Women on Board: Gender balance initiatives and their impact on board structure and firm performance

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Abstract

This paper is the first one to provide a comprehensive analysis of how different gender balance initiatives in Europe have impacted on firms' board structure. Our sample covers 18 countries over the period 2005-2018. We propose a novel indicator of the strictness of the country's gender balance initiative (GBI) by taking into account the nature of the quota, mandatory or advisory, the ratio of women on board required, and the type of sanctions imposed to non compliant firms, and use a diff-in-diff approach to investigate the resulting impact on several characteristics of the board as well as firm's performance. Our results document that stricter GBI lead to a larger increase of the percentage of Women on Boards (WoB). In contrast, we do not find any evidence that stricter GBI deteriorate the board effectiveness. On the contrary, some desirable features of a corporate board, such as busyness, qualifications and independence improve with stricter regulations. Our findings also show that stricter GBI have somewhat enhanced the likelihood of appointing chairwomen and female CEOs. Finally, we do not find any evidence of a detrimental impact of quota regulation on firm's performance. Our results remain robust to a battery of robustness tests. Overall, our findings provide support to the introduction of mandatory gender balance initiatives.

Keywords: gender quotas, corporate boards, board effectiveness, performance

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1. Introduction

Regulatory initiatives aimed to increase female representation on corporate boards have been at the forefront of the policy agenda of most European countries in the past 15 years. After the pioneering example of Norway which first enacted a gender balance quota in 2003, a large number of European countries have adopted various measures to improve gender balance on corporate boards. Several countries have followed the example of Norway and enacted legislations that mandated gender quotas in boards, e.g. France and Italy. Several others have preferred a softer approach and opted instead for introducing explicit principles in their corporate governance codes on how firms are to increase their board diversity which generally indicate a non-binding target ratio often on a "comply or explain" basis (Terjesen et al., 2015). The result of this effort is a very heterogenous regulatory landscape across Europe. But despite the relevance and scale of the phenomenon there is at present no comprehensive analysis of the impact of different gender balance initiatives (GBI hereafter). This paper addresses this knowledge void by conducting a pan-European investigation of existing GBI and their impact on board characteristics as well as firm's performance. Our analysis extends to 18 European countries over the period 2005-2018 and sheds light on the corporate responses to different regulatory approaches, thereby fostering our understanding of which is likely to be more effective at achieving gender balance in corporate boards (Mensi-Klarbach and Seierstad, 2020).

In 2003 the average share of women on corporate boards in the EU was only 8.5 per cent. In 2010, when the European Commission decided to tackle the issue with its *Strategy for Equality between Women and Men* the ratio had only marginally increased to 10.9 per cent (European Commission, 2016). Despite the substantial underrepresentation of female directors and the call for self-regulation of the European Commission that followed in 2011, GBI at country level were slow to follow. Only a handful of countries responded promptly implementing GBI in 2011 but many others followed much later. At present, there are several countries that like Norway have adopted a *mandatory* regime with binding quotas and sanctions imposed on non-compliant firms e.g. France, Italy, Belgium to mention a few. Other countries have preferred a softer approach opting for *voluntary* targets. This notably includes the UK and Spain among others.

It has been argued that legislated quotas have been privileged where priority has been given to reaching the desired target quickly, whereas voluntary initiatives have been justified

on the ground of being more effective at promoting long lasting changes in the corporate culture and to reduce the risk of "tokenism" (Klettner et al.2016).

In the literature as well as among policy makers and industry participants, it remains controversial whether mandating gender quotas has achieved the expected objectives. In addition to their mandatory or voluntary nature, however, GBI in Europe differ along several other dimensions such as the set target ratio as well as, for mandatory regimes, the type of sanctions imposed in the event of non compliance, which have been completely overlooked by the existing literature.

