

## ORIGINAL ARTICLE

# Direct and spillover effects of board gender quotas: Revisiting the Norwegian experience

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## Abstract

Building on the Norwegian case, this study examines the long-term implications of board gender quotas on the advancement of gender diversity in managerial leadership. Previous research has indicated that, aside from the board, the quota had limited impact on achieving this objective. However, these studies have narrowly focused on the spill-over effects of the quota, primarily concentrating on the positions of CEO and Chair. The findings of this study reveal contrasting effects of the board gender quota on the gender composition of the board and the executive committee of the board. Consequently, Norwegian companies have increased the representation of women on their boards, as mandated by the law, while simultaneously experiencing a reduction in the presence of female executive directors. Moreover, the strength of both opposing effects has diminished over time. In addition to the board of directors, the quota has not influenced the promotion of gender diversity at other managerial levels. Furthermore, our study suggests that the quota has led to a decrease in the average tenure and level of independence of the boards, although it has not affected the qualifications of board members.

## KEYWORDS

board of directors, gender diversity, gender quotas, managerial leadership

## 1 | INTRODUCTION

The underrepresentation of women in leadership is a matter of significant concern across various levels (Grosser, 2009; Peña-Martel et al., 2022). While there has been some progress in recent decades, supranational institutions such as the United Nations (UN) or the European Union (EU) acknowledge that it is a main challenge for both corporations and public institutions. As a result, the UN's 2030 Sustainable Development Agenda explicitly includes the enhancement of gender equality in leadership as one of its goals (UN, 2015). Similarly, the EU Gender Equality Strategy for 2020–2025

emphasizes gender equality in leadership as a key aspect in achieving comprehensive gender equality (EC, 2020). In this context, an increasing number of countries are implementing laws and regulations with the aim of addressing this issue. Focusing on senior management, two principal approaches have been followed. Despite important differences between them, both focus on the board of directors (hereinafter, BoD). Hence, what happens at other levels of management leadership (e.g., executive committees or top management teams) in terms of gender diversity is left out of the puzzle.

The main goal of this study is to investigate the long-term effects of board gender quotas (hereinafter, BGQs) on the improvement of

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gender diversity in senior management. As a second objective, it also addresses the potential effects of these quotas on other board characteristics beyond gender. The context is the Scandinavian region between 2014 and 2021. Scandinavia provides the ideal setting for conducting such a study because despite being a relatively homogeneous region from a corporate governance perspective (La Porta et al., 1998), this being the consequence of a long tradition of cooperation (Gregorič & Hansen, 2017). However, Norway enacted a mandatory BGQ at the beginning of the century, whereas Denmark, Finland and Sweden did not.

The study is primarily motivated by the practical relevance of the research topic. The implementation of BGQs is increasingly being adopted as a strategy by many countries to address the underrepresentation of women in leadership positions. However, the use of BGQs is not without controversy. First, BGQs give rise to ethical tensions and dilemmas (Terjesen & Sealy, 2016). Additionally, there is an ongoing debate regarding the effectiveness of BGQs compared to alternative approaches, such as soft regulatory measures based on recommendations (Choudhury, 2015; Gopalan & Watson, 2015; Szydło, 2015). It has been recently acknowledged by Seierstad et al. (2021) that there is a lack of research on the broader effects of BGQs on gender equality within organizations. They highlight the under-researched nature of this topic and call for further studies to explore it in more depth. Our study builds upon the work of Wang and Kelan (2013), who explored the Norwegian context from 2001 to 2010. The authors examined whether the implementation of a BGQs in Norway affected the probability of women being appointed as board Chairs or CEOs. However, their findings indicated insignificant results, suggesting that the quotas did not lead to a significant increase in the likelihood of women occupying these positions.

We intend to fill this research gap by making four contributions to the corporate governance and gender literatures. First, our study is the first to examine the spillover effects of the Norwegian BGQ while differentiating between the BoD, executive members of the board, and other levels of management. This important distinction has not been made in previous studies conducted by Wang and Kelan (2013), Seierstad et al. (2021) or Bertrand et al. (2019). It is worth noting that as the presence of women on boards has significantly increased in many countries in recent years, regulators and policymakers are now directing their attention towards the insufficient representation of women on the executive committee of the board.<sup>1</sup> Therefore, exploring the distinct effects of BGQs on executive and non-executive directors carries significant implications. By understanding how these quotas impact different levels of board members, policymakers and regulators can make more informed decisions in shaping effective and targeted initiatives aimed at promoting gender diversity in corporate governance. This research provides valuable insights that can assist in refining the design and implementation of future quota policies to achieve desired outcomes in terms of gender representation and equality in leadership positions. Second, it integrates the time perspective in the investigation of the effects of BGQs. This issue becomes particularly important because the spillover effects of BGQs on improving gender diversity

in the organization are expected to change over the years. With an increasing number of women being appointed to the boardroom, it is expected to foster improved access for other women to senior management positions. Third, the study also addresses the potential impact of BGQs on other characteristics of the BoD aside of gender, such as size, tenure, skills, and independence. Terjesen and Sealy (2016) point out the effects of BGQs on the functioning of the board as an area of interest for further studies to explore. However, the research attention devoted to this topic is not only scarce but also concentrates on the effects of BGQs on the level of qualification of board members (Eckbo et al., 2022; Matsa & Miller, 2013). A complete assessment of BGQs needs to consider the effects not only on improving gender diversity in the corporation but also any potential side effect, in particular on corporate governance. Finally, by exploring the impact on gender diversity at various managerial levels in the context of supply- and demand-side theories, the study provides insights into the complex interplay between structural barriers, organizational practices, and individual capabilities that contribute to the persistent gender gap in leadership.

Study results advocate that BGQs have opposite effects in enhancing gender diversity on the board and executive committee. In that regard, Norwegian firms increased the number of female directors on their boards, in accordance with the law, while simultaneously reduced the presence of women among executive directors. Furthermore, the strength of these opposite effects decreased over the years. Aside from the BoD, the quota had no further impact on improving gender diversity at other managerial levels. Finally, the study also suggests that the BGQ has reduced the tenure and the level of independence of the board, although it had no impact on the qualifications of its members.

The study continues as follows. The next section summarizes the BGQ regulation in Norway. Then, Section 3 discusses the background of the study and develops the hypotheses, whereas Section 4 describes the design of the empirical analysis. Finally, Sections 5 and 6 present and discuss the results of the study, respectively, whereas the conclusions are drawn in Section 7.

