% in 1988 and 53% in 1995 (SSB, 2019). However, in programs with a lengthy curriculum, i.e., master's and Ph.D. studies, the female representation was only 14.8% in 1980 and 25.8% in 1995 (Figure A, Appendix 6).

It would be natural to expect a higher representation of men in executive positions, as the number of male candidates with the experience and education required outnumber the female candidates. Moreover, we would expect a lower female representation in private firms after 2008 as the public firms may have recruited a high number of females as a result of the quota. Some of which was likely to come from the non-affected private firms.

When plotting female representation in executive positions together with the female representation in master studies at Norwegian universities 20 years before, we find a significant relationship (Figure 3).

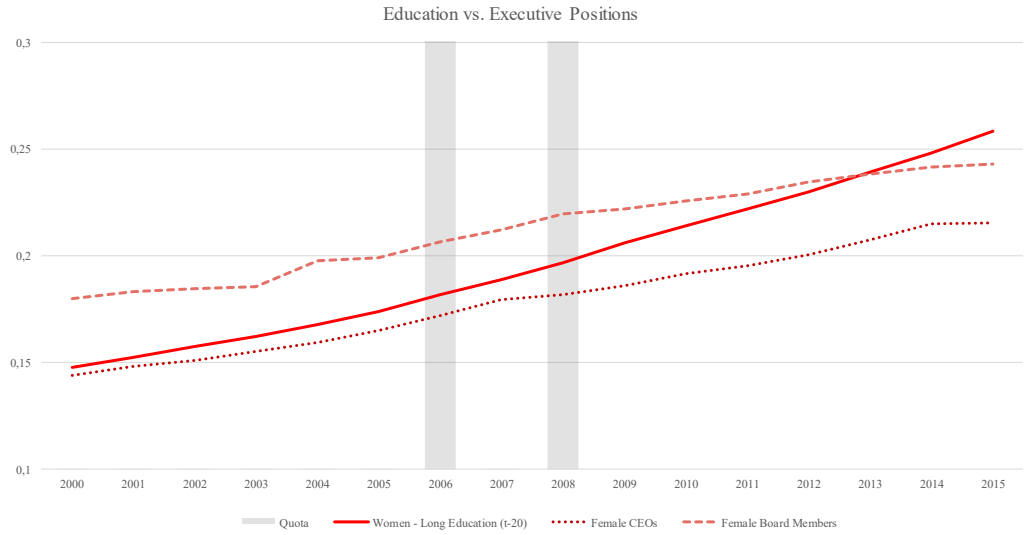

Figure 3: This figure presents the development of female CEOs and female board members with respect to the development of women's level of educational. In order to adjust for the time it takes to obtain the experience needed for the positions, the line representing a longer educational level (four years or more) is at time **t-20**, while all other lines are presented at time **t**. The bars represent the start and end of the quota period. Data is collected from Statistics Norway (Statistisk Sentralbyrå), and all numbers are reported in percentages where the portion of men and women together equals 100%.

We observe a clear relationship between the portion of females in studies with lengthy curricula at time $t-20$ and the portion of female CEOs and board members in Norwegian private firms at time t. The relationship is expected to be even more significant, as the average age of CEOs and board members is increasing over the sample period and should, therefore, be compared to the number of females in education 21-25 years before. Moreover, the tenure of CEOs and board members is often longer than one year. Therefore, the increase of female representation in relation to female graduates 20 years prior to any sample year will be somewhat lagged in effect. When calculating the correlations, we find a correlation between the portion of females in higher education, CEOs, and board members of 0.99 and 0.98, respectively (Table I, Appendix 7). The correlation is partly spurious, however, there is a clear trend.

There is also a visible decline in growth for the portion of female board members after the quota implementation in 2008. This pattern may be explained by the increased demand for female board members in public firms. Due to the limited pool of qualified women, these members are likely to be recruited from the non-affected private firms.

From our analysis of gender proportions present at Norwegian universities, we can argue that the level of female representation in CEOs and board members is justifiable related to the workforce available at the required level of education. This makes us wonder whether the quota was too optimistic and whether female board members may be recruited in favor of a better qualified male candidate, a view which is shared by one of the top executives in Norway (NTB, 2019).

We argue that diversity in private firms has moved slightly and has seen a natural development compared to education levels. However, there are significant deviations in both female CEOs and board compositions from private to public firms. Female board representation in private firms had increased slowly from 18% in the years before the quota was first announced. In the same period, public firms increase the portion of female board members from 5% to 11%. After Gabrielsen's announcement, we observe a large increase in female board representation in public firms (Ahern & Dittmar, 2012), whereas private firms continued the slow but steady growth.