For it to be meaningful, however, any research aimed at understanding the impact of gender regulation on corporations should capture the richness of the European regulatory landscape beyond the simplistic dichotomy of mandatory vs soft regimes. This paper tries to fill this gap and proposes a novel index of the "hardness" of GBI for 18 European countries over the period 2005-2018 based on the key dimensions of the regulation, i.e. type of regime, set target/quota and sanctions. We use the index in a multiple diff-in-diff model to assess how the hardness of the GBI affects several board characteristics including size, independence and busyness. Critics of legislated quotas have argued in fact that because of the alleged scarcity of qualified female directors, mandated quotas could result in "over-boarding", i.e. the few "golden skirts" holding multiple board positions, or the appointment of less qualified directors which could ultimately undermine the board effectiveness.[1]

If indeed board effectiveness deteriorates following the introduction of mandated GBI then this could in turn translate in poorer firm's performance. The existing evidence on this issue is however not unanimous. We therefore also investigate how, if at all, firm's performance is affected by the hardness of the GBI.

In contrast, softer GBI have been often argued to be more suitable to promote structural changes in the corporate culture. We address this question by investigating whether softer GBI have led to positive spill-overs on the likelihood of appointing female executives and/or chairwomen and find that this is not the case.

The existing research has so far focused on the experience of individual countries, mostly Norway reaching mixed results. Ahern and Dittmar (2012) documents that the introduction of mandated quotes in Norway caused worse firm's performance. They attribute this to female directors appointed after the law being substantially younger and less

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[1] Decreasing the board size could also be a "circumvention strategy" (The Economist, 2018) in order to increase the percentage of female representation.

experienced than male directors. These findings are in line with those documented by Bøhren & Staubo (2015). They also study the case of Norway and finds that boards showed increased independence after the introduction of the law, mostly because female directors were most likely to be independent, but that performance deteriorated particulalry for smaller firms. These findings are however challenged by Eckbo et al. (2020) who provide new evidence that the the quota law in Norway had no significant impact on firms' value and that the pool of qualified female directors was large enough not to pose an obstacle to the compliance with the rule. They also do not find any evidence that firms changed their corporate status in order to avoid the law. Furthermore, Nielsen and Huse (2010) using survey data of 201 Norwegian firms document that more female representation improves board effectiveness because it reduces the level of conflicts and promotes board development activities

Outside of Norway, some research is available on Spain which represents a quite peculiar case. Spain was the second country in Europe after Norway to introduce a GBI which legally required large firms to have 40 per cent of female directors in their board. However, the law fell short of implementing a proper system of penalties opting instead for providing the incentive that compliant firms might be preferred by the government when awarding public contracts. As such the Spanish GBI is de facto a soft law. Reguera-Alvarado et al. (2017) show that following the introduction of law the average number of female directors increased but still remained substantially below the set target of 40 per cent. They further document a positive association between the increased number of female directors and firms' performance for their sample of 125 firms listed on the Madrid Stock Exchange between 2005 and 2009. Their findings are in line with those of Mateos de Cabo et al. (2019) who, using a diff-in-diff approach on a sample of 767 Spanish firms between 2005 and 2017, further document that the firms experiencing the largest increase in the proportion of female directors were those who relied more on government contracts, while the impact was almost negligible for the others subject to the law.

At present, there is still very limited evidence on the comparison of the impact of different GBI across the European countries. Bennouri et al. (2020) compare mandatory vs soft regimes by studying the experience of France, Italy and the UK. They document that mandated quotas trigger a much faster increase in female representation on boards as well as a higher level of compliance than in soft regimes. They do not find any evidence that mandated quotas undermines the effectiveness of the board. Finally, they provide evidence that the likelihood of appointing a female executive or a chairwoman does not increase in either

regime. Comi et. al. (2020) compare the effect of gender quotas regulations on firm's performance in Belgium, Italy and Spain. They find a positive impact on performance only in Italy and explain this as a result of the better quality of female directors appointed following the introduction of the quota.[2]

In this paper we exploit the intertemporal variation of GBI across 18 European countries between 2004 and 2018 in a difference-in-difference research design with a multivalued treatment indicator to investigate how the "hardness" of the GBI adopted affected several measures of board effectiveness (board size, qualifications, busyness, and level of independence among others), the likelihood of appointing female executives and chairwomen as well as firm's performance. We construct our measure of hardness taking into account not only the nature of the regime, i.e. whether mandatory or advisory, but also the quota/target ratio set as well as, for mandatory GBI the type of sanctions imposed on non compliant firms. The staggered nature of the GBI over our sample period in some countries means that firms in each country can be in the control and treated group at different times.