## 2 | THE NORWEGIAN BOARD GENDER QUOTA

Since the regulatory process of enactment of a mandatory BGQ in Norway has been extensively discussed in previous studies (e.g., Bertrand et al., 2019; Storvik & Teigen, 2010; Teigen, 2015; Terjesen & Sealy, 2016), the aim of this section is simply to summarize the main characteristics of the Norwegian BGQ regulation. In December 2003, Norway passed a law requiring a minimum 40% representation for both genders on the BoDs of public limited liability companies (PLCs). The law was initially based on the voluntary compliance by the affected firms, however, it established that if the 40% threshold was not reached by July 2005, the quota would become mandatory. Hence, as Teigen (2015) notes, the 2003 legislation was expressed as a “threat”: if, by July 2005, Norwegian firms did not

voluntarily increase the number of women on their boards, the regulation would be effectuated. Whereas the presence of women on Norwegian boards increased between 2003 and 2005, by July 2005 they only held around 12% of the board seats, on average, thus well below the announced target. Consequently, by late autumn 2005 the government finally decided to make the 40% quota mandatory, and fully effective in 2006 for newly established firms and in 2008 for already existing PLCs.<sup>2</sup> By January 2008, requirements to comply were issued to 77 non-compliant companies, however, by April of this year, all PLCs complied with the 40% gender quota requirement (Ahern & Dittmar, 2012).

Whereas other countries have also established gender quotas for the BoD, Norway has become the study case for the investigation of the effects of BGQ regulations (e.g., Ahern & Dittmar, 2012; Dale-Olsen et al., 2013; Eckbo et al., 2022; Garcia-Blandon et al., 2022; Matsa & Miller, 2013; Yang et al., 2019). This is explained by the fact the Norway was a pioneer country to introduce a mandatory BGQ in national legislation. Hence, the BGQs enacted in several countries (e.g., France, Germany, Spain) were, somehow, inspired by the Norwegian experience. Furthermore, what makes the Norwegian BGQ unique is the extremely serious consequences for the non-compliant firms, which were forced to liquidation. For example, the 2007 Spanish BGQ does not penalize non-compliance, but rather grants advantages to compliant companies in terms of contracts with the public administration. Similarly, the implications contemplated by the 2011 French BGQ were that the corporate directors of non-compliant firms they would not receive fees (Terjesen & Sealy, 2016).

### 3 | BACKGROUND AND HYPOTHESES

The theoretical framework of this study draws on the supply- and demand-side perspectives to explain the appointment of women to senior management. According to Gabaldon et al. (2016), in order to understand the causes of the lack of women in these positions, it is crucial to distinguish between these two perspectives. This framework facilitates the understanding of the barriers that hinder women's access to the upper echelon of the company and, by doing so, it allows the development of solution instruments, such as public policies. As Labelle et al. (2015) point out, refereeing specifically to the enactment of mandatory BGQs, this framework permits to address the expected effects of public policies.

The supply-side perspective maintains that the lack of women in senior management is primarily due to female considerations and constraints. Previous studies (Gabaldon et al., 2016; Pande & Ford, 2011; Terjesen et al., 2009) group the supply-side factors into the following three categories: gender differences in values and attitudes, identification with gender role expectations and work family conflicts. Regarding the first group, Eagly (2005) argues that, due to these differences, women and men may have different motivations for climbing the corporate ladder. For instance, Schuh et al. (2014) maintain that women are less power-hungry than men. As for the

identification with gender roles, Gabaldon et al. (2016) note that women's self-identification with expected cultural gender roles creates internal barriers to access senior management. In the same vein, Powell and Butterfield (2013) point out that individuals with a more masculine self-perception would be more prone to access senior management positions than their peers who identify themselves as less masculine. Finally, work family conflicts are generally regarded as the main barrier that hinders women's access to senior management. Hence, the fact that women generally show stronger commitment to family responsibilities than men leads to inequalities in career opportunities for men and women (Straub, 2007).

On the other hand, the demand-side perspective stresses the role of the corporation as the main impediment to the professional advancement of women in management. The key issue here is gender discrimination. Gabaldon et al. (2016) identify several types of discrimination against women. For instance, firms may likely prefer to promote a man for a senior position simply because cultural and social conventions associate management leadership with masculinity (Heilman, 2001; Pande & Ford, 2011). These conventions, jointly with implicit gender discrimination, (Bertrand et al., 2005) can lead to a biased promotional system (Hoobler et al., 2009).

BGQs can impact the presence of women in senior management through supply- and demand-side factors. From the supply-side perspective, since BGQs may not affect the pool of available candidates for senior management positions in the short term, the short-term spillover effects should be negligible. However, in the long term, the main effects of BGQs on the supply of female candidates would occur through the identification with gender role expectations (Gabaldon et al., 2016). As more women are appointed to the boardroom, internal barriers related to self-identification with expected gender roles will diminish, potentially facilitating their access to top management positions. The reason would be that one of the barriers that impede women to attempt to go for top management positions is the conflict with their personal self-image (Eddleston et al., 2006; Gabaldon et al., 2016; Korman, 1970). Therefore, as the representation of women on boards becomes more commonplace, the lack of self-identification with top management positions will be necessarily lower. From a demand-side perspective, BGQs exert a direct influence on the appointment of women as board members. These quotas increase the demand for female directors as organizations strive to comply with the legal requirements. Moreover, BGQs hold the potential to extend the benefits of gender diversity to other realms of senior management, including executive committees and top management teams, through spillover effects. These effects can arise from a reduction in gender discrimination within the organization and the challenging of the "homosocial reproduction" construct (Kanter, 1977). Hence, BGQs can help overcome discrimination by increasing the exposure of talented women in leadership roles (Beaman et al., 2009). Additionally, according to Kanter (1977), homosocial reproduction refers to a social phenomenon where individuals tend to select and promote others who are similar to themselves in terms of gender, background, or other shared characteristics. In the context of corporate leadership, this means that

existing male-dominated boards may tend to favor and promote other men, perpetuating a lack of gender diversity in senior management. However, when women are appointed to boards due to BGQs or other initiatives, it disrupts the homosocial reproduction pattern.

As we discussed in the introductory section, the main reference for this study is Wang and Kelan (2013), who examine the context created by the Norwegian BGQ for the research period between 2001 and 2010. Their study has a rather broad focus, as it addresses the effects of the BGQ on the likelihood that a firm appoints a woman as CEO or Chair, among other research issues. It concludes that the quota did not encourage the appointment of female CEOs or Chairs. Since the quota was fully implemented in 2008, extending the research period to 2010 necessarily makes the analysis of the effects of the BGQ short-term in nature. Nevertheless, Wang and Kelan (2013) intend to examine the spillover effects of the BGQ (Norwegian firms were obliged to appoint 40% of female directors, though had no obligation to appoint female CEOs or Chairs), that are long term in nature with a short-term research design. Furthermore, Wang and Kelan's (2013) analysis of the spillover effects of the BGQ focuses solely on the positions of CEO and Chair, resulting in a rather restricted examination of these effects. It should also be noted that, as both positions typically exhibit stability, it is unlikely that the BGQ would exert a significant influence on whether a man or a woman, likely appointed prior to its implementation, holds these positions. More recently, Seierstad et al. (2021) extend Wang and Kelan's (2013) study to address the effects of the Norwegian BGQ on the long term. Following a similar approach as Wang and Kelan (2013), they examine whether the BGQ affected the likelihood that firms had a female CEO or Chair in 2016. They also examine the effects of the BGQ on the presence of women on the board. The results of Seierstad et al. (2021) indicate that 10 years after its enactment, the BGQ still has significant effects on improving board gender diversity. However, similar to Wang and Kelan (2013), the spillover effects are insignificant. Seierstad et al.'s (Seierstad et al., 2021) study is meaningful because it takes a long-term perspective to examine the spillover effects of the BGQ. However, similar to the limitation we discussed earlier in Wang and Kelan's (2013) analysis, it also maintains a narrow approach when examining the spillover effects of BGQs.