4.6.1 Differences Between Private and Public Firms

Several factors may explain the significant differences between private and public firms. Firstly, a large number of private firms are family owned. As a result, they are often run by family members. Therefore, the family member(s) with the highest qualifications would most likely be appointed to CEO or get a seat at the board.

Secondly, smaller (private) firms may be better at recruiting board members and CEOs. We see that diversity at universities is reflected in the diversity of these companies' executive positions. Therefore, they may be better in valuing skills (level of education) over experience. Smaller firms have fewer resources to employ lots of staff with lots of experience. As a result, they value potential employees' sets of skills, rather than experience and external factors like gender and nationality, among others.

Thirdly, smaller firms may find it more costly to replace staff relative to larger firms. As a result, the turnover of CEOs and board members is expected to be lower.

Therefore, we may observe some "lagged" results in portions, as the changes in private firms are likely to be relatively less frequent than in public firms.

Lastly, we found the lowest levels of diversity in industries such as manufacturing, fishing, and the oil industry. These industries are – and have been historically – male-dominated, and we would, therefore, expect these industries to have lower levels of diversity also in the future.

Taking these factors into consideration, we argue that the levels of diversity in boards and CEOs of Norwegian private firms highly reflect the level of education and the skill set of the workforce. Therefore, we argue that gender representation has had a natural development in private firms over the last 16 years. Some companies may have felt pressured by the media to recruit female employees for public relations reasons. However, we do not see the same increase as public firms had during the introduction of the quota.

4.7 Financial Performance

4.7.1 Gender Diversity in Boards and Financial Performance

To analyze how diversity and other board characteristics affect firm performance, we run the regression defined in equation (4) on all three diversity measures. We include dummy variables for time to adjust for time effects. To risk-adjust the returns, we add a firm volatility measure. We will use firm fixed effects, as the Hausman test concludes.

When running the regressions without the time effects and without risk adjusting the returns, we find a positive and significant association between diversity and firm performance (Table 8). We also find that 'Firm Size' is positively related to firm performance and statistically significant at the 1% level. Moreover, we find a negative and significant relationship between 'Board Age', 'Board Size', 'Firm Age', and firm performance. Finally, we find a negative and significant association between 'After Quota' and firm performance, suggesting that companies had lower financial performance after 2008.

ROA Regression Results

	Model 4.1	Model 4.2	Model 4.3
Diversity (D)	0.0130 **		
	(0.0062)		
Blau's Index		0.0276 **	
		(0.0138)	
Female Board Members			0.0338 **
			(0.0133)
CEO Age	0.0001	0.0001	0.0001
	(0.0003)	(0.0003)	(0.0003)
Chair Age	0.0000	0.0000	0.0000
	(0.0003)	(0.0003)	(0.0003)
Board Age	-0.0009 **	-0.0009 **	-0.0009 **
	(0.0004)	(0.0004)	(0.0004)
Board Size	-0.0259 ***	-0.0256 ***	-0.0248 ***
	(0.0025)	(0.0025)	(0.0024)
Firm Age	-0.0043 ***	-0.0043 ***	-0.0044 ***
	(0.0007)	(0.0007)	(0.0007)
Firm Size	0.1472 ***	0.1472 ***	0.1473 ***
	(0.0021)	(0.0021)	(0.0021)
After Quota (D)	-0.0439 ***	-0.0439 ***	-0.0439 ***
	(0.0048)	(0.0048)	(0.0048)
Constant	-1.8856 ***	-1.8863 ***	-1.8946 ***
	(0.0361)	(0.0361)	(0.0363)
Fixed Effects	Yes	Yes	Yes
Time Effects	No	No	No
Industry Effects	No	No	No
R^2	0.0063	0.0063	0.0063

Table 8: This table presents the estimated coefficients of the independent variables for Norwegian private companies. The regression model is specified in equation (4) in the main text. The dependent variable is 'ROA'. We report coefficient estimates, the standard errors (in parenthesis), and the significance level (1%, 5%, and 10% level of significance is denoted by ***, **, and *, respectively). Section 3.3.1 in the main text defines the variables. The industries are defined in table L, appendix 10.

ROA Regression Results

	Model 4.1	Model 4.2	Model 4.3
Diversity (D)	0.0089		
	(0.0066)		
Blau's Index		0.0178	
		(0.0149)	
Female Board Members			0.0336 **
			(0.0143)
CEO Age	0.0002	0.0002	0.0002
	(0.0003)	(0.0003)	(0.0003)
Chair Age	-0.0003	-0.0003	-0.0003
	(0.0003)	(0.0003)	(0.0003)
Board Age	-0.0006	-0.0006	-0.0006
	(0.0005)	(0.0005)	(0.0005)
Board Size	-0.0232 ***	-0.0229 ***	-0.0226 ***
	(0.0027)	(0.0027)	(0.0026)
Firm Age	-0.0097	-0.0097	-0.0097
	(0.0062)	(0.0062)	(0.0062)
Firm Size	0.1429 ***	0.1429 ***	0.1429 ***
	(0.0026)	(0.0026)	(0.0026)
Firm Risk	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)
After Quota (D)	0.0219	0.0220	0.0215
	(0.0782)	(0.0782)	(0.0782)
Constant	-1.7678 ***	-1.7779 ***	-1.7682 ***
	(0.0666)	(0.0668)	(0.0666)
Fixed Effects	Yes	Yes	Yes
Time Effects	Yes	Yes	Yes
Industry Effects	No	No	No
R^2	0.0050	0.0050	0.0050