While a diff-in-diff analysis facilitates the identification strategy by taking advantage of a quasi-natural experiment, its reliability rests on the validity of the parallel trend assumptions. Our research design addresses these methodological concerns by including firm fixed effect to control for time-invariant firm characteristics, and year fixed effect to absorb time-varying factors. We also conduct several robustness tests to ensure the validity of our results.

Our results document that countries that have introduced stricter GBI exhibit a larger increase of the percentage of Women on Boards (WoB). In contrast, we do not find any evidence that stricter GBI deteriorates the board effectiveness. On the contrary, some desirable features of a corporate board, such as the busyness and the qualifications, improve with stricter regulations. Interestingly, we also provide some encouraging evidence that stricter GBI have also a positive impact on the likelihood of appointing female CEOs and chairwomen. This is in stark contrast with the common argument that stricter GBI do not encourage profound changes of the corporate culture that extend beyond the boardroom (Klettner et al., 2016). Finally, we also investigate the impact of quota regulations on firm's performance which remains a controversial question in the literature. Our results show that stricter GBI do not have

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[2]Arnaboldi et al. (2019) analyse the impact of the introduction of gender balance initiatives in the banking industry. Their sample covers 14 European countries between 2007 and 2014 and their results suggest a positive impact of the reforms on banks' stock returns and their volatility.

any detrimental impact on firm's performance. All results are robust to several robustness tests.

Our findings are important to inform the policy debate around the most effective way to promote gender balance in corporation and provide compelling evidence in support of mandated gender balance initiatives.

The rest of the paper is organised as follows. Section 2 describes the data used in our analysis and the empirical strategy. In Section 3 and 4 we discuss our results while Section 5 provides a closing discussion.

2. Data and methodology

Our sample consists of an unbalanced panel of approximately 4,200 unique listed firms headquartered in 18 European countries over the period 2005 to 2018. The list of countries included in our sample, the number of observations for each country and for each year are reported in Table 1. The largest number of observations in our sample comes from the UK. We will address this issue in robustness tests.

[Table 1 here]

The detail of the GBI adopted over our sample period are reported in Appendix 1. Most European countries in our sample have introduced a GBI between 2011 and 2014. It is worth noticing that several countries have implemented staggered GBI, often starting with lower quotas or targets and subsequently increasing them. For instance, France introduced a mandatory GBI in 2011 requiring all listed companies and non-listed companies with more than 500 employees or revenues above EUR 50 million to have a minimum of 20 per cent of female directors by January 2014, and later increased the quota to 40 per cent to be achieved by January 2017. There are four countries that do not implement any GBI during our sample period.

From BoardEx we collect all data on relevant board characteristics such as board size, gender ratio, board member education and independence among the others for European listed firms. From BoardEx we also extract information about whether the firm has a female CEO and/or chairwoman. Next, we merge board data with firm-specific financial information collected from Compustat and Worldscope using company names, ISIN codes and ticker symbols. We also collect yearly GDP information from the International Monetary Fund (IMF), and information about the government political orientation of each country during the sample period from the IDB's database on Political Institutions (Cruz et al. 2018). We remove

all observations with missing variables such as total assets, cash holding and board characteristics. Our final sample consists of approximately 26,000 firm-year observations. The list of all variables employed in our analysis is reported in Appendix 2.

