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RESEARCH NOTE

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Board gender diversity and firm solvency: Evidence from Scandinavia

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Abstract
The implementation of a board gender quota in Norway in 2006 resulted in an extraordinary increase in the number of female directors over a short period of time. As a result, previous studies have used this unique scenario to examine the effects of appointing female directors on various corporate outcomes, such as the cost of debt. Extending this line of research, this study explores whether the appointment of female directors to the boardroom has a significant impact on a firm's solvency. The empirical analysis draws on a sample of firms from Denmark, Finland, Norway and Sweden and implements difference-in-differences estimations. The extant evidence is scarce and inconclusive and, more importantly, has been obtained without controlling for endogeneity. Our findings strongly suggest that the solvency of Norwegian firms did not change significantly after the appointment of a large number of female directors. This result is robust to a battery of sensitivity checks.

KEYWORDS
Altman Z-score, board gender quotas, difference-in-differences, female directors, firm solvency

INTRODUCTION

This study investigates the impact of female directors on firm solvency. The context of the empirical analysis is Norway during the years between 2001 and 2013. The enactment of a board gender quota in 2006 created a unique research setting for the study of the effects of female directors on different corporate outcomes. Hence, whereas in 2001 women held around 5% of the board seats, in 2007 their representation increased to more than 40% (Ahern & Dittmar, 2012). This study takes advantage of this unique research setting, and implements difference-in-differences (D-i-D) estimations.

Our main reference is García & Herrero (2021), whose main conclusion was that female directors made financial distress less likely. These authors examine a sample of listed European firms and measure the probability of bankruptcy through the Altman Z-score indicator. There are, however, important differences between both studies. First, whereas García & Herrero (2021) do not control for the likely presence of endogeneity in their proposed model[1] (as better governed firms are expected to have both more female directors on their boards and less risk of financial distress), our study takes advantage of the quasi-natural experiment research setting created by the Norwegian board gender quota that led to an unprecedented increase in the number of female directors over a short period of time. This setting is particularly robust to endogeneity concerns. The second difference concerns the research topics of both studies. Hence, although García & Herrero (2021) investigate how the presence of female directors on the board affect the probability of bankruptcy of the firm, our study focuses on the more general issue of firm solvency. Finally, another contribution of this study is that we acknowledge that firm solvency is a complex issue, and, therefore, we measure it from different perspectives.

[1]The authors claim to control for endogeneity in the analyses of the impact of female directors on the level, cost and structure of debt but say nothing regarding the analysis of financial distress.

The study continues as follows. Section 2 reviews the related literature and develops the hypothesis. Sections 3 summarizes the design of the research, and Section 4 presents the results. Finally, the last Section concludes the study.

BACKGROUND AND HYPOTHESIS

Previous studies on the impact of female directors on corporate outcomes generally use the theoretical framework provided by the psychological and behavioural economics literature and mostly report gender differences in risk aversion (Charness & Gneezy, 2012), monitoring ability (Clatworthy & Peel, 2013), independent thinking (Adams et al., 2010) and ethical behaviour (Ruegger & King, 1992). Given the research topic addressed here, if women were more risk-averse than men, firms with more female directors should show higher solvency than other firms. Several studies have empirically examined the impact of female directors on the probability of bankruptcy, as measured by the Altman Z-score indicator, reporting inconclusive results. García & Herrero (2021) find a lower probability of bankruptcy for firms with more female directors. However, both Santen & Donker (2009) and Salloum et al. (2013) investigate the same issue in the Netherlands and Lebanon, respectively, and none of them report significant results. However, these previous studies ignore the potential effects of endogeneity in their findings. In that regard, many previous studies point out that the relationship between female directors and corporate outcomes is intrinsically endogenous (e.g. García-Lara et al., 2017; Yang et al., 2019). Therefore, a significant correlation between the number of female directors and, for example, the likelihood of financial distress does not necessarily mean a causal relationship between both variables. As García-Lara et al. (2017) maintain, the positive association between female directors and accounting quality reported by some studies is likely explained by the fact the better governed firms have both more female directors on the board and also better accounting quality. Obviously, this explanation also applies to the association between female directors and firm solvency. Therefore, we pose the hypothesis of the study in the null form:

> **H1.** The presence of female directors on the board does not affect firm solvency.

