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Does a mandatory gender boardroom quota lead to more gender
equality in the corporate sector? A dual country perspective

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Abstract:

Does a mandatory boardroom gender quota lead to more gender equality in the corporate sector? I hypothesize that such a quota leads to an increase in female participation and a decrease in the gender pay gap among executive directors. As a response to the quota, firms have the option to only hire female non-executive directors to satisfy the rules of the quota. This gives firms the opportunity to limit the influence of new entering females and withhold females from the executive board. Therefore, I test the effect of a gender quota on participation for executive directors, because this gives a stronger indication of whether a quota leads to more gender equality. To research whether the quota leads to more gender equality, I examine the effect of a quota for CEOs and Non-CEO executives in France and Norway. The results of probit regressions show that the quota leads to an increase in female participation for all groups examined. Between France and Norway, I find no difference in the strength of the quota effect on participation. Using difference-in-difference models, I find mixed results on the effect of the quota on the gender pay gap. The quota decreased the raw gender pay gap for CEOs. In addition, results suggest that there exists equality in cash-compensation between females and males after the quota. Results for Non-CEO executives in France fail to prove a positive effect on the gender pay gap. In Norway, there is also no significant quota effect present for Non-CEO executives. The shortage of data makes it impossible to conclude on the quota effect for Norwegian CEOs.

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1. Introduction

“We are writing history. We breach the old boys’ network and take a big step towards equality and diversity in the top of business #genderquota” – Ingrid van Engelshoven (Dec 3, 2019, on Twitter)

Ingrid van Engelshoven, Minister of Education, Culture, and Science wrote this after the Dutch parliament passed her bill regarding a mandating gender boardroom quota. This quota forces publicly quoted corporations to have at least 30% representation of each gender in their board of directors. This makes the Netherlands the sixth country in Europe, after Norway in 2003, France, Belgium, and Italy in 2011 and, Germany in 2014, which adopts a legislative binding gender quota. The reason for these countries to implement a quota is that, despite significant progress, women are still underrepresented in top corporate jobs. Powell & Butterfield (2015) and Bertrand et al. (2019) argue that gender diversity in top management level positions in the past 20 years remains substantially low. Especially, when you compare it with diversity in lower occupational levels. The participation of women in boards is in half of the European Union member states below 20 percent. Furthermore, the total share of female board chairs in the European Union was only 7 percent in 2016. In the same year, female CEOs count for 5.1 percent of the largest companies in the European Union (Jourova 2016). This problem is often called the glass ceiling. Morrison et al. (1987) define it as: “a transparent barrier that keeps women from rising above a certain level in corporations”. Important aspects of a glass ceiling relate to the fact that inequality is based on discrimination and not on the qualifications and achievements of the employees. Furthermore, the barrier becomes heavier when women move up the corporate ladder in a company and the corporate sector (Cotter et al. 2001). The glass ceiling translates, besides female participation, into a wage gap between women and men. The European Commission (2018) reports an overall gender earnings gap of 41.2 percent in 2015. Similar results are reported by Bertrand & Hallock (2001), who argue that the gender pay gap for top executives in the US is at least 45 percent.

The lack of female participation and a gender pay gap represent the inequality between men and women in business. As the Dutch minister describes in the above quote, she intends to break the glass ceiling by breaching the old boys’ network and improve gender diversity and equality. The minister argues that differences in qualifications and achievements are not the reason for the lack of gender diversity, but that the incumbent top of corporates is responsible for gender inequality. This belief is supported in a strategy established by the European

Commission (European Commission 2011). The report argues that the problem is that women encounter discrimination and that males are being favored by the old boys' network. On the other hand, opponents of gender quotas state that there exists no glass ceiling and that the problem is a result of a shortage of qualified women available in the labor market. Ahern & Dittmar (2012) conclude that a board of directors is formed to maximize shareholder value and that establishing constraints on this formation brings unqualified females to the top of corporates, which could harm the performance of a company.

Although there is a lot of discussion on the effectiveness of gender quotas, previous research is mainly focused on the impact of a gender quota on firm performance and firm behavior. However, as discussed, gender quotas are imposed to improve gender equality in the corporate sector. This implies that the success of this legislation is related to the effect a gender quota has on gender equality. The European Union Equality Report (EU 2019) states that the results of countries with a gender quota are instructive. In 2019, in the legislative quota countries: Belgium, France, Germany, and Italy there is on average a share of 37.5 percent female directors in the boardroom. However, this is a representation forced by law. So far it is not evident whether a gender quota leads towards natural equality and diversity in the corporate sector.

Despite the fact that gender quotas are rolled-out in several European countries, there is limited research about the effect on gender equality at the top of business. The European countries that imposed a gender quota provide the opportunity for a quasi-natural experiment to test the effect of a gender quota on gender equality. In this research, I investigate whether gender quotas positively affect gender equality. To test this, I analyze the quota effect on female participation and the gender pay gap. In this research, I analyze the quota effect on executive directors. Because, firms have the opportunity to satisfy the law of the quota by only hiring non-executive female directors and never change hiring practices for executive directors. Non-executive directors play a smaller role in a company compared to executive directors, and firms could even use the hired non-executive female directors as window dressing. These scenarios could help firms to keep their old boys' network intact by limiting the female influence and prevent females from entering the day-to-day management of firms. The forced increase in participation of females in the whole board of directors could therefore reflect a sham improvement of equality. Testing participation for executive directors rules out the opportunity that a potential increase in participation is the result of a strategy to limit influence of the new female directors. This research method allows for stronger conclusions on whether gender equality is improving. Furthermore, remuneration for non-executive directors across Europe is

flat. For executive directors this remuneration is dynamic. This offers the opportunity to research the effect of a quota on the gender pay gap among executive directors.

There has been done some research related to the effect of a gender quota on gender equality. Wang & Kelan (2013) find that the gender quota in Norway led to an increase in female participation among CEOs and Chairman positions. Bertrand et al. (2019) state that in Norway the quota caused female directors to be observationally better qualified. However, they do not find evidence for an increase in the participation of females in the c-suite level of Norwegian firms. Ferreira et al. (2017) investigate the quota effect on the labor market for non-executive directors in France. They state that the quota led to stronger firm labor matches for female directors and that it caused firms to change their hiring policies in the advantage of previously ignored businesswomen.

Overall, previous papers find mixed results regarding the quota effect on gender equality. Remarkably, all of these papers are set-up as a single country study. Comi, et al. (2017) support the extension of analyzing gender quota effects for multiple countries. They argue that differences in corporate governance and cultural attitudes towards gender equality among countries influence the impact of a gender quota on firm performance and diversity. I broaden my research to a dual country study to improve the reliability of my results. In figure 1, the composition of the board of directors in the quota countries is displayed from 2003 till 2019. Norway is the first country that passed a gender quota. In France, the speed of adjustment to the new law is higher than Italy and Belgium, possibly because of a different set-up of the quota. Therefore, France and Norway provide the most years in which firms are subjective to a gender quota.

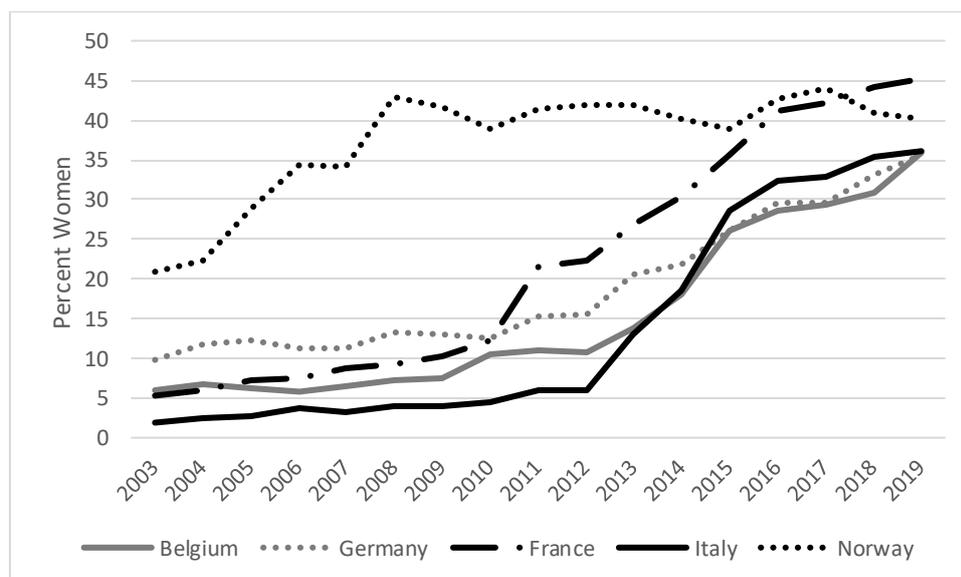


Figure 1: Percentage of women on the board of directors in countries with a mandatory quota

This makes Norway and France the two most suitable countries to interpret quota effects on gender equality among executives.

Besides analyzing the quota effect for two countries, I further split my research into two groups of executive directors. I separately analyze the quota effect for CEOs and Non-CEO executives. As the glass ceiling phenomena proclaims, the barrier becomes heavier for positions at the top of firms. CEO executives stand on top of the hierarchical pyramid of a firm. Therefore, I expect quota effects to be more pronounced for non-CEO executives compared to CEO executives. Furthermore, I state that the role of a CEO is not comparable with any other executive role in a company. For example, Wang & Kelan (2013) only identify female quota participation effects for CEOs and Chairmen. By including all executives this allows me to have a broader view on possible quota effects.

The dataset covers a period from 2001 to 2017 in which France and Norway both established their gender quota. I separate my analysis into two approaches to test quota effects on participation and the gender pay gap among executive directors.

For the first approach, I investigate whether the quota increases the probability of an executive being a female. By using a probit regression I show that the quota increases the probability of a female CEO by 2.9 percent in France. In Norway, the quota increases the probability of a female CEO by 1.8 percent. For Non-CEO executives, the results indicate an increase in the probability of a female executive by 5.7 percent in France. In Norway the probability increase for female Non-CEO executives is 5.1 percent. The coefficients of the quota remain significant after I execute additional tests. These results suggest that firms do not only hire non-executives to satisfy the needs of the quota law. I find no evidence for a stronger quota effect on participation comparing France and Norway. The magnitudes of the coefficients in both countries do suggest that the quota participation effect is stronger for Non-CEO executives compared to CEOs.

In the second approach, I run several regressions to interpret the quota effect on the gender pay gap for CEO and Non-CEO executives in both countries. I use a difference-in-difference method to analyze the effect of a quota. In this setting, the female executives represent the treated group and the male executives the control group. For French CEOs, there is a raw gender pay gap present before the quota. The quota causes this gender pay gap to decrease. However, after controlling for size and performance there surprisingly a positive gender pay gap present before the quota. This indicates that before the quota females tend to work for smaller and less successful companies. The years after the quota fully explain the negative and positive gender pay gaps present in the years before the quota. This means that

among French CEOs there tends to be no gender pay gap present after the quota. However, for equity-based compensation there is no significant effect of the quota on the raw gender pay gap, which indicates regarding this compensation measure there is still inequality. As a result of a data problem, I cannot present quota effects on the gender pay gap for Norwegian CEOs. For Non-CEO executives in France, The results show that there is a significant gender pay gap, even after controlling for numerous firm- and director characteristics. I find no significant positive effects of the quota on the gender pay gap. In Norway, the results for Non-CEO executives are similar compared to France. Before the quota, there exists a significant gender pay gap and there is no positive quota effect. To avert the possibility that the gender quota effect measured is influenced by a trend independently of the gender quota, I use France and Norway as each other's control group. This means that I test the quota effect with a different control group. This additional model helps to rule out possible endogeneity problems. The results measured in this model give no reason to doubt my conclusions on the quota effects.