Another antecedent of this study is Bertrand et al. (2019), who analyzed the effects of BGQs on female labor market outcomes, also in the context of Norway and for the years between 1986 and 2014. This is a very comprehensive study which examines a battery of subjects (e.g., the characteristics of the newly appointed board members, or the gender gaps in earnings among board members). The authors also examine whether the BGQ has significant effects on gender diversity among the top business earners, reporting mostly insignificant results. The use of individuals' earnings to label them as part of the upper echelon of the firm is appealing, although potentially misleading, considering the gender earnings gap among board members observed in the same study. Furthermore, it mixes the presence of men and women in different types of positions (e.g., executive and non-executive) simply because they have similar

economic compensations. This ignores the different roles of the persons in these positions (e.g., executive directors with other well-paid executives but not members of the board) and the varied motivation of the firm when appointing women to these positions. Hence, with attention now focused on the lack of female representation on the executive committee, firms may have stronger incentives to appoint women to executive directorships primarily for image-related considerations, as opposed to other well-compensated executive roles. Nevertheless, from a different perspective than Wang and Kelan (2013) and Seierstad et al. (2021), Bertrand et al. (2019) also reject significant spillover effects of the BGQ on managerial leadership.

The first hypothesis of this study refers to the direct effects of BGQs. While the positive impact of BGQ on increasing board gender diversity in the short term is not disputed, its long-term effects are less obvious. Seierstad et al. (2021) find that one decade after the enactment of the BGQ, Norwegian PLC firms still present greater board gender diversity than Norwegian limited companies, which were not affected by the gender quota regulation. Unlike Seierstad et al. (2021), we do not compare Norwegian PLC and limited companies but Norwegian public companies (all of them affected by the BGQ) with public firms from neighboring countries (not affected by the quota). On the other hand, gender diversity indicators show that while board gender diversity has remained stable in Norway since the enactment of the BGQ, it has steadily increased in other Scandinavian countries (European Women on Boards, 2021). However, despite this converging trend in the Scandinavian region, we expect that due to the BGQ, Norwegian companies still show more gender diversity than their peers in neighboring countries. Accordingly, the first hypothesis states:

**Hypothesis 1.** The BGQ has long-term direct positive effects in increasing board gender diversity.

Whereas the BGQ mandated a minimum 40% representation for men and women on the BoD, it said nothing about the nature of these directors (executive/non-executive). Therefore, the appointment of women as executive directors, although may help the firm to comply with the quota, was not regulated by it. According to the theoretical background discussed at the beginning of the section, the selection of a large number of female directors in order to comply with the quota may facilitate the appointment of female executive directors. The reasons are twofold. From the supply-side perspective, as the BGQ would have contributed to diminish the internal barriers related to self-identification with expected gender roles. From the demand-side perspective, the resulting exposure of many talented women in leadership roles should have reduced gender discrimination (Beaman et al., 2009) and, furthermore, according to the homosocial reproduction construct (Kanter, 1977), the newly appointed female directors would facilitate the presence of women on boards in executive roles. Bøhren and Staubo (2016) note that when the quota was initially passed, most firms decided to meet the 40% threshold by

appointing female non-executive directors. This behavior could be explained by the scarce presence of women among the senior executives of the firm, which limited the pool of female candidates available to be appointed executive directors. According to this behavior, we anticipate the effects of the BGQ on enhancing gender diversity to occur mainly among non-executive directors, being very limited in the executive committee. Finally, Wang and Kelan (2013), Seierstad et al. (2021) and Bertrand et al. (2019) report an insignificant impact of the BGQ on the appointment of female Chairs or CEOs and in the presence of women among the firm's top earners. This suggests an insignificant effect of the BGQ on the appointment of female executive directors. Therefore, although from a theoretical perspective it could be expected a positive effect of BGQ on the appointment of female executive directors, due to the extant evidence, we pose the next hypothesis in the null form as follows:

**Hypothesis 2.** The BGQ has insignificant spillover effects in increasing gender diversity among executive directors.

The last hypothesis extends the analysis beyond the boundaries of the BoD, as it examines the presence of women among the managers of the firm. These potential spillover effects are of utmost importance in the context of BGQ regulations. It is crucial to recognize that attaining minimum female representation in the executive committee of the board, often composed of three or four directors, may not necessarily signify a substantial enhancement of gender diversity in the upper echelons of the firm. Similar to Hypothesis 2 discussed before, the BGQ did not impose any obligations to firms to attain a minimum level of gender diversity among their managers and, from this perspective, the appointment of women to these positions was a free decision by the firm. Furthermore, the same supply and demand-side factors that should justify a positive impact of the BGQ on the appointment of female executive directors, also apply to the appointment of female managers. On the one hand, once the presence of women on boards is normalized, the problem of women self-identification with top management positions (Eddleston et al., 2006; Gabaldon et al., 2016; Korman, 1970) would be necessarily lower. On the other hand, the positive effect of the BGQ on reducing gender discrimination barriers (Beaman et al., 2009) should facilitate the appointment of women to managerial positions and, similarly, through a homosocial reproduction effect (Kanter, 1977), the more gender diverse boards, due to the BGQ would be more willing to appoint women to managerial positions. From a different perspective, Larrieta-Rubín de Celis et al. (2015) argue that the presence of women on boards has a positive impact on gender equality objectives, and thus could facilitate the appointment of women to managerial positions. Regarding the empirical evidence, prior studies agree on the lack of significant spillover effects of BGQs on improving gender diversity (Bertrand et al., 2019; Seierstad et al., 2021; Wang & Kelan, 2013). Therefore, as it occurred with Hypothesis 2, there is theoretical background to justify the existence of positive

spillover effects of BGQs favoring gender diversity in managerial positions. Nevertheless, based on the available evidence, and also for consistency with Hypothesis 2, we pose the last hypothesis in the null form:

**Hypothesis 3.** The BGQ has insignificant spillover effects in increasing gender diversity in management.

## 4 | DESIGN OF THE EMPIRICAL ANALYSIS AND SAMPLE

The empirical analysis is based on Equation (1) below. The dependent variable is gender diversity (*GD*), which is proxied by three different variables. For the assessment of Hypotheses 1, board gender diversity (*BGD*), defined as the percentage of female directors on the BoD, is used. Afterwards, for Hypothesis 2, the variable *BGDEC* (gender diversity in the executive committee) is used. *BGDEC* is defined as the number of female executive directors on the total executive directors of the board. Finally, for the assessment of Hypothesis 3, we use the variable *GDM* (gender diversity in management), defined as the number of women in the category of managers on the total managers of the company. The variable of interest of this study is board gender quota (*BGQ*), a dichotomous variable which denotes if a given firm is affected (with value of 1) or not (with value of 0) by the gender quota. Our sample comprises listed companies from Denmark, Finland, Norway, and Sweden. Among these countries, only Norway has implemented a BGQ for these companies. Therefore, the variable *BGQ* distinguishes a firm as either Norwegian or from the remaining countries in our analysis,

$$GD_{it} = \alpha_0 + \alpha_1 * BGQ_i + \alpha_{2-7} * CONTROLS_{it} + \varepsilon_{it} \quad (1)$$

Equation (1) also includes some control variables that are expected to affect the presence of women in the upper echelon of the firm. We have chosen controls similar to those of Wang and Kelan (2013), as the characteristics of the firm which explain a higher probability of appointing a female Chair or CEO should also explain the appointment of women in managerial positions more broadly. Hence, board size (*BOARDSIZE*, defined as the number of board members); board independence (*BOARDIND*, defined as the number of independent directors on total directors); board tenure (*BOARDTEN*, defined as the average number of years that board members have served on the board); and board skills (*BOARDSKILLS* defined as the percentage of directors who are labeled as skilled directors) are included as controls. In addition to the said variables, the model also contains the size of the firm (*FIRMSIZE*, defined as the total assets of the firm in logarithms), because larger firms are subject to more scrutiny and tend to be more gender diverse (Hillman et al., 2007), and women employees (*WOMEMPL*, defined as the percentage of women employees). The inclusion of *WOMEMPL* draws on the fact that a larger percentage of women employees may indicate that a firm is more oriented towards a female public (and this

would justify a larger presence of women in the management ranks of the firm<sup>3</sup>) and also because a larger number of women employees makes the pool of candidates for being promoted to managerial positions larger. Finally, year, country and industry fixed effects are also included in the estimations of Equation (1).

The sample for the empirical analysis consists of the publicly listed companies from Denmark, Finland, Norway and Sweden with information available in Refinitiv Workspace. The research period covers the years from 2014 to 2021. This period was chosen because 2021 was the last year with information available in Refinitiv Workspace when we started the study. Moreover, we choose 2014 because the focus of the study is on the long-term effects of the BGQ, and considering that it was fully implemented in 2008, our research period should allow to capture these long-term effects. The sample initially included 559 firms and, considering the eight-year research period, a maximum of 4472 firm-year observations. However, in the case of 84 firms (comprising 1176 observations), no information was available regarding the gender composition of the board or management throughout the entire research period. Furthermore, we excluded 1554 observations due to insufficient information on at least one of the variables included in Equation (1). As a result of that, the final sample is reduced to 1742 firm-year observations. When estimating Equation (1) with the dependent variable GDM, an additional 513 observations were lost due to the absence of reported data on the percentage of women in the manager category. Consequently, the final sample consisted of 1229 firm-year observations. The country distribution of the final sample is as follows: Denmark (231 observations), Finland (284 observations), Norway (282 observations) and Sweden (945 observations).

Table 1 shows the descriptive statistics for the sample. On average, women hold roughly one third of the board seats, however, if we focus on executive directors their presence drops to 21%. Interestingly, when all the managerial positions of the company are considered, the presence of women increases to 30%, not far from the representation they have in the total number of employees of the firm. In all cases, mean and median values are quite similar, indicating that there are not too many extreme observations.

	Mean	SD	p25	Median	p75
BGD	34.418	12.162	25	33.333	42.857
BGDEC	21.032	14.241	11.11	20	30
GDM	29.763	12.826	20	27	38
BOARDSIZE	8.346	2.446	6	8	10
BOARDTEN	6.057	2.618	4.2	5.563	7.375
BOARDIND	65.224	23.937	50	66.667	83.333
BOARDSKILLS	29.275	17.712	15.385	28.571	40
FIRMSIZE	22.913	2.099	21.40	22.895	24.463
WOMEMPL	34.719	16.14	21	32	46.55

Note: Variables: BGD (board gender diversity), BGDEC (gender diversity in the executive committee), GDM (gender diversity in management), BOARDSIZE (size of the board), BOARDTEN (board tenure), BOARDIND (board independence), BOARDSKILLS (board skills), FIRMSIZE (size of the firm), and WOMEMPL (percentage of women employees).

Table 2 displays the pairwise correlations for the variables included in Equation (1), with significance levels. We observe the expected positive correlation between BGD and BGDEC, as both variables measure the presence of women on the board. Moreover, a larger presence of female directors on the board is also associated with greater gender diversity in management (GDM). Other interesting results are that firms with more female employees also have more board gender diversity and, particularly, on management (74%). We also observe a positive association between the presence of women on the board and board independence, as BGD, and BGDEC are positively correlated with BOARDIND. Finally, the correlations between each pair of independent variables are rather moderate, with the only exception of FIRMSIZE and BOARDSIZE (59%), this indicating that larger firms tend to have larger boards. Despite this fact, and given the generally low correlations for the remaining variables, we do not expect serious multicollinearity problems in the estimations.

## 5 | EMPIRICAL RESULTS

This section is structured in two subsections. First, we conduct a univariate analysis of differences of mean and median for the variables included in Equation (1) between Norwegian firms (under a BGQ regulation) and the remaining Scandinavian firms (not subject to any quota rules). Afterwards, we perform a multivariate analysis based on the estimation of Equation (1).

### 5.1 | Univariate analysis

The goal of this analysis is twofold. For the gender-diversity variables, this is a preliminary analysis whose results will be confirmed or refuted by a subsequent multivariate analysis. For the variables accounting for certain attributes of the BoD, aside from gender, it aims to provide insight into how BGQs may affect board characteristics in the long run. Table 3 summarizes the results of the analysis. The t-test with unequal variances and the Mann-Whitney test are used

TABLE 1 Summary statistics.