Table 9: This table presents the estimated coefficients of the independent variables for Norwegian private companies. The regression model is specified in equation (4) in the main text. The dependent variable is 'ROA'. We report coefficient estimates, the standard errors (in parenthesis), and the significance level (1%, 5%, and 10% level of significance is denoted by ***, **, and *, respectively). Section 3.3.1 in the main text defines the variables. The industries are defined in table L, appendix 10.

When adding the firm volatility measure and adjusting for time effects, we find no association between 'Diversity', 'Blau's Index', 'CEOs Age', 'Chair Age', 'Board Age', 'Firm Age' and firm performance (Table 9). However, a higher portion of female directors is associated with higher firm performance. Moreover, 'Firm Size' is also significant and positively related to firm performance, whereas 'Board Size' is negatively related to performance. Furthermore, the 'After Quota' coefficient is not statistically significant, suggesting no relationship between the quota and performance.

To analyze the relationship between family firms and firm performance, we run the same regression, however, with random effects. We also add industry dummies to adjust for industry effects. The regression results suggest a positive and significant association between family firms and firm performance (Table J, Appendix 8).

Our results suggest that an increased number of female board members is positively related to firm performance, which is in line with previous research (Carter et al., 2003; Erhardt et al., 2003; Schwartz-Ziv, 2013). Moreover, in line with Dobbin and Jung (2011) and Siciliano (1996), we find no significant relationship between diversity and performance. However, these results may be driven by other factors such as an increased level of busy board members, which again may be positive in some firms (Field et al., 2013). Another factor that may drive these results is monitoring. An increased level of female directors may increase monitoring, which may have a positive effect on performance in firms that have weak governance (Adams & Ferreira, 2009). As a result, the positive association between an increased level of female board members may be due to an increased level of monitoring. Since we find no evidence for a relationship between diversity and performance, we argue that the gender of the board members does not affect firm performance. This is what we would expect when the portion of female board members highly reflect the female representation in the qualified workforce, as the "optimal" board composition is likely to be obtained.

4.7.2 CEO Gender and Financial Performance

One of the quota's main goals was to increase the number of female CEOs through increased female board representation. To study how the CEOs gender affects firm performance, we run the regression specified in equation (5). As for board diversity, we risk-adjust the returns and add dummy variables for time.

ROA Regression Result

	Model 5.1	Model 5.2	Model 5.3
Female CEO (D)	-0.0142	-0.0140	0.0107 *
	(0.0092)	(0.0099)	(0.0065)
CEO Age	0.0000	0.0001	0.0006 **
	(0.0003)	(0.0003)	(0.0002)
Chair Age	0.0000	-0.0003	-0.0003
	(0.0003)	(0.0003)	(0.0003)
Board Age	-0.0010 **	-0.0007	-0.0013 ***
	(0.0004)	(0.0005)	(0.0004)
Board Size	-0.0241 ***	-0.0219 ***	-0.0269 ***
	(0.0024)	(0.0026)	(0.0021)
Firm Age	-0.0041 ***	-0.0096	-0.0009 ***
	(0.0007)	(0.0062)	(0.0003)
Firm Size	0.1472 ***	0.1429 ***	0.0861 ***
	(0.0021)	(0.0026)	(0.0017)
Family Firm (D)			0.0374 ***
			(0.0052)
Firm Risk		0.0000	0.0000
		(0.0000)	(0.0000)
After Quota (D)	-0.0438 ***	0.0224	-0.0467 ***
	(0.0048)	(0.0783)	(0.0078)
Constant	-1.8794 ***	-1.7621 ***	-1.0449 ***
	(0.0362)	(0.0667)	(0.0298)
Fixed Effects	Yes	Yes	No
Time Effects	No	Yes	Yes
Industry Effects	No	No	Yes
R^2	0.0062	0.0490	0.0106

Table 10: This table presents the estimated coefficients of the independent variables for Norwegian private companies. The regression model is specified in equation (5) in the main text. The dependent variable is 'ROA'. We report coefficient estimates, the standard errors (in parenthesis), and the significance level (1%, 5%, and 10% level of significance is denoted by ***, **, and *, respectively). Section 3.3.1 in the main text defines the variables. The industries are defined in table L, appendix 10.