These findings have implications for the ongoing political debate on gender quotas. I provide evidence that gender quotas are effective to improve the participation of females in executive positions. Also, my findings show that the quota causes a decrease in the gender pay gap among CEOs in France. These results are useful for the legislators in France and Norway because they prove the success of their imposed legislation. In addition, this is important for policymakers to take into account when they consider adopting a similar gender quota. My findings further imply that forcing changes in the corporate governance results in spillover effects to the executive management in the corporate sector.

2. Discussion of literature

In this chapter, I present the existing literature related to gender equality and gender quotas. In the first section, I discuss various characteristics that account for the gender pay gap. Second, I discuss the effect of a gender quota on firm performance, firm behavior and management decisions. Finally, in the third section, I discuss current literature about the implications of a gender quota on gender equality.

2.1 Gender paygap

In order to analyze quota effects on the gender pay gap, it is important to understand which forces play a role in the build-up of a gender pay gap. The gender pay gap is a gap in

remuneration between men and women. The raw gender pay gap, or unconditional pay gap, is the difference in the average wage between men and women. Bertrand & Hallock (2001) discuss various characteristics that contribute to the existence of the gender pay gap among top corporate positions. They argue that part of this gap can be explained by women working for smaller companies and women working in lower-earning, lower-status occupations. In addition to that, the gap can be further explained by individual characteristics, including female executives being younger and having less seniority than male executives. After controlling for all of the above-mentioned characteristics, a small unexplained pay gap between male and female executives could be present. Possible explanations for this unexplained gap are discrimination against women, the insufficient explanatory power of independent variables, or a combination of both (Plantenga & Remery 2006). In the total labor market of a country, the lack of long-term career commitment is an important explanatory factor for a gender pay gap. However, in the top corporate labor market, this attitude is assumed to be minimized because in this area of the labor market it is expected that all participants have long-term career commitment (Bertrand & Hallock 2001). Bell (2005) proves the existence of a large difference between an unconditional and conditional pay gap. She finds that for top executives the raw gender pay gap is 25%. After controlling for company size, occupational title and industry an unexplained part of 8% difference remains.

Plantenga & Remery (2006) argue that controlling for job characteristics means that part of the gender inequality is taken out of the model because the fact that females work for smaller companies have lower occupations, are younger, and have less experience is a result of the glass ceiling problem. In other words, the raw gender pay gap, among the top functions in the corporate sector, is based on all underlying gender inequalities between males and females caused by the glass ceiling problem.

2.2 Related literature

A boardroom gender quota offers a natural experiment to research the impact of gender diversity on firm performance and firm value. After the implementation of the gender quota in Norway multiple studies have been published on the effect of a gender quota on firm performance. Ahern & Dittmar (2012) find that the gender quota in Norway led to a substantial drop in Tobin's Q and stock performance. They argue that this outcome can be related to the fact that gender quotas lead to inexperienced women on corporate boards. Bordalo et al. (2019) support these findings and show that a compulsory gender balance results in a decrease of

quality in the board and that this hurts shareholder value. Matsa & Miller (2011) find similar negative quota effects for firm performance in Norway as Ahern & Dittmar (2012). On the contrary, Nygaard (2011) argues that the quota had a positive effect on the stock price after the announcement. Comi et al. (2017) examine multiple EU countries that adopted similar gender quotas. They find that the quota in France led, similarly to Norway, to a negative significant effect on profitability. In contrast to France and Norway, they find a positive and significant effect on profitability in Italy. They argue that this can be explained by a difference in gender culture across countries. Ferrari et al. (2016) support this result and show positive stock market returns in Italy after the gender quota announcement, because, it causes favorable restructuring activities of the board of directors.

Besides firm performance, previous research examines the effect of a gender quota on firm management decisions and firm behavior. Ahern & Dittmar (2012) show that the quota led firms to execute more acquisitions, increase leverage and grow in size. In India, it is mandatory that one-third of the village head council positions need to be fulfilled by a female. Research shows that female leaders in these councils invest in different types of public goods compared to male leaders. This implies that mandating females on leadership positions can affect the outcome of policies set by an institution (Chattopadhyay and Esther Duflo, 2004).

Nielsen & Huse (2010) search for the contribution of females on the board of directors. They find that there are no general differences in leadership styles between men and women. However, the presence of females in a board of directors does lead to a reduction in the level of conflict.

By contrast, Adams & Funk (2011) argue that women in the boardroom act differently than men. This suggests that not only gender diversity in the boardroom changes policy outcomes, but individual differences between women and men influence policy outcomes as well. Adams & Funk (2011) control for the sole effect that diversity of a boardroom can have on the decision-making process. By doing this they find that men and women have different priorities. This causes female directors to make different choices compared to male directors. These priorities can be based on career costs for female directors. A boardroom decision can have different career costs for females compared to males which result in different behavior. Adams & Funk (2011) are unable to find intrinsic differences between men and women which could explain different leadership behavior. This implies that in a situation of perfect equality between males and females, there would be no difference in decision-making processes. In addition to this Adams & Ferreira (2009) argue that female directors have better attendance

records than male directors. Furthermore, female directors join monitoring committees more often. This implies that gender quota should lead to more monitoring intensive boardrooms.

2.3 Gender quota implications for gender equality

Wang & Kelan (2013) state that mandating corporates to hire female directors provide women with more equal opportunities. As a result, this improves the chances of females to reach executive leadership positions. Because, the law forces firms to hire female directors and therefore a certain critical mass is reached. This because the subgroup (female directors) can exercise more power after female proportion in the boardroom increases. Their research is focused on whether the gender quota in Norway improves the chance of women becoming CEO or board chair. They find a positive relationship between a certain critical mass of female directors on the board and women becoming CEO or board chair. Konrad et al. (2008) specify this critical mass in further detail. According to this paper three is a magical number in the area of group dynamics. They argue that from the moment that there are three or more women present at board meetings, women can have more impact on board decisions.

Bell (2005) states that women executives are more present in women-led firms and there is a smaller gender pay gap in these firms. Besides, a greater share of females in the board of directors causes a lower gender pay gap. The paper uses this argument to confirm the hypothesis that women help each other in improving their position in the labor market. Multiple other studies support this evidence. Women may hire other women or promote women because they prefer working with individuals that are like them (Becker 1957, Gorman, 2005). Ely (1994) looks from a network perspective and clarifies that women may have greater social connections with other women than men. This view is supported by Gorman (2005). He finds that in the case of female underrepresentation, females tend to have a strong preference for hiring other females.

Ferreira et al. (2017) focusses on the total labor market and analyzes turnover rates of female directors in France before and after a gender boardroom quota. They show that quotas lead to a decrease in the turnover rate of female directors. This can be partly explained by the fact that there is more demand for female directors. However, they see that post-female appointees are more independent, better qualified and slightly older. Before the quota, French firms used to hire female directors from an elite business school. As a result of the high demand for female directors, they are obligated to search beyond their standard pool of candidates. The paper argues that quotas changes firms their selection practices and this resulted in more stable

matches with a lower probability of termination. Reberioux & Roadaut (2016) support this result and they find that in France more ‘unseasoned women’ enter the board of directors after a gender quota. Bertrand et al. (2019) find similar results for the Norwegian labor market. Post-quota directors have better qualifications compared to pre-quota directors. They argue that an untapped network of females with better qualifications is activated.

Beaman et al. (2009) use a gender quota implemented in Indian village councils to study the effect of forced exposure to female leadership. They conclude that forced exposure to female leadership reduces bias about the effectiveness of female leaders.

3. Hypotheses development

In this section, I develop hypotheses based on the previous literature discussed and personal reasoning. To start, I make an important assumption for all hypotheses based on the previous literature discussed. In the discussion of theory, I come up with literature that proves that a mandating gender boardroom quota affects firm behavior and performance. This is important because even though the quota prescribes a minority share of women on the board of directors, they can influence firm policies and strategies. This argues against the possibility that women are on the board as window dressing. This lays the foundation for the possibility that a boardroom gender quota could potentially lead to more gender equality among executive board positions. Hence, this leads to the following research question:

“Does a mandatory gender boardroom quota lead to more gender equality among top executive positions?”

As discussed, as a reaction to a mandatory gender boardroom quota firms can use different strategies to satisfy the rules of the quota. First, firms replace male executive directors with female directors to increase the representation of female directors. Second, firms hire non-executive female directors to increase the representation of female directors. If firms choose for the first strategy this consequently results in more gender equality among top executive positions. In case firms execute the second strategy the number of non-executive directors increases. At first, this means no immediate increase in female participation among executive directors. However, if more female non-executives directors join the company this could potentially mean that females in the board of directors can exercise more power on hiring

practices and remuneration for female executives. This is explained by the critical mass theory, supported by Wang & Kelan (2013) and Konrad et al. (2008). The quota causes female directors on the board to reach a critical mass and this results in a firm where women can exercise more power as before the critical mass is reached. This only works in case females are not hired on boards as window dressing. The same-gender theory, discussed by Becker (1957), Gorman (2005), Ely (1994) and Bell (2008), helps to predict the consequences of the critical mass theory. Women prefer to work with women or promote other women, women have a greater social connection with other women and in the case of underrepresentation, women tend to hire other women. In case firms choose to satisfy the quota by hiring non-executive females, I expect that this causes an increase in the representation of executives over the post-quota period. Except for this critical mass effect of a gender boardroom quota, there are also more indirect effects. The study of Beamen et al. (2009) argues that forced exposure to female leadership reduces bias about female leadership. This implies that gender quotas may lead to the fact that women are more accepted in leadership positions.

Based on these theoretical arguments, I expect that this leads to an increase in female participation among executives after a gender quota. Accordingly, I test the following hypothesis:

H1: A mandatory boardroom gender quota positively affects the participation of females among executive positions

As discussed in the introduction, I separate my analysis for CEOs and Non-CEO executives. The glass ceiling tells that the barrier becomes heavier when women move up the corporate ladder. The function CEO is the highest level inside a company. If gender board quotas would lead to more gender equality among executives, then I expect the effect starts at a relatively lower position in the hierarchical pyramid. This leads to the following hypothesis:

H2: A positive quota effect is stronger for Non-CEO executives compared to CEOs

Bell (2005) argues that there is a smaller gender pay gap present in women-led firms. Gender quotas result in firms with more female influence in decision making. Consequently, I expect that a gender quota causes a decrease in the executive gender pay gap. As discussed, I expect that bigger and more successful firms hire more female executives. This would mean that females start working for firms who pay on average higher compensation. Therefore, I

expect that this causes a decrease in the gender pay gap. Furthermore, women tend to promote other women. This potentially leads to an increase in the occupational status of female executive directors. This means that the occupational segregation between female and male directors decreases. Previous literature discusses a possible unexplained gender pay gap that exists because of a discrimination effect. In case this discrimination effect exists, I expect that the increase in female influence decreases this potential discrimination effect. Ferreira et al. (2017) prove that post-quota female hires have a lower probability of termination and have better qualifications. A lower probability of termination causes higher average tenure among female executives. Moreover, better qualifications give women more bargaining power. This means that female directors have now stronger firm matches and consequently I expect a decrease in the gender pay gap.

H3: A mandatory boardroom gender quota leads to a decrease in the gender pay gap among executives

Discrimination based on gender is likely more present in countries that have a less progressive gender culture, which means a more present glass ceiling problem. Cracking the glass ceiling is the objective of a gender quota. I expect that the thicker the glass ceiling, the more progress there is to achieve. I base my reasoning partly on the paper of Comi et al. (2017). They prove that for countries with larger gender imbalance the quota has a positive effect on firm performance, compared to a negative effect on firm performance for more progressive gender cultural countries. Therefore, my fourth hypothesis states:

H4: A gender quota is more effective on gender equality in countries with a relatively less progressive gender culture

4. Context

In this section, I provide an institutional background for France and Norway. The gender quotas implemented in France and Norway form the quasi-natural experiment in this research. To understand potential differences in the effect of a quota it is important to outline corporate governance and gender culture in both countries.