TABLE 2 Pairwise correlations.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
BGD (1)	1.000							
BGDEC (2)	.179***	1.000						
GDM (3)	.239***	.436***	1.000					
BOARDSIZE (4)	-.020	.014	-.063**	1.000				
BOARDTEN (5)	-.145***	-.075***	-.040	.174***	1.000			
BOARDIND (6)	.062***	.052**	.077***	-.142***	-.223***	1.000		
BOARDSKILLS (7)	-.026	-.046*	-.030	.141***	-.012	-.019	1.000	
FIRMSIZE (8)	.200***	.079***	.081***	.585***	.174***	-.142***	.141***	1.000
WOMEMPL (9)	.197***	.300***	.736***	-.027	-.052**	.062***	-.019	.119***

Note: Variables: BGD (board gender diversity), BGDEC (gender diversity in the executive committee), GDM (gender diversity in management), BOARDSIZE (size of the board), BOARDTEN (board tenure), BOARDIND (board independence), BOARDSKILLS (board skills), FIRMSIZE (size of the firm), and WOMEMPL (percentage of women employees).

\*\*\* $p < .01$ ; \*\* $p < .05$ ; \* $p < .1$ .

TABLE 3 Univariate analysis.

	Mean		Median	
	NW	DK-FL-SW	NW	DK-FL-SW
BGD	42.083	32.939***	40	33.333***
BGDEC	21.481	20.945	21.825	20
GDM	28.139	30.061**	26.8	27
BOARDSIZE	8.346	8.362	8	8
BOARDTEN	4.999	6.261***	4.470	5.769***
BOARDIND	53.132	67.558***	59.166	66.667***
BOARDSKILLS	28.331	29.458	25	28.571
FIRMSIZE	23.420	22.815***	23.415	22.808***
WOMEMPL	31.705	35.301***	29	32***

Note: *t*-test and Mann–Whitney test are used for the assessment of statistical significance of mean and median, respectively. Variables: NW (Norway), DK (Denmark), FL (Finland), SW (Sweden), BGD (board gender diversity), BGDEC (gender diversity in the executive committee), GDM (gender diversity in management), BOARDSIZE (size of the board), BOARDTEN (board tenure), BOARDIND (board independence), BOARDSKILLS (board skills), FIRMSIZE (size of the firm), and WOMEMPL (percentage of women employees).

\*\*\* $p < .01$ ; \*\* $p < .05$ .

for the assessment of the statistical significance of mean and median differences, respectively.

Regarding the gender variables, the results of both tests show that Norwegian firms have a higher percentage of female directors than their peers in neighboring countries. This result is driven by the higher percentage of female non-executive directors, as the presence of women among executive directors is similar for both groups of firms. Interestingly, Norwegian firms present a significantly lower percentage of women in managerial positions according to the *t*-test. However, this result is consistent with the lower percentage of women employees, and may be due to differences in the industry composition of the sample of firms between Norway and the neighboring countries.

As for the variables intended to capture BoD attributes, the results in Table 3 show that Norwegian firms have less-independent boards, and boards with shorter tenures compared to their peers in

neighboring countries. These results are consistent for the *t*-test and Mann–Whitney test, and both have interesting interpretations. In the first case, it might indicate a reaction from the upper structures of the firm forced to appoint some (unwanted) female directors just to meet the quota, in order to have a stronger control of the board. Regarding the second finding, it was expected that the immediate impact of the BGQ would be a decrease in the average tenure of the board, considering the appointment of new female directors. However, what is particularly intriguing is that this effect persists even after several years since the full implementation of the BGQ. In any case, the BGQ seems to have contributed to increase the rotation of directors in Norwegian boards. On the other hand, the BGQ does not seem to have affected either the size of the boards or the skills of their members. Norwegian firms could implement two different strategies to meet the 40% gender diversity threshold: increase the size of the board by appointing new female directors or appoint

female directors to replace male directors while maintaining the size of the board. According to the results in Table 3, the second strategy seems to have been implemented in most cases. Interestingly, this result suggests that Norwegian firms do not seem to consider replaced directors as essential to the firm. It is also noteworthy that the BGQ did not seem to have reduced the level of competence of the BoD, as the negligible results reported for *BOARDSKILLS* show. Opponents of BGQs maintained that an important side effect of the quota would be the substitution of competent male directors with incompetent female directors (Teigen, 2015). This could have been the case if the supply of qualified female directors was not sufficient to cope with the significant increase in the demand for these directors. Prior evidence on the short-term effects of BGQs on board competence is mixed. Hence, as Matsa and Miller (2013) find that the level of qualification of BoDs in Norway decreased due to the BGQ, whereas Eckbo et al. (2022) report insignificant effects of BGQ on board competence. Our results are in line with Eckbo et al. (2022), suggesting that the BGQ has not affected the quality of Norwegian boards, at least in the long term.

## 5.2 | Multivariate analysis

The empirical analysis draws on the estimation of Equation (1). In accordance with the panel data structure of the sample, panel data models are used. A main issue in panel data models is the choice between fixed and random effects estimations. However, in our specific case fixed effects models cannot be applied because the variable of interest in Equation (1) (*BGQ*) shows no variation across firms during the research period. Therefore, the estimations must be conducted with random effects. Furthermore, significance tests are performed with robust standard errors clustered by firm.

The estimates of Equation (1) are summarized in Table 4. Column (1) shows the results for the dependent variable *BGD*, whereas Columns (2) and (3) tabulate the results for *BGDEC* and *GDM*, respectively. All three estimations are globally significant at the usual levels, with *R*-squared ranging between 23% and 60%. After the estimations, we compute the variance inflation factors (VIFs) to further assess for the existence of multicollinearity problems in the dataset (untabulated). The average VIF for the independent variables included in Equation (1) is 1.28, with a maximum value of 1.75 for the variable *FIRMSIZE*. The relatively low VIFs support our former view of no serious multicollinearity problems in the estimations. The results in Table 4 indicate that the effects of *BGQ* on gender diversity in management largely depend on the level of management being considered. Hence, the positive and significant coefficient in Column (1) ( $p$ -value  $< .01$ ) indicates that *BGQ* has a significant impact on enhancing board gender diversity. However, the insignificant coefficient of *BGQ* in Columns (2) and (3) shows that the quota has not increased gender diversity among executive directors or among firm managers. Furthermore, *BGQ* presents a negative coefficient in both cases, and in the estimations conducted with *GDM* as the dependent variable, the coefficient is statistically significant with

TABLE 4 Results of the multivariate analysis (I).