The regression results shown in table 10 suggest that there is no association between female CEOs and firm performance. This is what we would expect as the portion of female CEOs in private limited companies somewhat reflects the portion of qualified female candidates in the workforce. Without any large deviations in these portions, we are more likely to find qualified CEOs running the companies.

4.8 Was the Gender Quota Necessary?

Our findings from the education levels of the Norwegian workforce suggest that the "fair" level of female representation is around 20%. However, we are likely to find female candidates without a higher degree, with the skillset and experience required for an executive position. Nevertheless, with a 40% minimum gender balance requirement, the probability of finding the optimal board composition is not very likely. Such requirements will mostly force companies to take on less qualified candidates. As a result, it will be more difficult for a male candidate to obtain a directorship. Based on the education level of the available female workforce, we argue that the quota was too optimistic when introduced in 2006 (2008), and it toughened male competition for limited seats at the board. However, we expect female representation to be higher in the future, as the diversity in studies with a lengthy curriculum today shows a female representation of almost 50% (SSB, 2019). We also find that the turnover in top executive positions favors women, in that men, are more often replaced by women than vice versa (Table K, Appendix 9)

Therefore, we argue that gender diversity should not be forced. It takes time to accumulate the experience needed to qualify for an executive position. A possible solution may be to force change in the recruiting process as pioneered in Denmark (N.A., 2019). This way, companies will obtain the most qualified candidates in terms of skills and not be biased to by experience and external factors.

5 Limitations

Omitted unobservable company characteristics may give rise to endogeneity concerns (Adams & Ferreira, 2009). The omission of a variable explaining the dependent variable may lead to a correlation between the dependent variable and the residual term in the regression model (Brooks, 2014). In this paper, we address the endogeneity issue by including several control variables in the regression models. Additionally, the regressions are run with both company and time effects to control for unobservable heterogeneity, which may be constant over time for every company. Therefore, we have tackled the endogeneity problem to some degree.

When two variables of interest are influenced by the same third variable, or the two variables influence each other, we can end up with results affected by reverse causality (Stacescu, 2018). Unfortunately, we cannot state with certainty that this is not the case with the results we present.

Furthermore, we cannot say whether women get appointed CEOs and board members more often because their collective level of education increases, or whether women's level of education increases because more women are appointed CEOs or board members. However, we have paired the portion of female CEOs and board members in year t with the data regarding female education for year $t - 20$ to adjust for the time it takes to build up enough experience to be suitable for the occupation. This reduces the reverse causality problem to some degree.

6 Conclusion

This study evaluates changes in the governance of private limited firms as a result of the Norwegian gender quota. We analyze whether the mechanisms of the quota correspond with its intentions, and how gender diversity in executive positions developed in the years between 2000 and 2015. In addition, we analyze how gender diversity in boards and CEO positions affect financial performance.

We find a positive development in the number of appointed female board members and female CEOs in private companies after the quota implementation. However, the average increase in the portion of female executives was lower in the years following the implementation compared to prior years. We believe that these results may be driven by increased demand for female executives in public limited companies. When taking this into consideration, we argue that private limited companies did not change their governance as a result of the quota.

Further, we find evidence for a positive and significant association between female CEOs and the portion of female board members. The dependent and independent variables are correlated, hence we cannot with certainty say whether the female CEO affects the portion of female board members or vice versa. However, further analyses provide evidence for the probability of observing a female CEO increasing with the portion of females on the company's board. There is also evidence for a positive relationship between board turnover and increased level of diversity. These findings suggest that the changes enforced by the quota are in line with their purpose; to increase the portion of women in executive positions.

However, gender diversity seems to be driven by something else than the gender quota. When comparing the portion of women in executive positions with the portion of female students enrolled in programs with a lengthy curriculum at the university 20 years ago, we find a significant relationship. The portions are, nevertheless, considerably lower than the quota requirement of 40 percent.

Our analysis of board diversity in relation to financial performance is in line with previous findings and suggests that an increase in the number of female board members is positively associated with financial performance. However, these

results may be driven by other factors, such as an increased level of busy board members and increased monitoring. Moreover, we find no significant relationship between diversity and performance. This is what we would expect, as an optimal board composition is more likely to be found in the non-affected private firms. Therefore, we argue that the board member's gender does not affect financial performance. Furthermore, we find no association between the gender of the CEO and firm performance.

In conclusion, we find no evidence for any significant changes in the governance of private limited firms following the implementation of the gender quota. We believe the increase in women's level of education is a more valid driver for the increase of female representation in private limited firms. The quota may have accelerated the portion of female board members in public limited firms, but the requirement of 40 percent can be seen as too ambitious. The trend indicates that the market stabilizes itself at a higher percentage of women, with a close to gender-equal top executive Norway within 20 years. However, our findings show that female board representation is positively associated with female CEOs, which were one of the main effects expected by Norwegian politicians.