2.1 Research design and GBI indicators

Our main identification strategy consists in employing a diff-in-diff approach comparing corporate board characteristics and firm's performance before and after the adoption of a GBI by the country where the company is headquartered. In our sample period, only Poland, Switzerland, Greece and Ireland do not have a GBI in place.[3] Therefore, firms from these countries will always be in our control group. For the remaining countries, the staggered nature of the GBI implies that most firms over time are both in the treated and the control group, which has the benefit of somewhat alleviating concerns that the control and treated groups may differ along other characteristics than the adopted GBI (Simintzi et al. 2015; Dessaint et al. 2019).

We start by constructing a baseline GBI indicator GBI^B which takes value zero if a country has no GBI in place in a given year, one if a country has soft GBI in place in a given year, and, finally, two if the country has a mandatory GBI in place in a given year. We next refine this indicator and construct our main variable of interest which is GBI^H, an indicator that can take values from zero to five depending on the "hardness" of the GBI. We partly base the construction of this indicator on the classification of hardness provided by Mensi-Klabarch and Seierstad (2020). The authors classify as harder quotas those where sanctions are tougher and typically involve some monetary penalty. We then combine the hardness of the sanctions with the level of the target ratio/quota required. Similar to Mensi-Klabarch and Seierstad (2020) we distinguish between *balanced* and *tilted* ratios, depending on whether the ratio is above or below 33 per cent, but, as a robustness test, we also construct a more stringent GBI indicator which classifies as balanced target ratios at least equal to 40 per cent.[4] The indicator is therefore constructed incrementally depending on whether the GBI is mandatory or not, the ratio required is balanced or tilted, and the sanctions are hard or soft (for mandatory regimes only), while it is set equal to zero for countries that do not have any GBI in place. As an example, France has a GBI^H indicator equal to 4 up until the end of 2013 because the GBI is mandatory and involves

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[3] Ireland introduced a soft GBI applicable to listed companies only in 2019. Greece mandated a 25% quota in July 2020. Similarly, Switzerland has introduced a mandatory 30% quota on all large companies in June 2020.
[4] There are only three countries over our sample period that require a 40% ratio of female directors: Norway, France and Spain. Italy has increased the ratio from 33% to 40% from January 2020, therefore it is outside our sample period.

strict sanctions but the target ratio is tilted (20 per cent). From January 2014 the target ratio was increased to 40 per cent (balanced) hence the associated GBI^H increases to 5 from then onward. In contrast, the United Kingdom has a GBI^H indicator equal to 1 until 2015 because it has a soft GBI with a target ratio of 25 per cent (tilted) and equal to 2 from 2015 onward when the target ratio was increased to 33 per cent (balanced).

For countries with mandatory regimes, which are six in our sample, we construct our GBI indicator using the date of the enactment of the law. The majority of these initiatives did allow for a grace period of variable length to comply as adjustments to board composition take time to implement. An alternative modelling choice would be to use the end of the grace period to construct the GBI indicator. However, we believe that this change would not have a major impact on our analysis. Due to the stickiness of board composition it is unlikely that companies would have waited until the end of the grace period to comply. This is also supported by some existing evidence (Bennouri et al. 2020). Even in the event this was the case, the potential effect would go against our conjecture.

Figure 1 displays the distribution of our sample by country and the corresponding GBI indicators over our sample period. Table 2 provides more details about how we construct the GBI indicators, the year of the introduction of the GBI, if applicable, and the corresponding value of our GBI indicators. Figure 1 and Table 2 show that for some countries, the GBI indicators change over our sample period as a result of amendments to the regulation. In fact, several countries have made their regulations stricter over time. Among the countries in our sample, four (Greece, Ireland, the Netherlands, Switzerland) have only recently adopted mandatory GBI and as such they are assigned as GBI of zero during our sample period. A detailed description of the measures adopted by each country in our sample is provided in Appendix 1.