METHODOLOGY AND SAMPLE

The research design is based on Garcia-Blandon et al.'s (2022) study, which examined the impact of female directors on the firm's cost of debt. In that regard, the present study investigating the effects of female directors on firm solvency can be viewed as a natural extension of their research. We follow a similar approach by using D-i-D estimations and defining a treated group consisting of Norwegian firms affected by the quota, whereas the control group is composed of firms from other Scandinavian countries not affected by the quota. However, there are notable differences between the two studies in terms of theoretical frameworks, research periods, samples, dependent variables and control variables. The use of firms from other Scandinavian countries as the control group is supported by previous studies, which have also examined the context created by the Norwegian quota and are based on D-i-D research designs (Matsa & Miller, 2013; Yang et al., 2019). The pre-treatment period in our study includes the years 2001–2004, and the post-treatment period the years 2007–2013. Accordingly, the model represented by Equation (1) is proposed:

$$\begin{aligned} \mathrm{ZSCORE}_{it} = {} & \beta_0 + \beta_1 * \mathrm{TREAT}_i + \beta_2 * \mathrm{POST}_t + \beta_3 \\ & * \mathrm{TREATxPOST}_{it} + + \beta_4 * \mathrm{SIZE}_{it} + \beta_5 \\ & * \mathrm{AGE}_{it} + \beta_6 * \mathrm{GROWTH}_{it} + \beta_7 * \mathrm{LOSS}_{it} \\ & + \varepsilon_{it} \end{aligned} \tag{1}$$

The dependent variable in Equation (1) is the Altman Z-score indicator (*ZSCORE*). *TREAT* and *POST* are dummy variables indicating that the observation belongs to the treated group (with value of 1 and 0 otherwise) and the post-treatment period (with value of 1 and 0 otherwise), respectively. The variable of interest is the interaction variable *TREATxPOST,* which denotes that an observation simultaneously belongs to the treated group and the post-treatment period (with value of 1 and 0 otherwise). If the appointment of female directors really increases firm solvency, *TREATxPOST* should present a positive and significant coefficient. This would indicate that Norwegian firms were more solvent in the post-treatment period, therefore, after the appointment of a large number of female directors.

Equation (1) also includes several control variables. The use of control variables in D-i-D estimations is controversial (Angrist & Pischke, 2009; Yang et al., 2019). The first is because estimations with firm and year fixed effects already allow to control for the effects of firm characteristics that are time invariant as well as time trends (Eckbo et al., 2022; Matsa & Miller, 2013). The second problem is the risk of including the so-called bad controls, that is, variables that are also affected by the treatment and whose inclusion among the regressors in D-i-D estimations may cause misleading results. Accordingly, similar to Ahern & Dittmar (2012), Matsa & Miller (2013) and Yang et al. (2019), we first estimate Equation (1) with firm and industry-year fixed effects, but without control variables. Afterwards, the robustness of the results is assessed, including some control variables that are considered in the literature as determinants of firm solvency: size (*SIZE*), age (*AGE*), growth (*GROWTH*) and the existence of losses (*LOSSES*).

TABLE 1 Definition of the variables.