To further dive into this topic, we propose that further research in the economic literature on gender diversity regarding executive positions in Norway should focus on women and corporate strategy. With a potentially larger female body of executives in the future, does the increased number of women in decision-making roles make a company more environmentally concerned? Will companies take a greener strategic approach to performance? Will green strategies produce a positive alpha?

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8 Appendix

Appendix 1:

Hausman: Fixed vs Random Effects

	Model 5	Model 7.1	Model 7.2	Model 7.3	Model 8
Female CEO (D)	0.000				0.000
Female Board Members		0.000			
Blau			0.000		
Diversity (D)				0.000	

Table A: This table presents the change in the proportion of women represented on the boards of Norwegian private companies and the reason for the change

Appendix 2:

Proportion Female Board Members Across Industries

Industry	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
0	20 %	19 %	19 %	18 %	20 %	19 %	20 %	27 %	30 %	28 %	30 %	30 %	31 %	31 %	30 %	31 %
1	22 %	23 %	23 %	24 %	26 %	27 %	27 %	27 %	29 %	31 %	32 %	33 %	39 %	37 %	35 %	36 %
2	9 %	9 %	9 %	8 %	9 %	9 %	8 %	9 %	9 %	9 %	9 %	10 %	13 %	12 %	13 %	14 %
3	8 %	7 %	7 %	8 %	9 %	8 %	9 %	10 %	9 %	10 %	10 %	10 %	11 %	11 %	11 %	11 %
4	12 %	12 %	12 %	11 %	12 %	12 %	11 %	11 %	14 %	14 %	14 %	15 %	13 %	13 %	13 %	14 %
5	15 %	15 %	15 %	15 %	16 %	16 %	17 %	18 %	20 %	21 %	21 %	22 %	23 %	23 %	23 %	23 %
6	11 %	11 %	11 %	10 %	11 %	11 %	11 %	11 %	12 %	12 %	12 %	12 %	13 %	13 %	13 %	13 %
7	7 %	7 %	8 %	8 %	11 %	11 %	12 %	11 %	12 %	12 %	13 %	13 %	14 %	15 %	14 %	15 %
8	10 %	11 %	11 %	10 %	11 %	11 %	11 %	11 %	12 %	12 %	12 %	12 %	12 %	12 %	13 %	13 %
9	21 %	22 %	22 %	22 %	23 %	24 %	24 %	24 %	25 %	25 %	25 %	25 %	26 %	27 %	27 %	27 %
10										16 %	16 %	16 %	16 %	16 %	17 %	17 %
11	27 %	28 %	29 %	29 %	30 %	30 %	30 %	31 %	32 %	32 %	31 %	32 %	32 %	32 %	32 %	33 %
12	18 %	18 %	19 %	19 %	19 %	20 %	20 %	21 %	22 %	16 %	16 %	16 %	16 %	16 %	17 %	17 %
13	14 %	14 %	15 %	15 %	16 %	16 %	17 %	18 %	19 %	25 %	24 %	24 %	24 %	23 %	24 %	24 %
14	19 %	20 %	19 %	19 %	21 %	20 %	20 %	20 %	21 %	22 %	22 %	23 %	23 %	23 %	23 %	24 %
15	19 %	19 %	19 %	20 %	21 %	21 %	23 %	23 %	24 %	26 %	27 %	28 %	28 %	29 %	29 %	29 %
16	25 %	27 %	27 %	28 %	30 %	32 %	33 %	35 %	36 %	38 %	39 %	39 %	40 %	41 %	41 %	41 %
17										28 %	27 %	31 %	31 %	29 %	25 %	22 %
Total	18 %	18 %	18 %	19 %	20 %	20 %	21 %	21 %	22 %	22 %	23 %	23 %	23 %	24 %	24 %	24 %
Number of Women	16084	18542	19434	20026	21407	21994	22149	22609	23470	23532	24027	24482	25628	26382	25956	25796

Table B: This table presents the portion of female board members across industries, as well as the total number of female board members in each industry. The industries are defined in table L, appendix 10.