4.1 Legislative gender quotas in Norway and France

Norway: In December 2003, the Norwegian government passed a bill that regulates the gender composition of corporate boards. At least 40% of the board of directors need to be female. This gender quota applies to all public limited firms and first, a voluntary phase started in July 2005. The voluntary compliance had no success and from January 2006 the law became mandatory with a two-year transition period. Furthermore, from January 2006 the law applied to all new publicly listed companies, while from January 2008 the law became compliant to all publicly listed firms. In Norway there are two different LLCs (Limited Liability Companies), public limited companies are Aksjeselskap (AS) and private limited companies are Allmenaksjeselskap (ASA). The quota only applies to AS firms.

France: In France, the parliament passed the first reading of a gender quota in January 2010 and finally a definite bill passed in January 2011, that requires a minimum of 20% of female directors before 2014. After 2017, at least 40% of the board of directors requires to be female. On the contrary to Norway, in France, the law also applies to non-listed firms, however under the condition that a non-listed firm has at least 500 employees or revenues that exceed 50 million euro. The legal forms for a public listed firm are Sociétés Anonymes (SA) and Societas Europaea (SE).

4.2 Board of directors

Norway: The structure of the board of directors in Norway is a mix of a one-tier board and a two-tier model. The day-to-day management is delegated to the CEO. The board is responsible for the overall management of the company. Half of the board of directors needs to be independent of the company. This means that there is no separate supervisory board, but at least half of the board needs to be a non-executive director. Also, there can be no overlap between executive and non-executive board members. This implies that for example the CEO cannot be the chairman of the board and a chairman can never be executive director.

France: In France, companies can choose between a one-tier and a two-tier board structure. For a two-tier structure, this means a management board and a supervisory board. In 2004, among the 40 largest French listed firms, 76 percent of the firms use a one-tier structure. In this one-tier model two-third of the board members need to be non-executive. On the contrary to Norway, in France, a chairman can be an executive director. In 2004, only 22 percent of the 40 largest French companies have separated the chairman and CEO function.

4.3 Gender culture

As discussed in the previous section, I expect that a quota effect is more pronounced within countries with a less progressive attitude towards gender equality. To analyze hypothesis 3, it is necessary to outline the progressiveness regarding gender equality in Norway and France. In 2007 Norway was ranked second on gender equality by the world economic forum. In the same ranking, France took the 51st place. Furthermore, Norway is the first country that introduced a mandated gender quota for its board of directors. Besides that, Norway is famous for other progressive gender policies. For example, women and men have equal rights in the length of a parental leave period. Figure 1 shows that also before the announcement of a gender quota, Norway outperformed France regarding the diversity in the board of directors. These facts indicate a more progressive attitude towards gender equality in Norway compared to France. To analyze H3, I characterize France as a country with a less progressive gender attitude, relatively to Norway.

5. Data & methodology

In this chapter, I elaborate on the data and methodology used to test my hypotheses. First, I discuss the data collection. Second, I define the different variables of the data. Third, I explain the methodology I use. Lastly, I provide you with summary statistics.

5.1 Data collection

I retrieve from BoardEx data on gender and compensation for CEOs and Non-CEO executives in France and Norway. The period for this dataset is from 2001 to 2017. This time frame is used because it covers both countries a period before the quota and a period after the quota. I manually collect data for missing gender values in BoardEx. I use accounting data from Datastream.

5.1.1 Firm characteristics

The dataset for Norway is gathered after obtaining a list of all public companies listed on the Oslo stock exchange during my period of interest. This list is provided via email by Børs, which

is the official website of the stock exchange in Norway. I counseled this institution because I need to ensure that I only include listed firms in Norway. As discussed, the gender quota in Norway only applies to Allmennaksjeselskap (ASA) firms. For France, gender quotas apply to listed and non-listed firms. BoardEx mainly provides listed firms for France, but a small portion of the dataset contains private firms. In France, the names of listed firms contain either SA or SE in the end. I inspect the database and detect a small selection of private firms in my dataset. I use Orbis to investigate whether these private firms have at least 500 employees. Three private limited firms do not have at least 500 employees. Therefore, I exclude these firms from the dataset. Firms that are cross-listed are included in the sample set. This means that they are located in France or Norway, but they are listed on an exchange in for example the US. It is possible to include these firms because a firm needs to stick to the regulations that apply in the country they are located in. My final sample for France consists of 693 firms and for Norway, I have 122 firms. Data on size and performance for the selected firms is gathered from DataStream.

5.1.2 Director characteristics

As discussed before, In this research, I only analyze executive directors. BoardEx provides a NED indicator. This means that non-executive directors are indicated with a “YES” and executive directors with a “NO”. The non-executive directors are filtered out of the data and only executives are included. The data from BoardEx on Gender is incomplete. Therefore, I manually gathered incomplete gender data. I add the missing gender data by looking at the annual reports or news articles. First, I try to find an indication of the gender of a director. For example by looking at their titles ‘Mrs’ or ‘Mr’. If this is not present, then I use a photograph to determine whether the director is male or female. Duplicates for executive directors in the dataset are removed. The duplicates exist because firms that changed their firm name are occasionally mentioned in the data twice. The second reason is that executives are reported as a board member and as a disclosed earner. Data on age and tenure are provided by BoardEx. I split the data between CEOs and Non-CEOs by looking at the role name of a director. I manually analyze the role name of each executive and allocate it to CEOs or Non-CEO executives. The final sample for French CEOs consists of 6650 director-firm-year observations and 816 director-firm-year observations for Norwegian CEOs. The Non-CEO executive’s dataset contains 8212 director-firm-year observations for France and 1759 director-firm-year observations for Norway. This means that there is relatively more data available for French

CEOs compared to Non-CEO executives. It could be that CEOs in France are reported better compared to Non-CEO executives in France.

5.2 Variable description

5.2.1 Dependent variables

Gender: The variable *Female* is a dummy variable. It codes value 1 for a female executive and 0 for a male executive. The data on gender is provided by Boardex and missing values are manually added. In the dataset, females are indicated with “F” and males with “M”.

Compensation: For compensation the main variable is *Cash-compensation*. This variable consists of salary and bonus and is reported in thousands of dollars. Besides, I use equity-based compensation as a robustness check. *Totalequitycompensation* includes besides cash-compensation, the value of equity, the value of options and the value of long-term incentive plans awarded in a given year (Crocì, et al. 2012). I created my equity-based compensation variable by summing total compensation, the value of equity, the value of options and the value of long-term incentive plans, all separately provided by Boardex. The compensation measures are not normally distributed. Therefore, I use the logarithm for regression purposes.

5.2.2 Independent and control variables

Size and performance: Return on assets (ROA) and sales are analyzed to control for size and performance of companies. The currency in which sales are provided by Datastream depends on the country where a firm is listed. The dataset includes 14 different countries of issue with different currencies. All currencies are exchanged to dollars, by using exchange rates provided by Morning Star. I use the logarithm of *Sales* to increase the normality of this variable. *ROA* is winsorized at a 1% and 99% level to control for outliers.

Director characteristics: The director characteristic variables in the dataset are *Tenure*, *Age* and *Occupational segregation*. *Tenure* is the current time in role of a director. To increase the normality of the variable, I use the logarithm of *Tenure* in the regressions. The control variable *Occupational segregation* indicates the function of an executive director. I manually allocated 783 different Non-CEO function titles into 15 groups, because high numbers of dummy variables decrease the power of my regressions. The 15 groups are displayed in the Appendix (A).

Control variables: I use a sector variable provided by BoardEx as an alternative for SIC codes. This sector variable is manually reduced from 43 sectors to 11 sectors. I display the different sector groups in Appendix (B). Furthermore, I use year effects to capture the impact of time trends.

5.3 Methodology

Here I describe the empirical approach I use to answer my hypotheses about gender quotas and the effect on gender equality. The empirical analysis is separated into two different approaches. The first approach relates to female executive *participation* and the second approach to female executive *compensation*. In both models, I separately execute the analysis for CEOs and Non-CEO executives.

For both countries, I determine a post- and pre-quota period. For France, I determine data after 2011 as the post-quota period. For Norway, I use data after 2007 as the post-quota period. This means that for both countries the post-quota period is two years after the first strong signals of a mandatory gender quota. I use this two-years approach because this gives all firms time to respond to the new law. Some firms actually immediately react to the quota from the moment of the announcement that there will be a mandatory quota. Therefore, I exclude the years 2010 and 2011 from my models that test the quota effect in France. This is in line with Ferreira et al. (2018) who argue that in 2010 French firms already adopted to a mandated quota law, after the first reading was announced in January 2010. This observation is also visible in figure 1. If I would include these years in the pre-quota period this could bias my results, because the post-quota effect is underestimated. Norway passed the quota law already in 2003. However, until 2006 it was only a voluntary gender quota. This means that firms did not know yet that the quota would become mandatory. Keep in mind that I test for the effect of a mandatory quota on gender equality. Wang & Kelan (2013) argue that the announcement of the imposition of the quota caused a strong reaction of adoption to the law. Figure 1 shows that in 2007 firms start to respond to the announcement of the mandated gender quota effective from 2008. Therefore, I exclude the data of 2007 for the models regarding the quota effects in Norway and leave 2006 in the pre-quota period.

5.3.1 Participation of females in top executives' positions

I analyze the effect of a boardroom gender quota on female participation in four groups of executive directors i.e. CEOs and Non-CEO executives in both France and Norway. As suggested by Wang & Kelan (2013), I use a probit model to analyze female participation. In this model, the value of the dependent variable, *female*, is either 0 or 1. The model predicts the probability of the dependent variable being 1, by looking at the likelihood of the dependent variable is 1 (Davidson et al., 2004). In this case, that means that the conditional expectation of an executive being a woman is calculated. To analyze whether a quota improves this conditional expectation, I use the following regression:

$$\phi^{-1}(female_{it}) = \alpha_0 + \alpha_1 Post_t + \varepsilon_{it} \quad (1)$$

The dependent variable *Female* is a dummy variable equal to 1 when an executive is a female and 0 for males. The variable *Post* takes value 1 for observations in the post-quota period, and 0 for values in the pre-quota period. This variable *Post* represents the effect of a boardroom gender quota on female participation in executive positions.

To strengthen the results of my model, I combine the dataset of France and Norway. This combined analysis helps to rule out the opportunity that a trend independently from the quota causes the probability of a female executive to change (Fereira et al. 2018). In the following two specifications, I add an interaction term to calculate the quota effect in a specific country

$$\phi^{-1}(female_{it}) = F(\alpha_0 + \alpha_1 PostF_t + \alpha_2 France_d + \alpha_{12}(France_d * PostF_t) + \varepsilon_{it} \quad (2)$$

$$\phi^{-1}(female_{it}) = F(\alpha_0 + \alpha_1 PostN_t + \alpha_2 Norway_d + \alpha_{12}(Norway_d * PostN_t) + \varepsilon_{it} \quad (3)$$

The variable *PostF_t* presents the post-quota period for France. *PostN_t* indicates observations in the post-quota period for Norway. In specification (2), French female directors are the treated group. The control group consists of French male directors and Norwegian female and male directors. Norwegian female directors are the treated group in specification (3). The control group consists of Norwegian male directors, and French male and female directors. A probit model is a non-linear model. This implies that difference-in-difference coefficients cannot be interpreted with interaction terms. In line with Buis (2010), I use marginal effects to calculate the difference between the probability of executives being a female, before and after the quota. This means that I look at the marginal effect of a quota on

the probability of an executive being female. I follow the method of Mandic, et al. (2012) to calculate marginal effects for the interpretation of interaction terms. To simplify, I change my variables to the

following terms in my model: $Female = Y$, $Post = x_1$ and $Country = x_2$. This means that for the French directors x_1 is after 2011 and for Norwegian directors x_1 is after 2007. x_2 represents either France or Norway. This allows me to simplify regression (2) and regression (3) to:

$$E [Y | x_1, x_2] = F(\alpha_0 + \alpha_1 x_1 + \alpha_2 x_2 + \alpha_{12}(x_1 * x_2)) + \varepsilon_{it} \quad (4)$$

For equation (4), I simplify further by using: $v = \alpha_0 + \alpha_1 x_1 + \alpha_2 x_2 + \alpha_{12}(x_1 * x_2)$. This means that the marginal effect of $Post$ on the conditional value of a female executive is:

$$\frac{\Delta E [Y | x_1, x_2]}{\Delta x_1, \Delta x_2} = [F(v) | x_1 = 1, x_2 = 1] - [F(v) | x_1 = 0, x_2 = 1] \quad (5)$$

Specification (5) indicates the effect of a quota in one country within a dataset of both countries. The model executes the effect of the quota for both countries separately with different quota periods. This means that in one case x_2 represents French treated directors, and in the other case, Norwegian treated directors. Often, marginal effects show how much the dependent variable changes for a one-unit change in an explanatory variable. However, in this case, I am interested in the interaction effect between two explanatory variables. Furthermore, to analyze quota effects, I choose the marginal effects instead of a multiplicative effect. The multiplicative effect controls for the difference in the baseline situation between two groups (Buis, 2010). I do not want the model to control for the baseline situation in Norway and France, because I am interested in the quota effects for countries with different baseline situations.