Dependent variable	
ZSCORE **(Altman Z-score)**	**Altman Z-score indicator, as provided by capital IQ**
CASHONASS (cash on assets)	Cash and short-term investments divided by total assets
CASHONCULIAB (cash on current liabilities)	Cash and short-term investments divided by total current liabilities
CASSONCLIAB (current assets on current liabilities)	Total current assets divided by total current liabilities
Variables of interest	
TREAT (treated group)	1 for the observations that belong to the treated group (Norwegian firms), and 0 otherwise
POST (post-treatment period)	1 for the observations of the year 2007 or later, and 0 otherwise
TREATxPOST (interaction variable)	The interaction variable resulting of multiplying *TREAT* by *POST*
Control variables	
SIZE (size)	The logarithm of total assets
AGE (age)	The logarithm of the number of years since the firm was founded
GROWTH (growth)	The growth of sales over the previous year
LOSS (losses)	1 if the firm reported a negative net income the previous year, and 0 otherwise

Table 1 provides the definition of the aforementioned variables.

The sample consists of public firms from Norway, Finland, Denmark and Sweden over the years 2001–2013. Initially, it included 239 firms and 3107 observations (572 from Norway, 559 from Denmark, 585 from Finland and 1391 from Sweden). However, given the nature of the dependent variables, banks and financial companies are removed from the sample (representing 676 firm-year observations), and we also lose 117 observations for lack of data regarding the variable *ZSCORE,* leading to a final sample of a maximum of 2314 observations, 351 of which form the treated group and the remaining 1963 constitute the control group.[2]

The information for constructing the variables in Equation (1) is provided by Capital IQ. To minimize the negative impact of outliers on the estimations, the variables have been winsorized at the 1 and 99 percentiles.

TABLE 2 Pairwise correlations.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ZSCORE (1)	1.000									
CASHONASS (2)	0.444***	1.000								
CASHONCLIAB (3)	0.470***	0.732***	1.000							
CASSONCLIAB (4)	0.499***	0.633***	0.925***	1.000						
TREAT (5)	−0.091***	0.105***	0.080***	0.049**	1.000					
POST (6)	0.032	−0.101***	−0.070***	−0.067***	−0.000	1.000				
TREATxPOST (7)	−0.031	0.038*	0.028	0.011	0.703***	0.285***	1.000			
SIZE (8)	−0.253***	−0.323***	−0.296***	−0.304***	0.043**	0.114***	0.071***	1.000		
AGE (9)	−0.187***	−0.253***	−0.288***	−0.263***	−0.005	0.056***	0.005	0.132***	1.000	
GROWTH (10)	0.163***	0.192***	0.061***	0.054***	0.039*	−0.086***	0.004	−0.103***	−0.057***	1.000
LOSS (11)	−0.015	0.250***	0.269***	0.203***	0.036*	−0.062***	−0.006	−0.205***	−0.148***	−0.021

*$p < 0.1$.
**$p < 0.05$.
***$p < 0.01$.

[2]It should be noted that in the main estimation, the years 2005 and 2006 are removed from the sample, as these years could be somehow affected by the gender quota, with the consequent reduction in the number of observations.

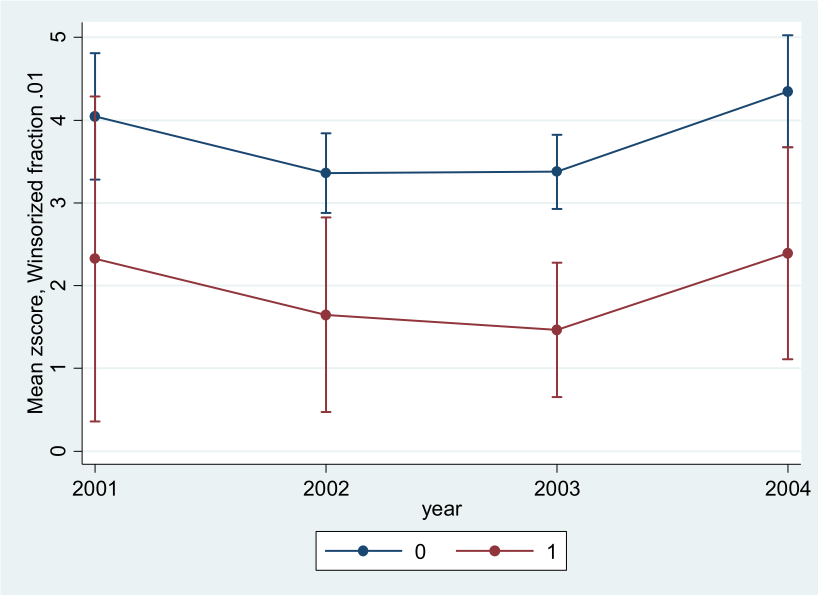

FIGURE 1 Parallel trend assumption. Behaviour of *ZSCORE* for the treated (1) and control (0) groups over the pre-treatment period (2001–2004).