Proportion Female CEOs Across Industries

Industry	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
0	13 %	14 %	13 %	13 %	14 %	15 %	15 %	17 %	17 %	19 %	20 %	20 %	20 %	20 %	21 %	21 %
1	14 %	15 %	17 %	19 %	21 %	19 %	22 %	22 %	24 %	26 %	27 %	28 %	38 %	39 %	39 %	41 %
2	6 %	6 %	6 %	5 %	4 %	4 %	3 %	2 %	3 %	3 %	4 %	4 %	3 %	3 %	2 %	2 %
3	4 %	5 %	6 %	6 %	5 %	4 %	5 %	5 %	4 %	4 %	4 %	4 %	4 %	4 %	4 %	4 %
4	6 %	5 %	5 %	5 %	6 %	5 %	6 %	6 %	4 %	4 %	4 %	4 %	2 %	3 %	5 %	4 %
5	10 %	11 %	11 %	12 %	12 %	12 %	12 %	14 %	15 %	17 %	18 %	18 %	18 %	20 %	19 %	20 %
6	6 %	6 %	6 %	6 %	6 %	6 %	6 %	6 %	7 %	6 %	6 %	6 %	6 %	6 %	6 %	6 %
7	1 %	1 %	4 %	1 %	2 %	4 %	2 %	2 %	3 %	3 %	4 %	4 %	6 %	6 %	7 %	7 %
8	2 %	2 %	2 %	2 %	2 %	2 %	2 %	2 %	3 %	3 %	3 %	3 %	3 %	3 %	4 %	4 %
9	20 %	20 %	21 %	22 %	23 %	24 %	25 %	25 %	25 %	25 %	26 %	27 %	27 %	28 %	29 %	29 %
10										6 %	6 %	6 %	7 %	8 %	8 %	8 %
11	29 %	29 %	30 %	31 %	31 %	32 %	34 %	34 %	35 %	36 %	37 %	38 %	38 %	39 %	39 %	40 %
12	13 %	13 %	14 %	14 %	13 %	13 %	14 %	17 %	18 %	11 %	12 %	12 %	11 %	12 %	13 %	13 %
13	9 %	10 %	10 %	10 %	9 %	10 %	11 %	11 %	11 %	14 %	13 %	12 %	14 %	14 %	15 %	14 %
14	12 %	13 %	13 %	13 %	13 %	12 %	12 %	12 %	13 %	15 %	15 %	15 %	15 %	15 %	15 %	15 %
15	18 %	17 %	17 %	18 %	19 %	20 %	21 %	22 %	22 %	26 %	26 %	27 %	27 %	28 %	30 %	29 %
16	21 %	23 %	25 %	26 %	28 %	31 %	35 %	37 %	37 %	39 %	43 %	43 %	44 %	45 %	46 %	46 %
17										32 %	30 %	37 %	43 %	38 %	22 %	24 %
Total	14 %	15 %	15 %	16 %	16 %	16 %	17 %	18 %	18 %	19 %	19 %	20 %	20 %	21 %	22 %	22 %
Number of women	3721	4310	4527	4747	5006	5306	5261	5577	5649	5708	5930	6101	6411	6858	7015	6970

Table C: This table presents the portion of female CEOs across industries, as well as the total number of female CEOs in each industry. The industries are defined in table L, appendix 10.

Appendix 3

Average Portion of Female CEOs Before and After the Quota

	Pre-Quota	Post-Quota	Difference
Mean	0.1596 ***	0.1995 ***	-0.0399 ***
	(0.0000)	(0.0000)	(0.0000)
Std. Dev	0.0113	0.0119	
Observations	274,037	285,689	

Table D: – This table presents the results of the difference in means t-test. The test performed is defined in equation (1) in the main text. We report coefficient estimates, the standard errors (in parenthesis), as well as the standard deviation and the number of observations. The significance levels 1%, 5%, and 10% is denoted by ***, **, and *, respectively.

Average Change in Portion of Female CEOs Before and After the Quota

	Pre-Quota	Post-Quota	Difference
Mean	0.0051 ***	0.0044 ***	-0.0007 ***
	(0.0000)	(0.0000)	(0.0000)
Std. Dev	0.0016	0.0022	
Observations	220,154	262,885	

Table E: – This table presents the results of the difference in means t-test. The test performed is defined in equation (1) in the main text. We report coefficient estimates, the standard errors (in parenthesis), as well as the standard deviation and the number of observations. The significance levels 1%, 5%, and 10% is denoted by ***, **, and *, respectively.