5.3.2 Gender pay gap in executive positions

I examine whether a boardroom quota decreases the gender pay gap in top corporate positions. Again, I execute the analysis for CEOs and Non-CEO executives in France and Norway. First, it is important to formulate a model that presents the gender pay gap. The gender pay gap within

a group is the difference in average compensation rates between males and females in that group. This is called the raw gender pay gap. This is specified in the following baseline model¹:

$$\text{Logcash} - \text{compensation}_{dft} = \alpha_0 + \alpha_1 \text{Female}_d + \varepsilon_{dt} \quad (6)$$

The dependent variable is *logcash-compensation* for executive directors and *dft* stands for director-firm-year. *Female* takes value 1 for female directors, and 0 for male directors. Additionally, I analyze different characteristics inspired by Bertrand & Hallock (2001) that could account for the existence of a raw gender pay gap. This gives a deeper insight into the buildup of the gender pay gap and therefore the glass ceiling problem. Several factors could play a role in the difference between the average compensation for men and women. For the Non-CEO executives, part of this gap could be explained by the fact that male executives have on average higher ranks than female executives. Therefore, I consider the different director roles among Non-CEO executives. In addition to that, larger and better performing firms pay higher compensation. I use sales and ROA to analyze respectively, the effect of firm size and firm performance on the gender pay gap. If on average, males are older and work longer for a company, then this could explain part the gender pay gap. Consequently, I include executive characteristics age and tenure. Women may work in different types of sectors compared to men. If women work on average in lower-paid sectors, then this could contribute to a gender pay gap (Bertrand & Hallock, 2001). I add the various characteristics discussed to the raw gender pay gap in specification (6). This leads to a conditional gender pay gap model²:

$$\text{Logcash} - \text{compensation}_{dft} = \alpha_0 + \alpha_1 \text{Female}_d + \tau_d + \gamma D_{dt} + \beta C_{dt} + \theta_d + \varepsilon_{dt} \quad (7)$$

Where τ_d is used to control for occupational segregation. For the CEO sample, this variable has no effect, because all directors have the same function. Further, I include firm characteristics denoted by γD_{dt} . Executive characteristics age and tenure are represented by βC_{dt} . Finally, θ_d are sector effects.

I use a difference-in-difference approach to analyze the quota effect on compensation for female directors compared to male directors. This means that female directors form the treated group and male directors form the control group. I add variable *Post* to test for the quota effect.

¹ This model is not estimated in the result section. It is only used to explain the build-up of my methodology

² This model is not estimated in the result section. It is only used to explain the build-up of my methodology

Post equals 1 when the observation falls in the post-quota period. Furthermore, I add year effects to capture aggregate time trends for both the control and treated group. The difference-in-difference analysis for the raw gender pay gap is specified in this regression specification:

$$\text{Logcash} - \text{compensation}_{dft} = \alpha_0 + \alpha_1 F_d + \alpha_2 \text{Post}_t + \alpha_3 (F_d * \text{Post}_t) + \varepsilon_{dt} \quad (8)$$

In specification (8), I abbreviate the variable *Female* to F_d . The difference-in-difference analysis is examined by analyzing an interaction term between the variables *Female* and *Post*. As already discussed in the literature review and in this section, the existence of the raw gender pay gap is caused by several characteristics discussed by Bertrand & Hallock (2001) and Plantenga & Remery (2006). In case the quota causes these characteristics to change in favor of female executives, then this causes the raw gender pay gap to decrease. To analyze what characteristic drive the measured quota effect, I run specification (8) also with the additional variables discussed in specification (7). I do this by gradually adding explanatory variables to the raw gender pay gap. Note that I do not include $\alpha_2 \text{Post}_t$ when I include year effects.

As discussed before, it is possible that in a country the gender pay gap changes because of a trend independently of the boardroom gender quota. Therefore, as a robustness check, I use French executives as a control group for Norwegian executives, and the other way around. In this difference-in-difference setting, I combine French and Norwegian executives' observations. This difference in difference approach helps to strengthen my answer, whether a gender quota leads to a decrease in the gender pay gap. I use the following regression specification to test the quota effect in France in a combined dataset of France and Norway:

$$\text{Logcash} - \text{compensation}_{dft} = \alpha_0 + \alpha_1 (F_d * q_f) + \alpha_2 (F_d * \text{Post}F_t * q_f) + \varepsilon_{dt} \quad (9)$$

Where q_f take value 1 for French directors. This regression implies that the treatment group contains female French directors and the control group of male French directors, and Norwegian male and female directors. I run specification (9) also with the additional variables discussed in specification (7). I do this by gradually adding explanatory variables to the raw gender pay gap. Note that compared to specification (8), the variable Post_t is not included separately in specification (9). This means that I always include year effects for the combined dataset of France and Norway. This is necessary because Norway and France both have different post quota periods. The variable $\alpha_2 (F_d * \text{Post}F_t * q_f)$ includes $\text{Post}F_t$, which means

that this is the post quota period for France. Therefore, $\alpha_2(F_d * PostF_t * q_f)$ represents French female directors in the French post quota period.

I use the same specification to test the quota effect in a combined dataset for Norwegian directors. Now the Norwegian female directors form the treatment group. The control group contains of Norwegian male directors and French female and male directors. This results in the following specification:

$$Logcash - compensation_{dft} = \alpha_0 + \alpha_1(F_d * q_n) + \alpha_2(F_d * PostN_t * q_n) + \varepsilon_{dt} \quad (10)$$

Where q_f take value 1 for Norwegian directors. $PostN_t$ refers to the post quota period in Norway.

Important to note is that the coefficients in specifications (9) and (10) do not give an appropriate view of the gender pay gap in Norway or France specifically. Since, the dataset is combination of French and Norwegian directors. For example in specification (9), I compare French females with French males and Norwegian females and males. Therefore, the results of this specification is not a gender pay gap. I only use it to check the effects of legislation on the treated group.

As a further robustness check, I run the models above with the dependent variable *Logtotalequitycompensation* instead of *Logcash-compensation*. Albenesi (2015) states that female executives have on average lower shares of equity compensation compared to male directors. Furthermore, female directors have lower pay-performance sensitivity. This means that their compensation is less dependent on firm value. This could imply that there exists a higher gender pay gap when equity-based compensation is included and therefore possibly a different quota effect on the gender pay gap. It is important to check if the quota effects for total compensation still hold when equity compensation is included.

5.4 Summary statistics

In table 1, I report executive director characteristics for France and Norway. Table 2 reports female executive director characteristics, before and after a quota. In table 3, I analyze the differences in female participation among executives. Tables 1-3 are all separated in panel A for CEOs and panel B for Non-CEO executives. In table 4 I show the statistics for firm characteristics before and after the quota. panel A represents French firm characteristics and panel B Norwegian firm characteristics.

Table 1, panel A shows the characteristics of CEOs in France and Norway. French females are younger and have lower average tenure than their male counterparts. This is in line with the findings of Bertrand & Hallock (2001). Furthermore, French females earn on average 1115 and their male counterparts 1958. This significant difference is descriptive evidence for a gender pay gap. In Norway, there is only a significant difference in tenure between men and women. Men serve on average 3.3 years longer than women. The lack of observations for compensation of female CEOs in Norway make it hard to draw conclusions from their statistics.

In Panel B of Table 1, I show the director characteristics for Non-CEO executives in both countries. In France, averages for compensation also show descriptive evidence for a gender pay gap. Men earn on average 820 more than women. Female executives are on average 4.5 years younger than male executives in France. A similar number holds for Norway, where females are on average 5.3 years younger. Interestingly, in France, women serve longer than their male counterparts. In Norway, this is the other way around.

Table 1: Director characteristics

This table provides summary statistics for directors in France and Norway. Panel A presents statistics for CEOs and panel B for Non-CEO executives. Total compensation is measured in thousands of dollars. Diff stands for the difference between women and men (women – men). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

	Mean	Min	Max	SD	N	Women	Men	Diff.
Panel A: CEOs								
<i>CEOs France</i>								
Age	62.5	30	89	9.2	5979	57.6	62.7	5.1***
Time in role	6.3	0	48.9	6.6	6650	4.4	6.7	2.3***
Total compensation	1945	7	8945	1236	1545	1115	1958	843***
<i>CEOs Norway</i>								
Age	61.7	45	84	7.2	703	62.3	61.7	-0.6
Time in role	4.6	0	30.9	4.9	816	1.57	4.7	3.1**
Total compensation	534	14	7645	743	210	267	536	270
Panel B: Non-CEOs								
<i>Non-CEOs France</i>								
Age	60	31	95	9.8	6609	56	60.5	4.5***
Time in role	5.3	0	54.9	5.3	8213	6.1	5.1	-0.91
Total compensation	1305	4	17598	1580	1524	542	1362	820***
<i>Non-CEOs Norway</i>								
Age	59.4	37	88	7.4	1467	56	59.9	4***
Time in role	3.1	0	21.1	3.2	1759	2.0	3.2	1.2***
Total compensation	385	1	2992	312	430	348	391	44

Table 2, panel A analyzes the female director characteristics before and after the quota. For Norwegian CEOs, the lack of observations makes it impossible to draw conclusions from the statistics. The post-quota female Norwegian CEO observations are missing. Therefore, there is no total compensation reported after the quota. French female CEOs show interesting

statistics. Before the quota, they are on average 62.4 years old and this declines to 55.1 years after the quota. Lastly, total compensation for females increased after the quota.

Non-CEO female executives in France show similar results compared to French female CEOs. After the quota, female executives are on average younger. Also, their compensation is on average 263 higher than before the quota. Non-CEO executives serve longer in their role after the quota compared to before. In Norway after the quota, Non-CEO executives are on average 1.6 years older than before the quota. Interestingly, compensation after the quota is on average significantly greater than before the quota.

Table 2: Female director characteristics

This table provides summary statistics for female directors, before and after the quota, in France and Norway. Panel A presents statistics for CEOs and panel B for Non-CEO executives. Total compensation is measured in thousands of dollars. Diff stands for the difference between after quota and before quota (after quota – before quota) ***p<0.01, **p<0.05, *p<0.1.

	Mean	Before quota	After quota	Diff.
Panel A: CEOs				
<i>CEOs France</i>				
Age	57.6	62.4	55.1	-7.3***
Time in role	4.1	4.3	3.9	-0.3
Total compensation	1115	868	1858	990**
<i>CEOs Norway</i>				
Age	62.3	61	64	3
Time in role	1.57	1.45	1.65	0.2
Total compensation	267	267	-	-
Panel B: Non-CEOs				
<i>Non-CEOs France</i>				
Age	56	59.1	53.1	-6.1***
Time in role	6.05	5.1	6.9	1.9**
Total compensation	542	459	722	263***
<i>Non-CEOs Norway</i>				
Age	56	57	55.4	-1.6*
Time in role	2.0	1.9	2.1	-0.3
Total compensation	348	116	390	274***

Table 3, panel A shows the diversity among CEO positions in France and Norway. In France, 3.4% of the total observations are female. For pre-quota period observations, 2.2% is female. This number increased to 4.8% for post-quota period observations. This indicates a relative increase in female participation after the quota. The participation of female CEOs in Norway is 1.2% of total CEO observations. The number of CEO observations in the post-quota period is substantially smaller than before the quota. Still, the number of female director

observations increased from 4 to 6. This means that 2.4% of the post-quota period observations are female, compared to 1.2% before.