	(1)	(2)	(3)
Variables	<i>BGD</i>	<i>BGDEC</i>	<i>GDM</i>
<i>BGQ</i>	9.833*** (1.175)	-2.017 (1.773)	-1.848 (1.141)
<i>BOARDSIZE</i>	-0.467* (0.244)	0.174 (0.209)	0.133 (0.225)
<i>BOARDTEN</i>	-0.515*** (0.168)	-0.408** (0.200)	-0.291** (0.142)
<i>BOARDIND</i>	0.0506*** (0.0191)	-0.00363 (0.0190)	0.0153 (0.0206)
<i>BOARDSKILLS</i>	-0.0354 (0.0218)	-0.0205 (0.0203)	-0.0142 (0.0168)
<i>FIRMSIZE</i>	1.901*** (0.346)	1.232*** (0.409)	0.130 (0.372)
<i>WOMEMPL</i>	0.131*** (0.0336)	0.237*** (0.0453)	0.520*** (0.0372)
Constant	-8.041 (7.471)	-8.788 (8.675)	12.33 (8.012)
Country FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
<i>R</i> -squared	.2263	.2264	.6032
Observations	1742	1742	1229

Note: Robust standard errors clustered by firm in parentheses. Variables: *BGD* (board gender diversity), *BGDEC* (gender diversity in the executive committee), *GDM* (gender diversity in management), *BGQ* (board gender quota), *BOARDSIZE* (size of the board), *BOARDTEN* (board tenure), *BOARDIND* (board independence), *BOARDSKILLS* (board skills), *FIRMSIZE* (size of the firm), and *WOMEMPL* (percentage of women employees).

\*\*\* $p < .01$ ; \*\* $p < .05$ ; \* $p < .1$ .

$p$ -value = .105, denoting that the quota may have reduced gender diversity in management at a general level. This finding aligns with the outcomes of the univariate analysis presented in Table 3, which indicated that the *BGQ* led to an increase in the representation of women on the board, but did not have a similar impact on the executive committee. Interestingly, the results suggest that the *BGQ* may even have negative effects on gender diversity at managerial levels. The results for the control variables are, in general, consistent with expectations. Hence, large firms present greater board gender diversity (both among directors and executive directors). This is likely explained by the increased scrutiny of large firms regarding lack of gender diversity in senior management. However, these firms do not present more gender diversity in management at more general levels. This is also consistent with the fact that the attention regarding lack of women in senior management largely focuses on the BoD and, therefore, large firms may not feel so obliged to enhance gender diversity in less scrutinized managerial positions. Results also show that firms with more female employees have also greater gender



diversity on the board, the executive committee and the management ranks.

Since this study focuses on the long-term effects of BGQs, it seems natural to analyze whether these effects have changed throughout the research period. In theory, one would assume that the direct impact of BGQs on promoting gender diversity within boards would diminish over time. This is because firms in countries without gender quotas have also taken steps to address concerns raised by national governments, international institutions, and society by increasing the representation of women on their boards. Conversely, regarding the spillover effects of BGQs, which are expected to emerge in the long run, the growing presence of women in boardroom positions should facilitate the advancement of other women in the corporate hierarchy. Through the provision of role models and opportunities, these spillover effects are likely to strengthen over time, ultimately leading to enhanced gender diversity within management. To address this issue, the model represented by Equation (2) is estimated,

$$GD_{it} = \alpha_0 + \alpha_1 * BGQ_t + \alpha_2 * YEAR_t + \alpha_3 * BGQ * YEAR_{it} + \alpha_{4-9} * CONTROLS_{it} + \epsilon_{it} \quad (2)$$

Equation (2) reproduces Equation (1) but includes the new variables *YEAR* and *BGQ\*YEAR*, where *YEAR* denotes the corresponding year (from 1 to 8) for each observation and *BGQ\*YEAR* is the interaction variable between *BGQ* and *YEAR*. This interaction variable would capture the change in the effects of the *BGQ* on the gender diversity variables over the years. The estimates of Equation (2) with random effects and robust standard errors clustered by firm, but excluding the year dummy variables, are summarized in Table 5. Interestingly, the results in Column (1) show that the positive impact of the *BGQ* on improving board gender diversity (positive and significant coefficient for *BGQ*) decreases over years (negative and significant coefficient for *BGQ\*YEAR*). Therefore, the strength of the direct effects of *BGQ* on *BGD* diminish through the research period, as anticipated. Furthermore, the estimates summarized in Column (2) indicate that the *BGQ* has a negative impact on the appointment of female executive directors (negative and significant coefficient on *BGQ*), although the strength of this effect has diminished over the years (positive and significant coefficient on *BGQ\*YEAR*). Finally, the results in Column (3) do not show any significant impact of the *BGQ* on enhancing gender diversity in the managerial ranks of the corporation (*BGQ* and *BGQ\*YEAR* both present insignificant coefficients). As expected *YEAR* is statistically significant in all the estimations, indicating that the presence of women on the board, the executive committee of the board and the managerial ranks of the corporation have increased in the sample through the research period.

Endogeneity is always an issue of concern in leadership studies (Antonakis et al., 2010). It occurs when the variable of interest is correlated with the error term (Angrist & Pischke, 2010). The principal effect of endogeneity is that the estimated coefficient cannot be interpreted in terms of a causal relationship between the variable of interest and the dependent variable. According to Antonakis

TABLE 5 Results of the multivariate analysis (II). Effects of the quota over the years.

	(1)	(2)	(3)
Variables	BGD	BGDEC	GDM
BGQ	15.59*** (2.370)	-8.506*** (3.123)	-2.873 (2.384)
YEAR	0.895*** (0.187)	0.908*** (0.187)	0.371** (0.157)
BGQ*YEAR	-0.910*** (0.308)	1.021** (0.396)	0.153 (0.316)
BOARDSIZE	-0.393* (0.238)	0.114 (0.212)	0.133 (0.217)
BOARDTEN	-0.509*** (0.166)	-0.439** (0.197)	-0.279** (0.139)
BOARDIND	0.0535*** (0.0189)	-0.00554 (0.0187)	0.0110 (0.0213)
BOARDSKILLS	-0.0318 (0.0215)	-0.0203 (0.0199)	-0.0115 (0.0172)
FIRMSIZE	1.789*** (0.336)	1.353*** (0.409)	0.0876 (0.364)
WOMEMPL	0.124*** (0.0336)	0.240*** (0.0452)	0.522*** (0.0373)
Constant	-12.99* (7.424)	-18.29** (8.618)	10.49 (8.132)
Country FE	Yes	Yes	Yes
Year FE	No	No	No
Industry FE	Yes	Yes	Yes
R-squared	.2180	.2223	.6008
Observations	1742	1742	1229

Note: Robust standard errors clustered by firm in parentheses. Variables: *BGD* (board gender diversity), *BGDEC* (gender diversity in the executive committee), *GDM* (gender diversity in management), *BGQ* (board gender quota), *YEAR* (the corresponding year), *BOARDSIZE* (size of the board), *BOARDTEN* (board tenure), *BOARDIND* (board independence), *BOARDSKILLS* (board skills), *FIRMSIZE* (size of the firm), and *WOMEMPL* (percentage of women employees).