Appendix 4

CEO Gender and Portion of Female Board Members

	10 %	20 %	30 %	40 %	50 %	60 %	70 %	80 %	90 %	100 %
2000	0.0260	0.1208	0.1822	0.2067	0.3126	0.4953	0.4824	0.5315	0.6667	0.9149
2001	0.0264	0.1272	0.1865	0.2063	0.3172	0.5339	0.4852	0.5604	0.8333	0.9317
2002	0.0251	0.1290	0.1933	0.2064	0.3256	0.5610	0.5070	0.5787	0.8333	0.9490
2003	0.0287	0.1491	0.1804	0.2140	0.3255	0.5486	0.5136	0.5771	0.8333	0.9397
2004	0.0263	0.1268	0.1701	0.2150	0.3252	0.4286	0.5229	0.5764	0.8333	0.9501
2005	0.0293	0.1399	0.1812	0.2179	0.3306	0.4570	0.5389	0.5885	0.8571	0.9323
2006	0.0298	0.1473	0.1743	0.2256	0.3392	0.3838	0.5430	0.6144	1.0000	0.9422
2007	0.0299	0.1635	0.1852	0.2337	0.3421	0.3697	0.5383	0.6130	0.7778	0.9432
2008	0.0293	0.1377	0.1904	0.2265	0.3465	0.4063	0.5346	0.5839	0.7000	0.9394
2009	0.0289	0.1477	0.1813	0.2326	0.3543	0.3906	0.5444	0.5966	0.7500	0.9523
2010	0.0300	0.1754	0.1854	0.2309	0.3584	0.4192	0.5492	0.6242	0.6471	0.9562
2011	0.0301	0.1592	0.1951	0.2338	0.3637	0.4508	0.5463	0.6198	0.5714	0.9561
2012	0.0282	0.1726	0.1909	0.2325	0.3683	0.4430	0.5575	0.6176	0.7857	0.9462
2013	0.0292	0.1710	0.1865	0.2410	0.3741	0.4626	0.5710	0.6163	0.7333	0.9475
2014	0.0299	0.1751	0.2028	0.2473	0.3759	0.4662	0.5953	0.6176	0.6250	0.9586
2015	0.0296	0.1728	0.1963	0.2496	0.3769	0.4708	0.5916	0.6124	0.8824	0.9578

Table F: This table presents the portion of female and male CEOs in Norwegian private companies. The companies are divided into groups depending on their portion of female board members.

Appendix 5

CEO Turnover Regression Results

	Model 3.1x	Model 3.2x	Model 3.3x
Diversity (D)	-0.1786 ***		
	(0.0438)		
Female Board Members		-0.3264 ***	
		(0.0938)	
Blau's Index			-0.4002 ***
			(0.0997)
ROA $_{t-1}$	0.0089	0.0086	0.0089
	(0.0149)	(0.0149)	(0.0149)
Firm Size	-0.1368 ***	-0.1381 ***	-0.1370 ***
	(0.0197)	(0.0197)	(0.0197)
Firm Age	0.0069	0.0071	0.0069
	(0.0055)	(0.0055)	(0.0055)
Firm Risk	-0.0002	-0.0002	-0.0002
	(0.0005)	(0.0005)	(0.0005)
Family Firm (D)	-0.1968 ***	-0.2012 ***	-0.1973 ***
	(0.0455)	(0.0454)	(0.0455)
Board Size	0.1204 ***	0.1033 ***	0.1166 ***
	(0.0174)	(0.0166)	(0.0172)
After Quota	0.1483 ***	0.1033 ***	0.1483 ***
	(0.0407)	(0.0166)	(0.0407)
Fixed Effects	Yes	Yes	Yes

Table G: This table presents the estimated coefficients of the independent variables for Norwegian private companies. The regression model is specified in equation (3) in the main text but with CEO Turnover instead of Board Turnover as the dependent variable. We report coefficient estimates, the standard errors (in parenthesis), and the significance level (1%, 5%, and 10% level of significance is denoted by ***, **, and *, respectively). Section 3.3.1 in the main text defines the variables.

Turnovers Listed per Year

	CEO Turnovers	Chairperson Turnovers	Board Turnovers
2001	1,401	535	5,377
2002	1,725	0	2,404
2003	1,995	3,644	560
2004	1,110	1,066	7,850
2005	1,586	2,936	1,819
2006	1,194	2,018	3,676
2007	1,550	1,709	3,327
2008	1,564	2,312	4,416
2009	1,494	2,150	3,639
2010	1,662	1,967	3,375
2011	1,329	2,069	3,419
2012	1,410	2,142	3,692
2013	1,641	2,064	3,633
2014	1,321	1,950	3,115
2015	1,564	2,312	3,903

Table H: This table presents turnovers per year.