TABLE 3 Results of the D-i-D estimations. Dependent variable: *ZSCORE*.

Variables	(1) Fixed effects (FE): no controls	(2) Fixed effects (FE): with controls	(3) Random effects: no controls	(4) Random effects: with controls
TREAT			−1.602**	−1.951**
			(0.678)	(0.768)
POST	0.440	0.365	4.312	5.655*
	(0.691)	(0.720)	(3.045)	(3.350)
TREATxPOST	**1.142**	**1.161**	**1.142**	**1.135**
	(0.756)	**(0.748)**	**(0.758)**	**(0.763)**
SIZE		−0.841**		−0.720***
		(0.345)		(0.171)
AGE		1.691		−0.344*
		(1.886)		(0.189)
GROWTH		1.753**		1.749**
		(0.858)		(0.844)
LOSS		−1.331***		−1.341***
		(0.342)		(0.363)
Constant	3.668***	3.214	3.056***	10.45***
	(0.676)	(7.638)	(0.614)	(1.676)
Firm FE	Yes	Yes	No	No
Year-industry FE	Yes	Yes	Yes	Yes
Country FE	No	No	Yes	Yes
R-squared	0.074	0.124	0.086	0.197
Observations	1958	1927	1958	1927

Note: Robust standard errors clustered by firm in parentheses.
*$p < 0.1$.
**$p < 0.05$.
***$p < 0.01$.

Table 2 presents the pairwise correlation coefficients for the variables, with significance levels. The correlation pattern of the main dependent variable (*ZSCORE*) and the alternative measures of solvency (*CASHONASS, CASHONCLIAB* and *CASSONCLIAB*) are consistent as all the coefficients are statistically significant with positive sign. The results for *TREATxPOST* show insignificant correlations with *ZSCORE,* suggesting that the solvency of Norwegian firms did not increase in the post-treatment period. This result holds for the alternative measures of solvency. Finally, the rather low correlations between the control variables (the maximum value is 0.21 in absolute values) do not suggest multicollinearity problems in the estimations.

A key assumption in D-i-D models is that in the absence of the treatment (in our case, the gender quota, which led to a large increase in the number of female directors in Norway), the dependent variable would have shown the same behaviour in the treated and control groups in the post-treatment period. Therefore, under this assumption, any differences in the dependent variable between both groups in the post-treatment period are expected to have been caused by the treatment. However, this assumption is sensible only when both groups already showed the same behaviour in the dependent variable in the pre-treatment period. This is the so-called parallel trend assumption in D-i-D models. A standard procedure for the assessment of this assumption is with a graph showing the behaviour of the dependent variable in both groups over the pre-treatment period. Figure 1 displays the corresponding graph for *ZSCORE*, which shows that the parallel trend assumption clearly holds in our study.