\*\*\* $p < .01$ ; \*\* $p < .05$ ; \* $p < .1$ .

et al. (2010), the main sources of endogeneity are omitted variable bias (when a relevant variable that correlates with the variable of interest and predicts the dependent variable is omitted in the estimations), selection bias (when the members of the treated and control groups are not randomly selected), simultaneity (when the variable of interest and the dependent variable simultaneously cause each other) and measurement error (when instead of observing the true exogenous variable  $x$  we observe a not so perfect indicator of  $x$ ). This study leverages the exogenous shock created by the Norwegian *BGQ*. By distinguishing between firms from Norway (subject to the *BGQ*) and firms from other Scandinavian countries (unaffected by the *BGQ*), the study minimizes the potential for significant

endogeneity concerns. Hence, we discard measurement errors in the variable of interest (as *BGQ* is obviously exogenous as it simply denotes if a firm is or not from Norway) or simultaneity (less women on the board could not cause a firm to be Norwegian or from another country). Similarly, we do not expect serious omitted variable bias as any omitted variable that could predict the presence of women on the board would hardly correlate with our dummy variable *BGQ*. However, endogeneity could be caused by selection bias, as the treated (Norwegian) and control (firms from other Scandinavian countries) groups might be different in terms of observed or unobserved factors that could correlate with the dependent variable. In that regard, Table 3 revealed that firms in the treated group were significantly larger than those in the control group, and there may also be some differences in the industry composition between both groups. To address this issue, as it is usual in the literature (Dyreg & Markle, 2016; Lennox et al., 2013) we implement the propensity score method to obtain one-to-one matched samples with similar characteristics in terms of size and industry composition. Afterwards, we estimate Equations (1) and (2) with the matched sample and report the results in Tables 6 and 7, respectively. The comparisons of the estimates of Equation (1) obtained with the whole (in Table 4) and matched sample (in Table 6) reveals no differences with respect to *BGQ* (positive and significant coefficient in the estimations with *BGD* as the dependent variable, and insignificant coefficient in the remaining estimations). Furthermore, a similar situation is observed if we compared the estimates of Equation (2) with the whole (reported in Table 5) and the matched sample (in Table 7) for *BGQ* and *BGQ\*YEAR*. Therefore, we conclude that the results of the study do not seem to be affected by endogeneity.

## 6 | DISCUSSION

Due to the relatively recent implementation of *BGQs*, there is limited evidence regarding their long-term effects. This situation seems contradictory considering that the purpose of such a policy instrument is expected to yield significant impacts over time. Previous studies on the effects of the Norwegian *BGQ* have found no significant influence on the appointment of female Chairs or CEOs (Seierstad et al., 2021; Wang & Kelan, 2013), nor on gender diversity among the top earners within companies (Bertrand et al., 2019). Of the mentioned studies, only Seierstad et al. (2021) specifically examine the long-term effects of board gender quotas (*BGQs*). In line with the objective of this paper, which investigates the long-term impact of *BGQs* on gender diversity in management, the findings reveal that over a decade after the complete implementation of the *BGQ*, Norwegian firms continue to exhibit greater gender diversity on their boards compared to their counterparts in other Scandinavian countries. This outcome supports the findings of Seierstad et al. (2021), who noted that 10 years after the introduction of the *BGQ*, Norwegian public limited companies (*PLCs*) mandated to achieve a minimum of 40% gender diversity on their boards still maintain higher levels of gender diversity compared to Norwegian

**TABLE 6** Results of the multivariate analysis (III). Estimation conducted with a matched sample.

	(1)	(2)	(3)
Variables	<i>BGD</i>	<i>BGDEC</i>	<i>GDM</i>
<i>BGQ</i>	9.338*** (1.268)	-0.217 (2.087)	-0.716 (1.324)
<i>BOARDSIZE</i>	-0.121 (0.373)	0.275 (0.280)	0.107 (0.267)
<i>BOARDTEN</i>	-0.282 (0.206)	-0.00759 (0.309)	0.150 (0.228)
<i>BOARDIND</i>	0.0595 (0.0543)	0.00779 (0.0531)	0.0284 (0.0367)
<i>BOARDSKILLS</i>	-0.00526 (0.0282)	-0.0558 (0.0342)	-0.0520* (0.0283)
<i>FIRMSIZE</i>	0.997** (0.466)	1.776*** (0.581)	0.267 (0.412)
<i>WOMEMPL</i>	0.112** (0.0457)	0.137* (0.0704)	0.488*** (0.0509)
Constant	6.918 (11.77)	-26.37* (13.79)	6.770 (9.457)
Country FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
R-squared	.2543	.1951	.6551
Observations	564	564	398

Note: Robust standard errors clustered by firm in parentheses. Variables: *BGD* (board gender diversity), *BGDEC* (gender diversity in the executive committee), *GDM* (gender diversity in management), *BGQ* (board gender quota), *BOARDSIZE* (size of the board), *BOARDTEN* (board tenure), *BOARDIND* (board independence), *BOARDSKILLS* (board skills), *FIRMSIZE* (size of the firm), and *WOMEMPL* (percentage of women employees).

\*\*\* $p < .01$ ; \*\* $p < .05$ ; \* $p < .1$ .

limited companies not subjected to any quota regulation. Therefore, from a different perspective than Seierstad et al. (2021),<sup>4</sup> our results confirm that the direct effect of the Norwegian *BGQ* in improving board gender diversity still holds in the long run. Nevertheless, the findings also suggest that these direct effects have diminished over time, as peer companies in the absence of mandatory requirements have also increased the representation of women on their boards. As for the spillover effects, the results indicate a negative influence of the *BGQ* on enhancing gender diversity among executive directors. Furthermore, the effects on the presence of women in managerial positions within the firm are found to be statistically insignificant.

While supply-side and demand-side perspectives anticipate positive spillover effects of *BGQs* on the executive committee and managerial ranks, previous studies have found these spillover effects to be statistically insignificant (Bertrand et al., 2019; Seierstad et al., 2021; Wang & Kelan, 2013). Despite important distinctions between our study and these previous works, particularly in terms of

**TABLE 7** Results of the multivariate analysis (IV). Effects of the quota over years. Estimations conducted with a matched sample.

	(1)	(2)	(3)
Variables	BGD	BGDEC	GDM
BGQ	13.21*** (2.609)	-8.718** (3.683)	1.498 (2.542)
YEAR	0.677** (0.281)	0.682** (0.291)	0.646*** (0.185)
BGQ*YEAR	-0.679* (0.364)	1.193*** (0.457)	-0.207 (0.324)
BOARDSIZE	0.0218 (0.349)	0.135 (0.264)	0.216 (0.245)
BOARDTEN	-0.282 (0.202)	-0.0630 (0.299)	0.167 (0.217)
BOARDIND	0.0285 (0.0258)	-0.0201 (0.0231)	0.0207 (0.0255)
BOARDSKILLS	-0.00355 (0.0280)	-0.0613* (0.0315)	-0.0476* (0.0259)
FIRMSIZE	1.050** (0.446)	1.978*** (0.559)	0.270 (0.385)
WOMEMPL	0.115*** (0.0438)	0.160** (0.0711)	0.475*** (0.0493)
Constant	3.526 (10.19)	-33.96*** (12.25)	1.990 (9.201)
Country FE	Yes	Yes	Yes
Year FE	No	No	No
Industry FE	Yes	Yes	Yes
R-squared	.2690	.2614	.6634
Observations	564	564	398

Note: Robust standard errors clustered by firm in parentheses. Variables: BGD (board gender diversity), BGDEC (gender diversity in the executive committee), GDM (gender diversity in management), BGQ (board gender quota), YEAR (the corresponding year), BOARDSIZE (size of the board), BOARDTEN (board tenure), BOARDIND (board independence), BOARDSKILLS (board skills), FIRMSIZE (size of the firm), and WOMEMPL (percentage of women employees).