Appendix 6

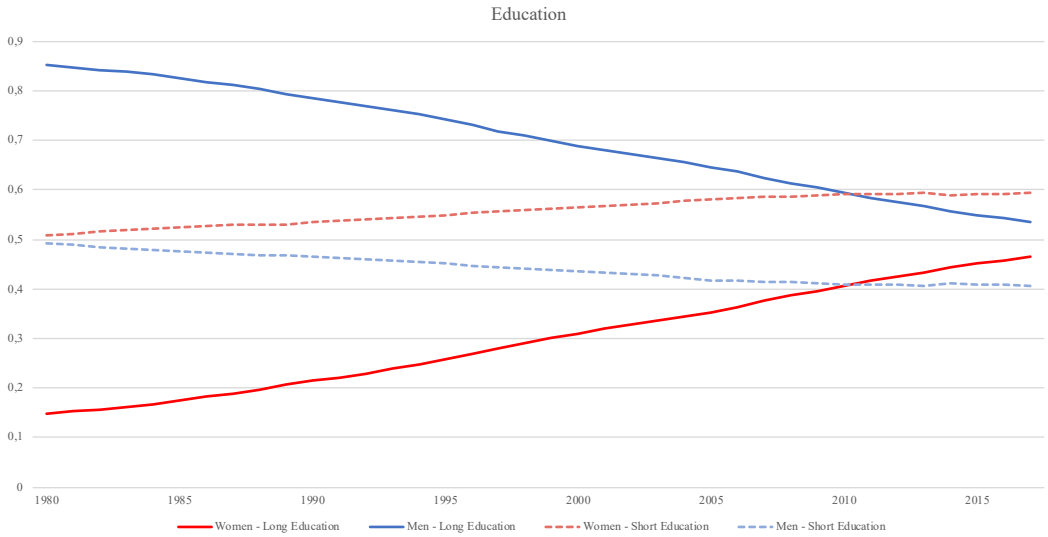

Figure A: This figure presents the development of the educational level in Norway, split between men and women. 'Short Education' is a bachelor's degree (less than four years), and 'Long Education' is a master's or Ph.D degree (four years or more). Data is collected from Statistics Norway, and all numbers are reported in percentages where the portion of men and women together equals 100%.

Appendix 7

Pearson Correlation Matrix

	Female Education	Female CEOs	Female Board Members
Female Education	1.0000		
Female CEOs	0.9945	1.0000	
Female Board Members	0.6840	0.9945	1.0000

Table I: This table presents the correlation between female CEOs, female board members, and the level of women enrolled in higher education at time t-20.

Appendix 8

ROA Regression Results

	Model 4.1	Model 4.2	Model 4.3
Diversity (D)	0.0200 ***		
	(0.0048)		
Blau's Index		0.0462 ***	
		(0.0106)	
Female Board Members			0.0470 ***
			(0.0092)
CEO Age	0.0005 **	0.0005 **	0.0005 **
	(0.0002)	(0.0002)	(0.0002)
Chair Age	-0.0003	-0.0003	-0.0003
	(0.0003)	(0.0003)	(0.0003)
Board Age	-0.0013 ***	-0.0013 ***	-0.0012 ***
	(0.0004)	(0.0004)	(0.0004)
Board Size	-0.0295 ***	-0.0291 ***	-0.0276 ***
	(0.0022)	(0.0022)	(0.0021)
Firm Age	-0.0009 ***	-0.0009 ***	-0.0009 ***
	(0.0003)	(0.0003)	(0.0003)
Firm Size	0.0863 ***	0.0863 ***	0.0867 ***
	(0.0017)	(0.0017)	(0.0017)
Family Firm (D)	0.0339 ***	0.0336 ***	0.0337 ***
	(0.0053)	(0.0053)	(0.0053)
Firm Risk	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)
After Quota (D)	-0.0466 ***	-0.0467 ***	-0.0482 ***
	(0.0078)	(0.0078)	(0.0078)
Constant	-1.0392 ***	-1.0563 ***	-1.0411 ***
	(0.0296)	(0.0298)	(0.0296)
Fixed Effects	No	No	No
Time Effects	Yes	Yes	Yes
Industry Effects	Yes	Yes	Yes
R^2	0.0107	0.0107	0.0107

Table J: This table presents the estimated coefficients of the independent variables for Norwegian private companies. The regression model is specified in equation (4) in the main text. The dependent variable is 'ROA'. We report coefficient estimates, the standard errors (in parenthesis), and the significance level (1%, 5%, and 10% level of significance is denoted by ***, **, and *, respectively). Section 3.3.1 in the main text defines the variables. The industries are defined in table L, appendix 10.

Appendix 9

Change of Gender of the CEO

	Freq.	Percent
Male CEO to Female CEO	3,212	0.76%
Female CEO to Male CEO	2,557	0.60%
Female CEO to Female CEO	1,727	0.41%
Male CEO to Male CEO	15,734	3.71%
No Change in CEO	400,449	94.52%

Table K: This table presents the change of gender if there is a turnover of CEO.

Appendix 10

Classification of Industry Groups

	Description
1	Basic Agriculture
2	Forestry
3	Fishing
4	Mining and Oil
5	Light Industry
6	Heavy Industry
7	Utilities
8	Building
9	Retail and Wholesale
10	Transport
11	Tourism
12	Publishing, Media, IT, Telecom
13	Financials
14	Real Estate
15	Services
16	Public Administration
17	Gambling
0	*Multiple Codes*

Table L: This table presents the definition of industries used in this analysis. The industries are grouped by a combination of the code system used in Brønnøysundregistrene and a proposal from our supervisor, Professor Stacescu.