RESULTS

As previous studies, the main estimation is performed with panel data models with firm and industry-year fixed effects (Ahern & Dittmar, 2012; Matsa & Miller, 2013; Yang et al., 2019). The results are summarized in Table 3 (Column 1). In accordance with the fixed-effects estimation, the variable *TREAT* and the country-fixed effects are automatically removed from the estimation given their time-invariant nature. The most interesting result refers to the interaction variable *TREATxPOST,* whose associated coefficient is insignificant. This result discards that the level of solvency of Norwegian companies increased when female directors held more than 40% of the board seats, compared to the situation before the enactment of the quota, when they represented roughly 5% of the board. Table 3 (Column 2) shows the estimates of Equation (1) including the control variables. In the former section, we argued that D-i-D research designs minimize the need of including control variables in the estimations. The results reported in Column (2) support this view, as the value of the coefficient of *TREATxPOST* and its level of statistical significance are very similar to those shown in Column (1). Consequently, H1 cannot be rejected. Previous studies on the effects of female directors on the Altman Z-score have shown inconclusive results. Hence, whereas García & Herrero (2021) observe female directors to be associated with higher levels of solvency, both Santen & Donker (2009) and Salloum et al. (2013) reported insignificant results. These studies have in common the use of standard regression estimations and that none of them implemented any procedure to control for the inherently endogenous relationship between the presence of female directors on the board and firm solvency. Furthermore, even they investigate a different topic, our results are consistent with the evidence reported by Garcia-Blandon et al. (2022), also in the context created by the Norwegian board gender quota, showing that female directors do not affect the firm cost of debt.

We conduct two sensitivity analyses with the aim of assessing the soundness of the former findings. The first one evaluates the robustness of the results to the estimation method. As previous studies (Ahern &

TABLE 4 Sensitivity of the analysis to the definition of the pre- and post-treatment periods. Pre-treatment period: 2001–2006; post-treatment period: 2007–2013. Dependent variable: *ZSCORE.*

	(1)	(2)
Variables	Fixed effects (FE): no controls	Fixed effects (FE): with controls
POST	0.559	0.457
	(0.694)	(0.783)
TREATxPOST	**0.810**	**0.805**
	(0.670)	**(0.637)**
SIZE		−0.721**
		(0.301)
AGE		1.153
		(2.017)
GROWTH		1.346**
		(0.650)
LOSS		−1.403***
		(0.346)
Constant	3.600***	4.598
	(0.683)	(8.385)
Firm FE	Yes	Yes
Year-industry FE	Yes	Yes
Country FE	No	No
R-squared	0.072	0.112
Observations	2314	2278

Note: Robust standard errors clustered by firm in parentheses.
*$p < 0.1$.
**$p < 0.05$.
***$p < 0.01$.

TABLE 5 Additional analysis: results of the D-i-D estimations. Dependent variable: *CASHONASS*.

	(1)	(2)	(3)	(4)
Variables	Fixed effects (FE): no controls	Fixed effects (FE): with controls	Random effects: no controls	Random effects: with controls
TREAT			0.0599	0.0591
			(0.0458)	(0.0380)
POST	−0.00149	0.0480	−0.0233	0.0661
	(0.0281)	(0.0312)	(0.0378)	(0.0409)
TREATxPOST	**−0.0104**	**−0.0196**	**−0.0109**	**−0.0173**
	(0.0212)	**(0.0218)**	**(0.0212)**	**(0.0213)**
SIZE		−0.00240		−0.0193***
		(0.0115)		(0.00574)
AGE		−0.0510		−0.0286***
		(0.0446)		(0.00956)
GROWTH		0.0749***		0.0843***
		(0.0254)		(0.0254)
LOSS		−0.0164		−0.00718
		(0.0119)		(0.0117)
Constant	0.137***	0.333	0.0798**	0.316***
	(0.0275)	(0.203)	(0.0354)	(0.0685)
Firm FE	Yes	Yes	No	No
Year-industry FE	Yes	Yes	Yes	Yes
Country FE	No	No	Yes	Yes
R-squared	0.079	0.101	0.069	0.202
Observations	1963	1947	1963	1947

Note: Robust standard errors clustered by firm in parentheses.
*$p < 0.1$.
**$p < 0.05$.
***$p < 0.01$.