In table 3, panel B I detect the same trends for Non-CEO executives compared to CEOs, in both countries. Female executives count for 12% of the total observations in France. This is 12.2% in Norway. Both countries show a relative increase in female observations after the quota. In France, this percentage increased from 9.9% to 14.9% and in Norway from 9.5% to 13.5%.

Table 3: Gender diversity among executives

This table provides summary statistics about gender diversity among executives, before and after the quota, in France and Norway. Panel A presents statistics for CEOs and panel B for Non-CEO executives. The observations relate to director-firm-year observations.

	Total	Before quota	After quota
Panel A: CEOs			
<i>CEOs France</i>			
Total observations	6650	3495	3077
Female observations	226	78	148
% female observations	3.4%	2.2%	4.8%
Total male observations	6424	3417	2929
% male observations	96.6%	97.8%	95.2%
<i>CEOs Norway</i>			
Total observations	816	567	249
Female observations	10	4	6
% female observations	1,2%	0,7%	2,4%
Total male observations	806	563	243
% male observations	98.8%	99.3%	97.6%
Panel B: Non-CEOs			
<i>Non-CEOs France</i>			
Total observations	8213	4728	3485
Female observations	989	469	520
% female observations	12.0%	9.9%	14.9%
Male observations	7224	4259	2965
% male observations	88.0%	90.1%	85.1%
<i>Non-CEOs Norway</i>			
N observations	1759	823	936
Female observations	214	78	126
% female observations	12.2%	9.5%	13.5%
Male observations	1545	745	800
% male observations	87.8%	90.5%	85.5%

Table 4, Panel A presents the firm characteristics of the French firms in the dataset. Note that the averages correspond to director-firm-year observations. This means that they do not correspond to averages of all firms. Remarkably, sales show a substantial decrease after

the quota compared to before the quota. This means that the average size of French firms in my data set is lower after the quota.

Table 4, Panel B shows that in Norway an opposite trend is visible. There is a substantial increase in average sales after the quota. Furthermore, it stands out that the number of observations for ROA and sales is relatively low in the post-quota period. This could be a result of the fact that firms in Norway delisted as a reaction to the quota. Therefore, the number of public limited firms decreased after the quota.

Table 4: Firm characteristics

This table provides summary statistics for firms in France and Norway. The number of observations relates to director-firm-year observations. The data is separated for observations before and after the quota. Sales are measured in millions of dollars. The variable ROA is winsorized. Panel A presents statistics for France and panel B for Norway.

	<i>Mean</i>	<i>Min</i>	<i>Max</i>	<i>SD</i>	<i>N</i>
Panel A: France					
<i>Total</i>					
ROA	5.3	-0.74	22.7	4.1	7603
Sales (\$ millions)	2809	0.0002	224611	19750	8896
<i>Before quota</i>					
ROA	5.3	-0.74	22.7	4.1	4745
Sales (\$ millions)	3941	0.001	205268	23098	5268
<i>After quota</i>					
ROA	5.4	-0.74	22.7	4.0	2858
Sales (\$ millions)	1164	0.0001	224612	13317	3628
Panel B: Norway					
<i>Total</i>					
ROA	8.6	-0.74	22.7	6.5	1811
Sales (\$ millions)	292	0.0002	8410	1282	2377
<i>Before quota</i>					
ROA	9.6	-0.74	22.7	6.9	1067
Sales (\$ millions)	58	0.0002	6337	407	1340
<i>After quota</i>					
ROA	7.1	-0.74	22.7	5.6	744
Sales (\$ millions)	594	0.000960	8411	1842	1037

6. Results

In this chapter, I provide you with my empirical results. In line with my methodology, I separate my results for female participation and compensation.

6.1 The quota effect on the participation of females in executive positions

In this section, I discuss the regression results of my probit model, on how the quota affected female participation in executive positions. I separate the results for CEOs and Non-CEO executives.

6.1.1 Participation of female CEOs

Table 5 shows the effect of a gender quota on female participation for CEO positions. Column 1 tells that in France the quota significantly increases the probability that a CEO is female, at a significant level of 1%. Likewise, results in column 3 show that the quota increases the probability for a female CEO in Norway. This result is significant on a 5% level. To interpret the magnitudes of the coefficients, I need to analyze the marginal effects of a quota on the probability of a female executive. This means that the margin is the discrete change in the probability of a female after the quota compared to the probability before the quota. This implies that the probability of a female CEO in the pre-quota period represents the base level. Column 2 indicates the marginal effect of the quota in France, the quota increases the probability of a female CEO by 2.9 percent. In Norway, the quota increases the probability of a female CEO by 1.8 percent. Note, the result for Norway should be treated with caution, because it is only significant at a 10 percent level. The results in table 5 suggest that gender quotas positively affects the participation of females among CEO positions in France and Norway. This is in line with the expectations in hypothesis 1.

Table 5: Probit model for CEOs

This table presents the results for the probit regression for CEOs in France and Norway. The dependent variable is *Female*, which is a dummy variable that equals 1 for female executives and 0 for male executives. The independent variable *Post* equals 1 in the post-quota period and 0 in the pre-quota period. For France, the value is 1 in the years after 2011 and Norway in the years after 2007. Respectively specification (2) and (4) represent the marginal effects corresponding to respective specifications (1) and (3). ***p<0.01, **p<0.05, *p<0.1.

Dependent variable:	Female			
	(1)	(2)	(3)	(4)
Post	0.402*** (0.0675)	0.029***	0.534** (0.266)	0.018*
Constant	-2.065*** (0.0554)		-2.510*** (0.203)	
Treated group	FRANCE	FRANCE	NORWAY	NORWAY
Observations	5,853	5,853	746	746

The results in table 6 report the results for the regression (5), in which data of both France and Norway are included. Column 1 shows the probability for a female to be CEO in four different groups. French treated and non-treated CEOs, and Norwegian treated and non-treated CEOs. By following Buis (2010), the quota effect is measured by subtracting the probability of non-treated CEOs from treated CEOs separately for both countries. Column 2 indicates that the quota results in a significant increase in the probability of a female executive in France. The result for Norway in column 3 also indicates a positive quota effect, on a 5 percent significance level. The results in table 6 support the evidence that a quota positively increases the participation of female CEOs. Interestingly, column 4 shows that the baseline probabilities significantly differ between France and Norway. Before the quota, the probability of a female CEO is higher in France. This is contrary to my expectations that Norway is more progressive on gender equality. To analyze the difference in quota effects, I subtract the Norwegian quota effect from the France quota effect. Column 5 shows that the difference is negligible and not significant. This means that for CEO positions, I find no evidence in favor of my hypothesis that a gender quota is more effective on gender equality for countries with a less progressive gender culture.

Table 6: Marginal effects of probit model with interaction terms for CEOs

This table presents the marginal effects of the probit regression with interaction terms for CEOs in France and Norway. The dependent variable is *Female*, which is a dummy variable that equals 1 for female executives and 0 for male executives. Column 1 shows the probabilities for a female executive before and after the quota in France and Norway. Column 2 shows the marginal probability effect of the quota for France and Norway. Column 3 shows the difference in probabilities before the quota in France and Norway (France – Norway). Column 4 shows the difference in the marginal effect of the quota between France and Norway (France – Norway).
 ***p<0.01, **p<0.05, *p<0.1.

Dependent variable:	<i>Female</i>				
	(1)	(2)	(3)	(4)	(5)
France pre-quota period	0.127***				
France post-quota period	0.190***				
Norway pre-quota period	0.081***				
Norway post-quota period	0.139***				
France marginal effect quota		0.063***			
Norway marginal effect quota			0.057**		
Baseline difference (France - Norway)				0.046***	
Quota effect difference (France - Norway)					-0,005
Treated group	France & Norway				
Observations	6599	6599	6599	6599	6599

6.1.2 Participation of female Non-CEO executives

Results in Table 7 show the quota effect on female participation for Non-CEO executives in France and Norway. Column 1 shows a significant positive relationship between the post-quota period and the probability for a female executive in France. The same relation holds for Non-CEO executives in Norway, as can be seen in column 3. In France, gender quotas have a marginal effect of 5.7 percent on the probability of a female executive. In Norway, the marginal effect is 6.7 percent. For both countries, results are significant on a 1 percent level. The results provide evidence that the quota positively increases female participation for Non-CEO executives. This is in line with my expectations of hypothesis 1.

Table 7: Probit model for Non-CEO executives

This table presents the marginal effects of the probit regression with interaction terms for Non-CEO executives in France and Norway. The dependent variable is *Female*, which is a dummy variable that equals 1 for female executives and 0 for male executives. The independent variable *Post* equals 1 in the post-quota period and 0 in the pre-quota period. For France, the value is 1 in the years after 2011 and Norway in the years after 2007. ***p<0.01, **p<0.05, *p<0.1.

Dependent variable:	Female			
	(1)	(2)	(3)	(4)
Post	0.285*** (0.0381)	0.057***	0.363*** (0.0941)	0.067***
Constant	-1.325*** (0.0279)		-1.419*** (0.0792)	
Treated group	FRANCE	FRANCE	NORWAY	NORWAY
Observations	7,405	7,405	1,461	1,461

The results in table 8 support the quota effects measured in table 7. For France and Norway, the quota effects are positive and significant. In the pre-quota period, there is no significant difference between the probability of female executives in France compared to Norway. Similarly, no significant difference is measured between the quota effects in France compared to Norway. Although, the magnitude of the quota effect is higher in Norway than in France. Also, there is no significant difference in the base-line probabilities for female executives in the two countries. This means that I find no confirmation that Norway is more gender progressive prior to the quota. Furthermore, I find no evidence for a stronger quota effect in France.

Table 8: Marginal effects of probit model with interaction terms for Non-CEO executives

This table presents the marginal effects of the probit regression with interaction terms for Non-CEO executives in France and Norway. The dependent variable is *female*, which is a dummy variable that equals 1 for female executives and 0 for male executives. Column 1 shows the probabilities for a female executive before and after the quota in France and Norway. Column 2 shows the marginal probability effect of the quota for France and Norway. Column 3 shows the difference in probabilities before the quota in France and Norway (France – Norway). Column 4 shows the difference in the marginal effect of the quota between France and Norway (France – Norway). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Dependent variable:	<i>Female</i>				
	(1)	(2)	(3)	(4)	(5)
France pre-quota period	0.266***				
France post-quota period	0.354***				
Norway pre-quota period	0.242***				
Norway post-quota period	0.348***				
France marginal effect quota		0.088***			
Norway marginal effect quota			0.106***		
Baseline difference (France - Norway)				0.024	
Quota effect difference (France - Norway)					0.018
Treated group	FRANCE & NORWAY				
Observations	9972	9972	9972	9972	9972

Noteworthy, comparing the magnitudes of the baseline for CEOs and Non-CEO executives shows that the probabilities for Non-CEO executives are greater compared to CEOs. This means that before the quota the probability of a female being CEO is lower compared to Non-CEO executives. This is in line with the summary statistics of table 3 and provides evidence for the existence of the glass ceiling phenomena. Furthermore, the marginal quota effects for Non-CEO executives in both countries have greater magnitudes compared to CEOs. Thus, the quota tends to show a stronger effect for Non-CEO executives compared to CEO executives. This is in line with hypothesis 4.