[Figure 1 and Table 2 here]

In order to investigate the changes in board characteristics around the adoption of GBI measures we estimate the following diff-in-diff regression (Simintzi et al. 2015; Dessaint et al. 2019):

$$Y_{i,t} = \alpha + \beta_1 \, GBI_t + \beta_2 \, Firm \, controls_{t-1} + \beta_3 \, Country \, controls_t + \lambda_i + \theta_t * \delta_i + \varepsilon \qquad [1]$$

Our first set of dependent variables ($Y_{i,t}$) consists in several board characteristics. First, we look at the impact of different GBI on the ratio of women on board to assess which is more effective at achieving gender balance on boards. Next, we look at several other board

characteristics that capture the effectiveness of the board. Our choice of characteristics is guided by the literature as well as data availability and include *Busyness* which measures the total number of directorships held by each director in the board. It has been argued that mandated GBI would increase the risk of over-boarding because of the scarcity of qualified female directors (Bennouri et al., 2020). Recent empirical literature shows that busy directors are less effective and are detrimental to the firm's value (Cashman et al. 2012). Similarly, there was a concern that quotas would force the appointment of unqualified female directors which would also negatively impact on the overall board effectiveness. We therefore also include *Qualifications* measured by the average number of qualifications of all directors on a board as one of our board characteristics. *Independence*, i.e. the proportion of outside directors, is another key feature of boards which we include in our analysis. Bohren and Staubo (2016) document that in Norway board independence increased from 46 to 67 per cent after the enactment of the mandatory quota because female directors were more likely to be independent. They argue that the increase in board independence is however suboptimal as it enhances the monitoring of the board at the expense of its advisory role. In order to better gauge the impact of GBI on the overall experience of the board we further include in our board characteristics the size of the board *Network*, defined as the log of the directors' average network size, and a measure of the director's *Experience* defined as the average number of past directorships in public and private companies held by the board of directors. In addition to board characteristics, we also investigate whether GBI have had a beneficial effect on the likelihood of appointing a female chair to the board and a female CEO. It remains in fact a contentious issue about gender quotas whether they have had a trickle effect beyond the boardroom on the appointment of more women into senior leadership roles (Bennouri et al. 2020). To this purpose we run a probit version of the model described in Equation 1 where the dependent variable is *Chairwoman* (*Fem CEO),* a dummy variable that takes a value one if the company's chairperson (CEO) is a woman, and zero otherwise. Our final set of dependent variables are measures of firm's performance. We employ both the yearly return on asset, *ROA,* and the Tobin's Q which are commonly used in the literature.

The control variables we employ consist of a set of *Firm controls* that are likely to be associated with the dependent variables such as *ROA*, *Cash / Tot. Assets*; and *Debt / Equity*, which are lagged by one year. *Country controls* include the lagged values of the Log(GDP *pc*) and the GDP growth rate, *GDPg,* as well as a discrete variable *Govt Party* which takes value three if, in *t-1,* the government is left-wing, two if the government is centre, and one if it is

right-wing. There is evidence that the introduction of GBI has been particularly encouraged by left-wing governments (Mensi-Klabarch and Seierstad, 2020). Finally, all regressions include firm fixed effects to control for time-invariant firm's characteristics (λ_i), and industry-year fixed effects ($\theta_t * \delta_i$) to eliminate bias from within industry un-observables that change over time.

3. Results

In Table 3 we report the descriptive statistics of our variables. We can see that the average ratio of *WoB* is only approximately 12 per cent over our entire sample period. The median is even lower and below 10 per cent. Figure 2 shows how the ratio of women on board has increased over our sample period for all countries in our sample. It is apparent that there has been a sharper increase from around 2011 which is the year when one third of the countries in our sample have introduced some form of GBI. When we break down our data into countries that have implemented mandatory GBI as opposed to soft GBI or no GBI at all, results are even sharper and highlight that the change of the ratio of women on board follows parallel trends up until 2011, but after that point it substantially diverges for countries that have adopted hard GBI and that currently exhibit the largest ratio of women on board. On the contrary, surprisingly there seems to be little difference between countries with soft GBI and countries with no GBI at all, particularly towards the end of the sample period.