Dittmar, 2012; Matsa & Miller, 2013; Yang et al., 2019), panel data estimations with firm fixed effects are our preferred estimation method. However, a common sensitivity analysis in studies drawing on panel data estimations is to examine the robustness of the results to the estimation method. Therefore, we re-estimate Equation (1) with random effects. The result of this analysis is summarized in Table 3, with Columns (3) and (4) replicating the estimations in Columns (1) and (2), but with random instead of fixed effects. The new estimations include the variable *TREAT* among the regressors as well as year-industry and country fixed effects. As in the fixed-effects estimations, *TREATxPOST* shows an insignificant coefficient.

The second sensitivity analysis addresses the robustness of the findings to alternative definitions of the pre- and post-treatment periods. The definition of these periods in our study is consistent with previous studies also implementing D-i-D models in the context of the Norwegian quota. It should be noted that the quota was initially passed in 2004, however based on voluntary compliance. Although the success of the 'voluntary quota' was rather limited,[3] the number of female directors in Norway started to increase in 2004. Consequently, we removed the years 2005 and 2006 from the sample, as these years might also be affected by the gender quota. However, Matsa & Miller (2013) include the years 2005 and 2006 within the pre-treatment period. Therefore, as Matsa & Miller (2013), we re-estimate Equation (1) with the new pre- and post-treatment periods given by the years 2001–2006 and 2007–2013, respectively. The new results are shown in Table 4, which reproduces the structure of Table 3. The main result in Table 4 is the insignificant coefficient of *TREATxPOST* in both estimations, exactly as in Table 4. Although for simplicity, only the results of the fixed-effects estimations are tabulated, the results with random effects (untabulated) are qualitatively the same.

This study draws on the Altman Z-score as the proxy for solvency. The advantage of this measure over alternative indicators of solvency (i.e. liquidity ratios) is its comprehensiveness, as it measures solvency from multiple perspectives. However, the last sensitivity analysis of the study addresses the robustness of the results to alternative definitions of solvency such as corporate cash holdings and working capital. Some previous studies have empirically examined the

[3]And this led to the gender quota finally being made mandatory.

TABLE 6 Additional analysis: results of the D-i-D estimations: dependent variable *CASHONCLIAB*.

	(1)	(2)	(3)	(4)
Variables	Fixed effects (FE): no controls	Fixed effects (FE): with controls	Random effects: no controls	Random effects: with controls
TREAT			0.309	0.330
			(0.462)	(0.377)
POST	−0.357	0.431	0.282	1.417
	(0.636)	(0.305)	(1.242)	(1.096)
TREATxPOST	**−0.190**	**−0.232**	**−0.195**	**−0.215**
	(0.343)	**(0.283)**	**(0.344)**	**(0.293)**
SIZE		0.0946		−0.148***
		(0.120)		(0.0445)
AGE		−1.377**		−0.305***
		(0.668)		(0.0982)
GROWTH		−0.663***		−0.496***
		(0.190)		(0.174)
LOSS		−0.102		−0.000791
		(0.0832)		(0.0825)
Constant	0.995	5.554**	1.195	3.001***
	(0.621)	(2.668)	(0.776)	(0.765)
Firm FE	Yes	Yes	No	No
Year-industry FE	Yes	Yes	Yes	Yes
Country FE	No	No	Yes	Yes
R-squared	0.057	0.109	0.059	0.190
Observations	1951	1927	1951	1927

Note: Robust standard errors clustered by firm in parentheses.
*$p < 0.1$.
**$p < 0.05$.
***$p < 0.01$.

association between female directors and cash holdings. Hence, Atif et al. (2019) find a negative relationship between the two variables, whereas Cambrea et al. (2019) limit this effect to female independent directors and female chairs, and Tosun et al. (2022) find an insignificant association. Although Sah et al. (2022) do not focus on female directors but on chief executive officers (CEOs), they find that female CEOs maintain higher levels of cash than male CEOs. Finally, no previous study to our knowledge has examined the effects of female directors on the firm's working capital.