6.2 The quota effect on the gender pay gap in executive positions

This section reports the results for the quota effects on the gender pay gap. Again, the results are separated for CEO and Non-CEO executives. As already discussed, data on Norwegian

CEOs is insufficient. This means that I do not report the compensation analysis for this group. I do use the Norwegian CEO data that is available as a control group for French CEOs in table 10.

For the appropriateness of the results displayed in this section, I test whether the following assumptions hold. First, I need to check if there is no multicollinearity present between the independent variables. In Appendix (C), I show the results for a Variance Inflation Factor (VIF) test. The test indicates that there is no multicollinearity present between my variables. I conduct the Breusch-Pagan / Cook-Weisberg test to test for potential heteroscedasticity. The results for this test are displayed in Appendix (D) and show that the hypothesis that there is no heteroscedasticity cannot be rejected. Furthermore, the observations in my dataset are not independent from each other inside a firm overtime. To tackle these two problems, I use in all regressions robust standard errors that allow for clustering at firm level.

6.2.1 The gender pay gap for CEOs

Table 9 shows the output for French CEOs. In columns 1 to 4, I display the results specified in regression (8). Column 1 starts with no controls and for each column after that, I gradually add more explanatory characteristics. First, columns 1 and 2 prove that there existed a substantial raw gender pay gap for French CEOs before the quota. In column 1 there is a significant coefficient of -1.093. This magnitude suggests that without a quota intervention the raw gender pay gap in France is equal to 67 percent³. After controlling for year effects in column 2, the magnitude suggests a gender compensation differential of 65 percent. In column 3, I add the variable *Sales* to control for size. The effect is somewhat puzzling because this leads to a positive significant coefficient of the gender pay gap without quota intervention. This means that after controlling for size, female CEOs earned on average more than men. Also, it suggests that before the quota, females tended to work for smaller firms than men. In column 4, I add *ROA* to control for firm performance. Now, the positive magnitudes of *Female* increase even further. This implies that females, before the quota, tend to work for less successful companies compared to men. In addition, females earn on average more compared to men after controlling for *ROA* and *sales*. This implies that I find no evidence for an unexplained gender pay gap among CEOs, as discussed by Plantenga & Remery (2006), Bertrand & Hallock (2001) and Bell

³ I follow the method of Chhaochharia & Grinstein (2009) to interpret the coefficient of the effect of a dummy variable on the log of cash-compensation. Example: In table 8, column 1, the variable *female* reports a coefficient of -1.093 on the log of total compensation. This means in this case a discount of $\exp(-1.093)$, which represents a gender pay gap of -67% in total compensation.

(2005) in the literature review. I do find evidence for gender inequality regarding that males tend to work for bigger and more successful firms. Note that the number of observations sharply decreases after I include sales and ROA. If I add more control variables the interaction variable *Female x Post* is omitted from the regression. This is probably the case because the number of observations becomes insufficient. As a consequence it is not possible to test the effect of tenure, age and sector on the gender pay differential.

Now, I focus on the results for the quota effect on the gender pay gap for female CEOs. In column 1 the variable *Female x Post* shows a positive significant effect on a 10 percent level. This means that the quota leads to an increase in total compensation for females compared to males. Consequently, a decrease in the raw gender pay gap. The significant positive effect of the variable *post* in column 1 indicates that compensation for all CEOs in France increased during the post-quota period. Column 2 shows after controlling for year effects a similar positive quota effect, and now on a 5 percent significance level. In column 2, the raw gender pay gap is fully explained by the post-quota years. Surprisingly, the positive gender pay gap before the quota, in columns 3 and 4 seems to be dampened by the quota. The quota now has a negative significant effect on compensation. This means that after controlling for size, female CEOs received less compensation in the years after the quota. Note that the results tend to indicate that there is almost no positive nor a negative gender pay gap present after the quota. Because, the positive gender pay gap is fully explained by the years after the quota. This is in line with the findings for the raw gender pay gap in columns 1 and 2. Therefore, my results suggest that, among CEOs in France, there is neither a positive or negative gender pay gap present after the quota. It means that female and male CEOs tend to be equal in terms of cash-compensation after the quota.

Table 9: Gender pay gap CEOs: Regression results

This table presents the regressions with the dependent variable *Logcash-compensation*. The dummy variables: *Post* equals 1 in the post-quota period and 0 in the pre-quota period. *Female* equals 1 for female executives and 0 for male executives. *Female x Post* represents the interaction term between *Female* and *Post*. I use White heteroscedasticity robust standard errors that allow for clustering at firm level. ***p<0.01, **p<0.05, *p<0.1.

Dependent variable:	Logcash-compensation			
	(1)	(2)	(3)	(4)
Female	-1.093* (0.601)	-1.049** (0.521)	0.355** (0.151)	0.552*** (0.166)
Post	0.376** (0.144)			
Female x Post	1.106* (0.612)	1.156** (0.530)	-0.368* (0.188)	-0.348* (0.182)
Logsales			0.0744** (0.0353)	0.0913*** (0.0338)
ROA				0.0536*** (0.0185)
Constant	7.130*** (0.0859)	6.536*** (0.153)	5.979*** (0.394)	5.486*** (0.423)
Treated group	France	France	France	France
Control group				
Year effects	NO	YES	YES	YES
Observations	1,377	1,377	888	813
R-squared	0.052	0.121	0.154	0.190

Table 10 presents the analysis for French CEOs in the combined dataset specified in regression (9). The variable *France x Female* is an interaction variable that indicates French females and the variable *France x Female x Post* indicates French females after the quota. With regards to the direction and significance of the interaction terms, the results in table 10 are comparable to the results in table 9. Column 1 in table 10 shows a positive and significant quota result for the raw gender pay gap. After controlling for sales and ROA the quota effect is negative. This suggests that there are no trends independently from the quota that bias my interaction terms. Concluding from table 9 and 10, the raw gender pay gap for French females is lower when Norwegian CEOs are included. This seems logical because table 1 indicates that the average total wages in France are substantially greater than in Norway.

With respect to my hypotheses, results in table 9 and 10 demonstrate that the gender quota causes a decrease in the raw gender pay gap for French CEOs. This is in line with hypothesis 3. After controlling for sales there is a negative quota effect, which is not in line with hypothesis 3. Because I cannot execute the analysis for Norwegian CEOs, it is not possible to compare quota effects between French and Norwegian CEOs. Therefore, I cannot test hypothesis 4 for CEOs.

Table 10: Gender pay gap CEOs: Additional results

This table presents the regressions with the dependent variable *Logcash-compensation*. The dummy variables: *Post* equals 1 in the post-quota period and 0 in the pre-quota period. *Female* equals 1 for female executives and 0 for male executives. *France x Female* equals 1 for French female directors and 0 for other directors.. *France x Female x Post* represents the interaction term between *France x Female* and *Post*. I use White heteroscedasticity robust standard errors that allow for clustering at firm level. ***p<0.01, **p<0.05, *p<0.1.

Dependent variable:	Logcash-compensation		
	(1)	(2)	(3)
France x Female	-0.797 (0.516)	0.529*** (0.153)	0.540*** (0.147)
France x Female x Post	0.907* (0.525)	-0.570*** (0.159)	-0.433*** (0.164)
Logsales			0.0744** (0.0353)
ROA			
Constant	6.277*** (0.131)	5.337*** (0.243)	5.121*** (0.305)
Treated group	France	France	France
Control group			
Year effects	NO	YES	YES
Observations	1,579	1,065	933
R-squared	0.147	0.363	0.318

6.2.2 The gender pay gap for Non-CEO executives

Table 11 presents the effect of the quota on female Non-CEO executives in France. I run the model with no control variables in column 1, and after that, I gradually add control variables. Year effects are included from columns 2 to 5.

The variable *Female* represents the gender pay gap without a quota intervention. The magnitudes in columns 1 and 2 display a raw gender pay gap of 73 percent and after controlling for year effects it is still 73 percent. In column 3, I add dummies for occupational segregation among Non-CEO executives. This leads the gender pay gap to drop to 69 percent. This means that only a small part of the gender pay gap is explained by the fact that females occupy lower ranks than males. Adding sales results in a significant drop in the gender pay gap to 57 percent, which signals that before the quota on average females worked for smaller companies. In column 5, I include ROA, tenure, and age in the model. This leads the gap to further drop to 53 percent. Thus, after controlling for numerous characteristics relevant for compensation, there still exists a significant gender pay gap before the quota intervention. Adding more factors does not seem appropriate regarding the sample size. This means that the results fail to provide evidence that there is no unexplained gender pay gap. As discussed in the literature section, Plantenga & Remery (2006) argue that the unexplained gender pay gap that remains in column 5 could be explained by discrimination against women, the insufficient explanatory power of independent variables, or a combination of both.

In columns 1 and 2, I find no significant evidence that the quota leads to a decrease in the raw gender pay gap among French Non-CEO executives. The magnitudes of *Female x Post* are in both columns positive and of considerable magnitude. However, the p-values are slightly above the 10 percent level. In columns 3,4 and 5 there is also no significant effect of the quota present. The magnitude of *Female x Post* decreases after gradually adding control variables and is negligible in the most saturated version in column 5.

Table 11: Gender pay gap French Non-CEO executives: Regression results

This table presents the regressions with the dependent variable *Logcash-compensation*. The independent variables: *Post* equals 1 in the post-quota period and 0 in the pre-quota period. *Female* equals 1 for female executives and 0 for male executives. *Female x Post* represents the interaction term between *Female* and *Post*. I use White heteroscedasticity robust standard errors that allow for clustering at firm level. ***p<0.01, **p<0.05, *p<0.1.

Dependent variable:	Logcash-compensation				
	(1)	(2)	(3)	(4)	(5)
Female	-1.319*** (0.309)	-1.305*** (0.295)	-1.176*** (0.285)	-0.842*** (0.221)	-0.752*** (0.282)
Post	0.325 (0.208)				
Female x Post	0.619 (0.429)	0.614 (0.422)	0.703 (0.444)	0.116 (0.581)	-0.0884 (0.673)
Logsales				0.168*** (0.0270)	0.149*** (0.0259)
ROA					0.0136 (0.0191)
Age					-0.0105 (0.0124)
Tenure					0.109** (0.0529)
Constant	6.542*** (0.146)	5.817*** (0.199)	5.561*** (0.300)	4.040*** (0.462)	5.526*** (0.833)
Treated group	French females				
Control group	French males				
Year controls	NO	YES	YES	YES	YES
Occupational controls	NO	NO	YES	YES	YES
Sector controls	NO	NO	NO	NO	NO
Observations	1,396	1,396	1,396	1,011	742
R-squared	0.061	0.138	0.181	0.304	0.344

Table 12 shows results for specification (9) in which Norwegian executives are added to the control group to investigate the quota effects for French female executives. Year effects are included in all columns. The direction and significance of the results are comparable to table 11. This means that there exists a significant gender pay gap in all columns. Furthermore, the direction of the quota effect is similar in the combined dataset compared to table 11. Like table 11, there is no significant effect of the quota on the gender pay gap. This means that the results in table 11 give reason to doubt the conclusion that there is no significant effect of the quota for Non-CEO executives in France. Therefore, this is not in line with my expectations stated in hypothesis 3.

Table 12: Gender pay gap French Non-CEO executives: Additional results

This table presents the regressions with the dependent variable *Logcash-compensation*. The dummy variables: *Post* equals 1 in the post-quota period and 0 in the pre-quota period. *Female* equals 1 for female executives and 0 for male executives. *France x Female* equals 1 for French female directors and 0 for other directors. *France x Female x Post* represents the interaction term between *France x Female* and *Post*. I use White heteroscedasticity robust standard errors that allow for clustering at firm level. ***p<0.01, **p<0.05, *p<0.1.