\*\*\* $p < .01$ ; \*\* $p < .05$ ; \* $p < .1$ .

the time perspective,<sup>5</sup> our findings align with this evidence by highlighting the lack of significant spillover effects of BGQs on gender diversity in management. The theoretical framework of this study suggested that BGQs may increase the presence of women in senior management by acting through both supply- and demand-side factors. In the first case, by eroding female constraints (e.g., gender differences in values and attitudes, identification with gender role expectations and work family conflicts) BGQs can increase the number of available female candidates for senior management. From the demand-side perspective, BGQs can reduce gender discrimination, not only in the access to the boardroom but to senior management more broadly. Nevertheless, our results somehow challenge this framework as the spillover effects are found to be insignificant.

Finally, in contrast to prior studies, our results suggest that the spillover effects of BGQs may even have a detrimental impact on gender diversity at other managerial levels.

## 7 | CONCLUSION, FUTURE LINES OF RESEARCH AND LIMITATIONS

Gender quotas in different fields (e.g., politics, management) have become increasingly popular over the last two decades. In the area of management, so far these quotas affect the board of directors, although several countries are currently considering extending quotas to the executive committee of the board. When regulators decided to guarantee by law a minimum representation of women on boards, they expected that once the presence of women on boards was normalized, it would automatically extend to other managerial levels of the firm. However, this has not been the case, since the significant increase in the number of female directors has not led to a similar growth in the presence of women at other executive levels of the company.

By studying the Norwegian case, we contribute to the understanding of the long-term consequences of board gender quotas on gender diversity in managerial leadership. Our findings demonstrate the dual impact of the quota on board composition and the executive committee, shedding light on the complex dynamics at play. Additionally, we highlight the limited scope of the quota's influence on gender diversity beyond the board level and its effects on board characteristics such as tenure and independence, while having no discernible impact on the qualifications of board members.

Apart from the effects of the quota on the women's access to the upper echelon of the company, results indicate that it may have reduced board's independence, suggesting a defensive reaction to the mandatory appointment of some unwanted (female) directors. Finally, we also observe that whereas Norwegian firms rotate their board members more frequently than their peers in neighboring countries, the gender quota had no impact on the board members skills. While it may seem evident that appointing a significant number of female directors would inevitably decrease average board tenure, the enduring nature of this effect over a decade after the quota's full implementation is truly intriguing. Regarding the impact of the quota on board skills, there were concerns among quota opponents that it would result in less competent boards. However, this study indicates that, at least in the long term, the quota did not have a substantial effect on the level of competence among board members.

This study may have some interesting implications for regulators and policy-makers who are contemplating the implementation of gender quotas. The first implication is that gender quotas may not have the anticipated impact on achieving gender equality in the long run. In fact, the study suggests that the spillover effects of gender quotas could be insignificant or even counterproductive. This implies that simply increasing the number of women on boards through quotas may not automatically lead to improved gender equality or better representation for women in other areas of society. The second

implication is that board gender quotas can have broader consequences beyond gender-related issues. The study suggests that these quotas may affect the overall dynamics and functioning of the board, not only in the short term but also in the long term. This implies that the presence of more women on boards, enforced through quotas, can potentially impact decision-making processes, communication patterns, and overall board effectiveness. These effects may extend beyond gender-related matters and influence the board's ability to fulfill its responsibilities effectively. Accordingly, regulators and policy-makers as well as the stakeholders of the firm should carefully assess the potential spillover effects and unintended consequences of gender quotas, considering their long-term impact on board dynamics, decision-making processes, and organizational effectiveness.

There are some caveats that need to be considered when interpreting the results of this study. First, results should not be generalized due to the paramount importance of corporate governance structures and practices, along with gender equality, in the research topic. These challenges arise from the distinctive characteristics of the Scandinavian region. Specifically, Scandinavia unique corporate governance system and, particularly, its widespread recognition as the global leader in gender equality, make it difficult to draw general conclusions based on the study's findings. Second, the number of Norwegian firms in our sample is relatively small. Thirdly, the analysis of the effects of the quota on other characteristics of the board besides gender is purely exploratory, as it is based on univariate statistical analysis. Therefore, further studies extending the analysis conducted here to other settings and using more robust research designs are welcome. For instance, examining countries with a common law tradition in corporate governance and a lower ranking in gender equality would greatly contribute to the existing knowledge base. The introduction of board gender quotas in several countries, inspired by the Norwegian experience, provides a favorable environment for conducting such studies.

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#### CONFLICT OF INTEREST STATEMENT

None.

#### PEER REVIEW

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#### DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

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#### ENDNOTES

- <sup>1</sup> See, for example, the German Second Leadership Positions Act which came into effect in August, 2021 or the Rixain Law in France dated 24 December 2021.
- <sup>2</sup> The exact application of the 40% quota hinged on the total size of the BoD. Hence, in firms with boards of two or three members, both genders should be represented. Firms with boards of four or five members should have a minimum of two members of each gender. In boards with six to eight members, a minimum of three members of each gender were required. For boards of nine members, at least four members for each gender were required. Finally, for boards with more of nine members, each gender should have a minimum representation of 40%.
- <sup>3</sup> Hillman et al. (2007) reproduce the following statement from the CEO of a grocery chain: "Women have insight into our customers that no man—no matter how bright, no matter how hardworking—can match. That's important when 85% of all consumer buying decisions made in our stores are made by women" (Natividad, 2005, p. 13).
- <sup>4</sup> The comparison of PLCs and limited companies is potentially problematic, as the later are generally smaller and, therefore, could likely be less scrutinized in terms of gender diversity. Hence, differences in the type of firms that form the treated and control groups may cause misleading results. Unlike these authors we do not compare Norwegian PLCs and limited companies, but public companies in Norway and its neighboring countries.
- <sup>5</sup> Wang and Kelan (2013) and Seierstad et al. (2021) only examine the effects of the BGQ on the appointment of a female Chairs or CEOs and Bertrand et al. (2019) do not differentiate between direct and spillover effects.

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