The analysis based on cash holdings is conducted through the estimation of Equation (1), first with *CASHONASS* and subsequently with *CASHONCLIAB* as the dependent variables. We use two variables as cash holdings are usually measured as percentage of total assets and of current liabilities. Tables 5 and 6 summarize the results of the new estimations. The new tables reproduce the structure of Table 3, but the dependent variables are *CASHONASS* in Table 5 and *CASHONCLIAB* in Table 6. The results show that *TREATxPOST* presents insignificant coefficients in all the estimations, and, thus, we conclude that female directors do not significantly impact corporate cash holdings.

Finally, for the analysis based on firm's liquidity, Equation (1) is estimated with the working capital ratio (*CASSONCLIB*) as the dependent variable. The new estimates, summarized in Table 7, show insignificant results for *TREATxPOST* in all the cases.

CONCLUSIONS

This study shows that the appointment of a large number of female directors on the boards of Norwegian firms had no significant effects on firm solvency. This result is sound as it holds for several indicators of solvency, estimation methods and definitions of pre- and post-treatment periods. Therefore, if the solvency of Norwegian firms did not change when female directors held 5% or 40% of the board seats, we must reject any significant effects of female directors on firm solvency.

These findings may have some interesting implications. For the management literature, they add to some

TABLE 7 Additional analysis: results of the D-i-D estimations. Dependent variable: *CASSONCLIAB*.

	(1)	(2)	(3)	(4)
Variables	Fixed effects (FE): no controls	Fixed effects (FE): with controls	Random effects: no controls	Random effects: with controls
TREAT			−0.0101	0.00896
			(0.484)	(0.401)
POST	−0.750	−0.0681	−0.425	0.689
	(0.627)	(0.405)	(1.187)	(1.124)
TREATxPOST	**−0.00115**	**−0.0468**	**−0.0130**	**−0.0324**
	(0.397)	**(0.329)**	**(0.398)**	**(0.343)**
SIZE		0.0551		−0.199***
		(0.129)		(0.0528)
AGE		−1.212*		−0.307***
		(0.689)		(0.108)
GROWTH		−0.750***		−0.593***
		(0.219)		(0.201)
LOSS		−0.259***		−0.192**
		(0.0919)		(0.0836)
Constant	2.569***	6.851**	2.875***	5.215***
	(0.608)	(2.716)	(0.777)	(0.871)
Firm FE	Yes	Yes	No	No
Year-Industry FE	Yes	Yes	Yes	Yes
Country FE	No	No	Yes	Yes
R-squared	0.052	0.094	0.061	0.197
Observations	1951	1927	1951	1927

Note: Robust standard errors clustered by firm in parentheses.
*$p < 0.1$.
**$p < 0.05$.
***$p < 0.01$.

recent works questioning that the presence of women in leadership positions has significant effects on corporate outcomes. Our results suggest that endogeneity might have played an important role explaining the significant effects reported by some previous studies. For the gender studies literature, because women are generally found more risk averse than men, our results indicate that these gender differences may not apply in very specialized positions. At a more practical level, investors and other market participants should not infer the level of solvency of a firm from the number of female directors it has on the board. However, the study should not be extended to other corporate outcomes that have their own specific dynamics (in particular, to corporate governance or social responsibility issues) and, therefore, should not be used as an argument to discourage the incorporation of women into boards or top management positions.

The main limitations of the study are inherent to the use of Norway as the research setting. First, the size of the sample is relatively small. The second limitation refers to the possibilities of generalizing the results, given the importance of the institutional setting as a potential driver of the effects of gender issues on corporate outcomes.

AUTHOR CONTRIBUTIONS

Dr Garcia-Blandon, the corresponding author of the paper, assumed a crucial role in the research project. He initiated the study, conducted a comprehensive review of the existing literature, formulated the theoretical framework and spearheaded the response to reviewers' inquiries. Dr Argilés-Bosch contributed significantly to the research by overseeing the empirical study and designing the sample of firms under investigation. Dr Ravenda was entrusted with the main responsibility of the empirical analysis, conducting estimations and sensitivity analyses, which played a crucial role in the study's analysis and conclusions.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

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