Dependent variable:	Logcash-compensation			
	(1)	(2)	(3)	(4)
FrancexFemale	-1.054*** (0.305)	-0.923*** (0.298)	-0.736*** (0.237)	-0.645** (0.310)
FrancexFemalexPost	0.691 (0.465)	0.811 (0.521)	0.593 (0.636)	0.409 (0.705)
Logsales			0.144*** (0.0234)	0.111*** (0.0368)
ROA				-0.00880 (0.0236)
Age				-0.00263 (0.0113)
Tenure				0.237*** (0.0712)
Constant	5.790*** (0.195)	5.476*** (0.318)	4.608*** (0.429)	5.616*** (0.818)
Treated group	French females	French females	French females	French females
Control group	French males	French males	French males	French males
Year controls	NO	YES	YES	YES
Occupational controls	NO	YES	YES	YES
Sector controls	NO	NO	NO	NO
Observations	1,777	1,768	1,310	896
R-squared	0.076	0.136	0.284	0.297

Table 13 reports results for the Norwegian Non-CEO executives. What stands out is the level of the gender pay gap. Compared to French executives, the coefficient of the gender pay gap is lower. This is in line with table 1 in the summary statistics, where average compensation for female and male are closer to each other in Norway than in France. Columns 1 and 2 show a raw gender pay gap of respectively 48 percent and 49 percent. After controlling for occupation, the gender pay gap becomes 37 percent. This means that a significant part of the raw gender pay gap is explained by differences in ranks between females and males. After I add sales, the gender pay gap decreases to 35 percent and loses significance. Adding more control variables leads to an insufficient level of observations. This means in the most saturated version of my model in column 4 there still exists a significant gender pay gap. Again, this could be explained by insufficient explanatory power of the independent variables, discrimination against women, or a combination of both.

The variable *Post* in column 1 is significant and strong. This means that the common trend is that compensation is increasing for all executives. However, the results for Non-CEO executives in Norway indicate that the quota has no significant positive impact on the gender pay gap. In columns 1 and 2, the coefficients are substantial and positive, but there is no significance. This positive quota effect is lower after controlling for occupational segregation and sales in columns 3 and 4.

Table 13: Gender pay gap Norwegian Non-CEO executives: Regression results

This table presents the regressions with the dependent variable *Logcash-compensation*. The independent variables: *Post* equals 1 in the post-quota period and 0 in the pre-quota period. *Female* equals 1 for female executives and 0 for male executives. *Female x Post* represents the interaction term between *Female* and *Post*. I use White heteroscedasticity robust standard errors that allow for clustering at firm level. ***p<0.01, **p<0.05, *p<0.1.

Dependent variable:	<i>Logcash-compensation</i>			
	(1)	(2)	(3)	(4)
Female	-0.654*** (0.203)	-0.673*** (0.193)	-0.459** (0.220)	-0.425* (0.218)
Post	0.608** (0.269)		-0.117 (0.271)	
FemalexPost	0.291 (0.244)	0.255 (0.226)	0.0835 (0.229)	0.108 (0.234)
Logsales				-0.0123 (0.0325)
Constant	5.255*** (0.171)	5.252*** (0.121)	4.502*** (0.248)	4.923*** (0.384)
Treated group	Norwegian females	Norwegian females	Norwegian females	Norwegian females
Control group	Norwegian males	Norwegian males	Norwegian males	Norwegian males
Year controls	NO	YES	YES	YES
Occupational controls	NO	NO	YES	YES
Sector controls	NO	NO	NO	NO
Observations	376	376	366	279
R-squared	0.071	0.198	0.249	0.278

Table 14 shows the model in which France executives are added to the control group and Norwegian female executives represent the treated group. Furthermore, year effects are included in all columns. The variable *Norway x Female* presents the Norwegian female executives and *Norway x Female x Post* is the interaction variable for Norwegian female executives in the post-quota period. In this section, the post-quota period refers to the Norwegian post-quota period (after 2008). Interestingly, the variable *Norway x Female x Post* shows a significant increase in compensation for female executives in columns 1 and 2. This means that the quota causes a significant increase in the compensation for Norwegian female executives in comparison with the control group. After controlling for sales, the quota effect becomes negative and highly insignificant. On the contrary with results in table 14, the results in table 13 show that there is no positive quota effect on the gender pay gap in Norway. This is caused by the fact that compensation is also significantly increasing for male directors in the post-quota period, as showed in table 13. Therefore, the results in table 14 show a significant increase in compensation of Norwegian female executives, compared to French executives. However, compensation for Norwegian male executives is also increasing in the post-quota period. Thus, there is no significant decrease in the gender pay gap in Norway. From the results, I can conclude that the quota is not decreasing the gender pay gap in Norway, which is not in line with my expectations in hypothesis 3.

With respect to hypothesis 4, results regarding the gender pay gap confirm my expectations that Norway is more gender progressive compared to France. The gender pay gap for Non-CEO executives in France is stronger than in Norway. However, I cannot draw any conclusions on the effectiveness of the quota on gender equality between the two countries. Because, for both countries, I do not find significant results that prove a decrease in the gender pay gap. Therefore, I am not able to confirm, nor reject hypothesis 4.

Table 14: Gender pay gap Norwegian Non-CEO executives: Additional regression

This table presents the regressions with the dependent variable *Logcash-compensation*. The independent variables: *Post* equals 1 in the post-quota period and 0 in the pre-quota period. *Female* equals 1 for female executives and 0 for male executives. *Norway x Female* equals 1 for Norwegian female directors and 0 for other directors. *Norway x Female x Post* represents the interaction term between *Norway x Female* and *Post*. I use White heteroscedasticity robust standard errors that allow for clustering at firm level. ***p<0.01, **p<0.05, *p<0.1.

Dependent variable:	<i>Logcash-compensation</i>		
	(1)	(2)	(3)
NorwayxFemale	-1.570*** (0.224)	-1.564*** (0.250)	-0.894*** (0.235)
NorwayxFemalexPost	0.466** (0.218)	0.673** (0.271)	-0.164 (0.340)
logsalesnew			0.130*** (0.0194)
Constant	5.711*** (0.205)	5.422*** (0.305)	4.695*** (0.372)
Treated group	Norwegian females	Norwegian females	Norwegian females
Control group	Norwegian males	Norwegian males	Norwegian males
Year controls	NO	YES	YES
Occupational controls	NO	NO	YES
Sector controls	NO	NO	NO
Observations	1,900	1,890	1,373
R-squared	0.082	0.139	0.283

6.2.3 The quota effects including equity-based compensation

In this section, I provide you with the results using *Logtotalequitycompensation* as the dependent variable. In table 15, I display the raw gender pay gap including year effects. Column 1 indicates the raw gender pay gap for French CEOs, column 2 for French Non-CEO executives and column 3 for Norwegian Non-CEO executives. Tables with all specifications are displayed in Appendix E, Appendix F, and Appendix G.

Column 1 in table 15 indicates the raw gender pay gap for CEOs in France. The gender pay gap, with equity-based compensation, prior to the quota is slightly higher than with Cash-compensation. The direction of the variable *Female x Post* is comparable with Cash-compensation. However, the magnitude is lower and the quota effect with equity-based compensation is not significant. This means that when equity-based compensation is included the quota does not significantly lead to more gender equality among CEOs in France. This means that the quota leads to more gender equality for cash-compensation, but this effect loses significance when equity-based compensation is included. Appendix E shows that the results have no further differences in significance when *sales* and *ROA* are included.

For French Non-CEO executives the results with and without equity-based compensation show no noteworthy differences. The magnitudes and directions of the variables are similar. This suggests that for Non-CEO executives in France there is no substantial difference in the share of equity-based compensation between males and females and logically no differences for the quota effect on compensation.

The results for Norwegian Non-CEO executives are reported in column 3. Remarkably, the gender pay gap prior to the quota is considerably larger when equity-based compensation is included. This holds for all the specifications, as showed in Appendix G. This confirms the findings of Albenesi (2015) discussed before. Female executives tend to have lower equity-based compensation. In Norway, this means that the gender pay gap is even larger when equity-based compensation is included. Furthermore, the magnitude of the variable *Female x Post* is also larger in table 15, than in table 14. However, the effect is not significant and therefore my conclusions regarding the quota effect do not change.

Table 15: Gender pay gap using Equity-based compensation

This table presents the regressions with the dependent variable *Logtotalequitycompensation*. The independent variables: *Post* equals 1 in the post-quota period and 0 in the pre-quota period. *Female* equals 1 for female executives and 0 for male executives. *Female x Post* represents the interaction term between *female* and *post*. Specification (1) shows the results for French CEOs. Specification (2) shows results for French Non-CEO executives. Specification (3) shows results for Norwegian Non-CEO executives. I use White heteroscedasticity robust standard errors that allow for clustering at firm level. ***p<0.01, **p<0.05, *p<0.1.

Dependent variable:	Logequitytotalcompensation		
	(1)	(2)	(3)
Female	-1.159* (0.608)	-1.326*** (0.306)	-0.953*** (0.297)
Female x Post	0.912 (0.615)	0.529 (0.467)	0.524 (0.327)
Constant	6.712*** (0.174)	5.989*** (0.192)	5.252*** (0.121)
Treated group	French females	French females	Norwegian females
Control group	French males	French males	Norwegian males
Year controls	NO	YES	YES
Occupational controls	NO	NO	YES
Sector controls	NO	NO	NO
Observations	1,386	1,396	377
R-squared	0.140	0.179	0.192

7. Conclusion

In this last section, I first discuss the findings of my paper. Second, the limitations and shortcomings. Finally, implications and directions for further research.

7.1 Findings

In the past two decades, several European countries adopted a mandatory gender boardroom quota. Up until this day, it is a heavily debated and criticized mechanism. With this legislation, governments try to boost gender equality in businesses. In this paper, I examine whether a mandatory boardroom gender quota is successfully improving gender equality in France and Norway. The fact that the quota is active in different countries gives me the opportunity to strengthen the reliability of my research by executing a dual country study. This allows me to analyze quota effects for countries with different gender cultures. In my research, I find optimistic results regarding the quota effects for the participation of females in executive positions. By using a probit regression, I show that the quota increases the probability of an executive being a female in France and Norway. In France results for CEOs are highly significant and show an increase of around 3 percent in the probability of CEOs being a female. The same holds for CEOs in Norway where the probability increase with around 2 percent. Note that the quota effect for Norwegian CEOs is only significant at a 10 percent level. For Non-CEOs the quota effects are positive and stronger than CEOs in both countries. In France, the quota causes an increase in the probability of a female Non-CEO executive of around 6 percent. For Norwegian Non-CEO executives, this is around 7 percent. My results provide evidence in favor of hypothesis 1 because the quota causes more participation of females in executives positions. This means that the sole response of corporations is not to only hire non-executive female directors to satisfy the quota law. Therefore, results show that a quota can help to breach the old boys' network and that the quota leads towards more gender equality in the corporate sector.

In both countries, the quota tends to show a stronger effect for female participation among Non-CEO executives compared to CEOs. Norway is known to be certainly progressive towards gender equality and scores higher than France on gender ranks. However, statistics show that before the quota the probability of a female CEO is significantly higher in France than in Norway. In addition, before the quota I find no significant difference in probabilities for female Non-CEO executives between France and Norway. Therefore, these expectations

about gender progressiveness are not in line with the findings. My results for female participation do not indicate differences in results regarding the effect of a quota between the two countries. As a consequence, I find no evidence in favor of a stronger quota effect in France.

I also consider the effect of a gender quota on the gender pay gap. This analysis provides more mixed results regarding the effectiveness of the quota on gender equality. My difference-in-difference analysis shows that the quota causes a decrease in the raw gender pay gap for French CEOs. Thus, after the quota the averages cash-compensation differential between males and females decreased. Before the quota, there was a positive gender pay gap present after controlling for sales and performance. This means in this setting females earned more than men. The post-quota years seem to fully explain the difference in average cash-compensation between males and females for French CEOs. This means that in the post-quota period there is no longer a differential in cash-compensation between males and females. For equity-based compensation, there is no significant quota effect present. This means that the quota has no significant impact on gender equality regarding equity-compensation. The lack of data availability for Norwegian CEOs makes it impossible to draw conclusions on the quota effects for the gender pay gap among CEOs in Norway. Results for Non-CEO executives in France show that there is still a significant gender pay gap after controlling for several firm- and director characteristics. However, there is no evidence that the quota causes the gender pay gap to decrease. Results for Non-CEO executives in Norway show that there is a significant gender pay gap, also after controlling for size and performance. The quota has no significant impact on this gender pay gap. Results show that compensation for females is increasing in the post-quota period. However, the same holds for male executives. Therefore, the gender gap in compensation is still present in the post-quota period. The fact that Norway is seen as a more progressive gender culture country than France is in line with results on the gender pay gap for Non-CEO executives. Because, before the legislation, the Norwegian gender pay gap was substantially lower than in France. However, I fail to present results for CEOs in Norway. Therefore it is hard to draw conclusions on the difference in the quota effect between France and Norway for CEOs. Regarding Non-CEO executives, I do not find significant quota results in France and Norway. As a consequence, I cannot conclude that there is a difference in the effect of the quota on the gender pay gap between France and Norway.

7.2 Limitations and shortcomings

The results of my research are subject to a couple of limitations and shortcomings. First, the dataset for Norway causes difficulties. The lack of observations makes it impossible to analyze quota effects on the gender pay gap among CEOs. Furthermore, Ahern & Dittmar (2012) provide evidence that the firms in Norway, which are most affected by the gender quota, tend to delist after 2008. By most affected, they mean firms that employed relatively the least female directors before the quota. Statistics show that the pre-quota percentage of female directors is negatively related to the probability of delisting. This implies that the dataset before the quota contains relatively more firms with low gender progressiveness, compared to after the quota. This means that the treated group exists of more gender progressive firms. As a result, the difference-in-difference analysis for Norway might suffer from selection bias. In France, this is not a concern, because firms cannot avoid the law by delisting, as the law also holds for private firms.

Second, the choice for the appropriate post-quota period is hard to align for France and Norway. The set-up of the legislation between the two countries is far from comparable. As figure 1 indicates, in France the average percentage of female directors reaches 40 percent around 2015. For Norway, this percentage is reached around 2008. In this study, I use data after 2011 as the post-quota period for France and data after 2007 as the post-quota period for Norway. This means that in Norway during the post-quota years there exists a higher percentage of female directors compared to the post-quota years in France. This could imply that the quota effects for Norway are overestimated when comparing it to France. On the other hand, the Norwegian parliament already installed a voluntary gender quota in 2003. It is possible that firms already reacted to this voluntary quota. Comparing quota effects with France, using a post-quota period for the years after 2007 in Norway, could therefore lead to underestimation of the Norwegian quota.

The control variables in my study suffer from a lack of availability. Therefore, it is not possible to run my models with a full set of control variables. This limits my conclusions about the quota effects on the gender pay gap. It also implies that it is not possible to analyze the unexplained gender pay gap. Furthermore, controlling for the variable *sales* could result in selection bias. Controlling for sales causes a substantial drop in the number of observations in the regression. For the French dataset, I suspect that this drop in observations results in non-randomness of the data before the quota. Table 4 shows that the average sales plummeted after the quota. This drop seems unrealistic. Possibly, it is the result of the fact

that sales data before the quota is less available for smaller firms. This suspicion implies that controlling for sales causes smaller firms to be omitted from the data before the quota. An assumption of a difference-in-difference analysis is the random selection of the treatment and control groups. If this is not the case, it could lead to a selection bias, because the treatment group consists of relatively smaller firms than the control group.

7.3 Implications and directions for further research

The effectiveness of gender quotas is subject to debate in various European countries. More and more countries are considering to implement a gender boardroom quota. Also, in Norway, France, and other countries, that already passed a mandatory gender quota, it is still a criticized mechanism. The key question is whether a gender quota leads towards more gender equality in the corporate sector. So far, limited research has focused on the actual progression of gender equality as a result of a legislative gender quota. In this paper, I examine the effect of gender quotas on gender equality. Therefore, I contribute to research on a so-far neglected subject. Besides that, I use more recent data compared to the research that has been done so far. This allows for analyzing a longer post-quota period. Therefore, it is possible to incorporate the more long-term effects and capture the spillover effects of a quota. Also, existing research mainly focused on the quota effect on gender equality for one country. However, gender cultures differ across the countries that adopted a gender quota. Most of the literature focuses on the quota effects regarding gender equality in Norway. By adding France, I give insight into the implications of quota effects for countries with a different gender culture.

From a political perspective, the results of my research have important implications. First, I find evidence that gender quotas help to improve female participation in executive positions. Furthermore, among French CEOs, results show that the quota causes a decrease in the gender pay gap. These findings could serve as an advisement for legislators that consider the implementation of a gender boardroom quota. Also, it proves the success of the gender quotas in France and Norway specifically. This is also useful for countries that consider adopting a gender quota and have comparable corporate sectors compared to France or Norway. Also, my research shows that a more progressive gender culture does not necessarily imply that there is more diversity in the corporate sector. Furthermore, the gender board quota is an example of legislation that changes the corporate governance of firms. The results of this research prove that changes in corporate governance can lead to spillover

effects for executive directors. This is an important implication for when governments want to influence the structure of firms their day-to-day management.

Further research is required to gain knowledge on the quota effects in the other European countries that adopted a gender quota. This gives legislators better information about country-specific factors that play a role in the success of a gender quota. Furthermore, research with a more complete dataset on the control variables would give more insight into how the quota works in combination with explanatory variables. Besides that, it is possible to investigate the quota effects on the unexplained part of a gender pay gap. This could help to answer the question of whether the unexplained part exists because of insufficient explanatory power or a discrimination effect. Lastly, I consider only one post-quota period. However, in a later stage, there is sufficient data to identify whether gender equality is only improving shortly after the quota effect, or that the quota also causes positive improvements on a more long term basis. Differentiating the post-quota period in different time spans would allow for identifying short-term and long-term effects.

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Appendix

A: Broad occupation groups executive directors

<i>Position</i>	<i>Count</i>	<i>Percentage</i>
<i>CEO</i>	7466	42.68
<i>Deputy-CEO</i>	263	1.51
<i>CFO</i>	877	5.03
<i>Assistant CEO</i>	58	0.33
<i>Executive Board Member</i>	2438	13.99
<i>COO</i>	427	2.35
<i>Chairman</i>	691	3.97
<i>Vice Chairman</i>	372	2.14
<i>CMO</i>	127	0.73
<i>Other Chief Officer</i>	319	1.83
<i>Excecutive VP</i>	1254	7.20
<i>Group VP</i>	344	1.97
<i>VP</i>	295	1.69
<i>Managing partner</i>	1052	6.04
<i>Others</i>	1438	8.25

B: Broad sector groups

<i>Sector</i>	<i>Count</i>	<i>Percentage</i>
<i>Agriculture, Forestry, Fishing</i>	80	0.46
<i>Mining, Oil, Construction</i>	1907	10.94
<i>Food, Tobacco, Textile</i>	1216	6.97
<i>Chemicals, Concrete, Autos</i>	1649	9.46
<i>Transport, Communication, Electric, Gas</i>	968	5.55
<i>Wholesale, Retail, Trade</i>	965	5.53
<i>Finance, Insurance, Real Estate</i>	2489	14.27
<i>Software, Computer Service</i>	3181	18.24
<i>Health, Services</i>	2469	14.16
<i>Media, Entertainment</i>	1540	8.83
<i>Others</i>	974	5.59

C: Variance inflation factors

Variable	VIF
Female	2.51
Post	1.28
Female x post	2.64
Logsales	1.25
ROA	1.23
Age	1.35
Logtenure	1.14
Mean VIF	1.63

D: Breusch-Pagan/Cook-Weisberg

	France CEOs	DID CEOs	France Non- CEOs	Norway Non- CEOs	DID Non- CEOs
chi2	14.53	15.53	61.70	55.90	57.15
Prob > Chi2	0.0001	0.0001	0.0000	0.0000	0.000

E: Gender pay gap French CEOs using Equity-based compensation

This table presents the regressions with the dependent variable *Logtotalcompensation*. The independent variables: *Post* equals 1 in the post-quota period and 0 in the pre-quota period. *Female* equals 1 for female executives and 0 for male executives. *Female x Post* represents the interaction term between *female* and *post*. I use White heteroscedasticity robust standard errors that allow for clustering at firm level. ***p<0.01, **p<0.05, *p<0.1.

Dependent variable:	Logtotalcompensation			
	(1)	(2)	(3)	(4)
Female	-1.178 (0.712)	-1.159* (0.608)	0.468** (0.179)	1.126*** (0.209)
Post	0.564*** (0.173)			
Female x Post	0.771 (0.729)	0.912 (0.615)	-0.806*** (0.209)	-1.209*** (0.199)
Logsales			0.0724* (0.0390)	0.0942** (0.0370)
ROA				0.0710*** (0.0198)
Constant	7.361*** (0.0951)	6.712*** (0.174)	6.240*** (0.441)	5.588*** (0.460)
Treated group	France	France	France	France
Control group				
Year effects	NO	YES	YES	YES
Observations	1,386	1,386	897	822
R-squared	0.070	0.140	0.161	0.209

F: Gender pay gap French Non-CEO executives using Equity-based compensation

This table presents the regressions with the dependent variable *Logtotalcompensation*. The independent variables: *Post* equals 1 in the post-quota period and 0 in the pre-quota period. *Female* equals 1 for female executives and 0 for male executives. *Female x Post* represents the interaction term between *female* and *post*. I use White heteroscedasticity robust standard errors that allow for clustering at firm level. ***p<0.01, **p<0.05, *p<0.1.

Dependent variable:	Logtotalcompensation				
	(1)	(2)	(3)	(4)	(5)
Female	-1.345*** (0.329)	-1.326*** (0.306)	-1.236*** (0.270)	-0.940*** (0.223)	-0.787** (0.311)
Post	0.639*** (0.233)				
Female x Post	0.530 (0.478)	0.529 (0.467)	0.596 (0.540)	0.0574 (0.682)	-0.268 (0.802)
Logsales				0.188*** (0.0283)	0.178*** (0.0274)
ROA					0.0190 (0.0192)
Age					-0.0121 (0.0116)
Tenure					0.102* (0.0519)
Constant	6.780*** (0.165)	5.989*** (0.192)	5.452*** (0.323)	3.888*** (0.498)	5.158*** (0.834)
Treated group	France	France	France	France	France
Control group					
Year controls	NO	YES	YES	YES	YES
Occupational controls	NO	NO	YES	YES	YES
Sector controls	NO	NO	NO	NO	NO
Observations	1,396	1,396	1,396	1,011	742
R-squared	0.077	0.179	0.215	0.345	0.377

G: Gender pay gap Norwegian Non-CEO executives using Equity-based compensation

This table presents the regressions with the dependent variable *Logtotalequitycompensation*. The independent variables: *Post* equals 1 in the post-quota period and 0 in the pre-quota period. *Female* equals 1 for female executives and 0 for male executives. *Female x Post* represents the interaction term between *female* and *post*. I use White heteroscedasticity robust standard errors that allow for clustering at firm level. ***p<0.01, **p<0.05, *p<0.1.

Dependent variable:	<i>Logtotalcompensation</i>			
	(1)	(2)	(3)	(4)
Female	-0.821*** (0.228)	-0.953*** (0.297)	-0.646** (0.278)	-0.617** (0.276)
Post	0.536* (0.301)		-0.117 (0.271)	
Female x Post	0.467* (0.271)	0.524 (0.327)	0.257 (0.287)	0.279 (0.288)
Logsales				-0.0118 (0.0343)
Constant	5.421*** (0.202)	5.252*** (0.121)	4.342*** (0.270)	4.733*** (0.405)
Treated group	Norway	Norway	Norway	Norway
Control group				
Year controls	NO	YES	YES	YES
Occupational controls	NO	NO	YES	YES
Sector controls	NO	NO	NO	NO
Observations	377	377	367	280
R-squared	0.053	0.192	0.260	0.283