[Figure 2]

We also note that only 2.6 per cent of firms in our sample have a female CEO and this percentage goes down to 1.8 per cent if we consider firms who appoint a chairwoman. Finally, the average ratio of independent directors is approximately 42 per cent over our sample period.

[Table 3 here]

3.1 GBI indicators and board characteristics

The results of our first diff-in-diff regression model with our basic GBI index are presented in Panel A of Table 4 where the variable of interest is the basic GBI indicator, GBI^B. The regression results show quite clearly that mandatory GBI have been more effective at increasing female representation on boards. The coefficient estimates in Column 1 is positive and statistically significant at 1 per cent level. In terms of economic significance, mandatory GBI increase the proportion of female directors by 1.9 percentage points compared to soft GBI. Our regression results further show that mandatory regimes are associated to less busy directors

(Column 2), more qualified and more independent boards (Column 3 and 5 respectively). Also, the results show that mandatory GBI tend to increase the size of the board while they have no significantly different impact on the experience and network size of the board.

The main interest of our investigation is however to account for the different degree of hardness of the various GBI which we capture with the two expanded GBI indicators. Table 4 Panel B reports the regression results when our variable of interest is the GBI indicator GBI^H (which sets the balanced ratio of WoB equal to 1/3). Results are generally consistent with those obtained for the basic GBI indicator but they allow us to tease out more clearly the effect of stricter GBI on the board structure. Our findings show that stricter GBI have stronger impact on the ratio of WoB. The coefficient estimate in Column 1 is in fact positive and statistically significant at 1 per cent. The economic significance is such that an increase of 1 unit of the GBI indicator entails an increase of 1.4 percentage point of the ratio of female directors. Similar to the previous results, we find no evidence that the increase of female representation on corporate boards of stricter GBI deteriorates in anyway the effectiveness of the board. As before, stricter GBI decrease the board busyness while they increase its independence and the average board qualifications. The effect on the network size remains positive and is now weakly significant but the magnitude is very small. We now find a statistically significant and negative impact of stricter GBI on the average board experience. However, the magnitude of the effect remains relatively small as for 1 unit increase of the GBI indicator the board experience decreases by 1 per cent. Finally, results are confirmed if we replace GBI^H with GBI^{H*} which sets the threshold of a balanced ratio of women on board equal to 40 per cent. The results for the GBI indicator, GBI^{H*}, are reported in Panel C of Table 4.

[Table 4 here]

We further investigate the impact of the GBI indicators on the likelihood of appointing a female CEO or a chairwoman and we report the result in Table 5. Some evidence (Hampton-Alexander Review, 2020) suggests that GBI have not contributed to break the glass-ceiling to the extent that they do not seem to have increased the appointments of women to senior leadership roles. The results of this analysis are presented in Table 5 and, interestingly, the coefficient estimates of our GBI indicators are always positive and statistically significant except in one instance (Column 5). These findings are of great relevance as they provide evidence that, contrary to what normally argued, stricter GBI appear to have some positive spillover effects beyond the boardroom on the appointment of women to senior leadership roles.

[Table 5 here]

Overall, the results of this section indicate that stricter GBI promote faster and larger increases of female representation on corporate boards without undermining the effectiveness of the board. This contrasts the arguments generally put forward against hard GBI. We further show that stricter GBI also seem to improve the likelihood of appointing women to senior leadership roles.

3.2 GBI and firm's performance

Ferreira (2015) states that there is "a fascination" among regulators and academics to try and establish a causal link between female directors and firm's performance. Results in the literature are at best mixed on the matter. The task is methodologically very challenging due to the many confounding effects that could drive the results (Ferreira, 2015). We are aware that while using quasi-natural experiments in a diff-in-diff set up mitigates some of these concerns, it does not quite eliminate them.

We attempt nonetheless to contribute to the debate on the impact of gender balance on boards and firm's performance by looking specifically at the differential impact of alternative GBI with different degrees of hardness.

One channel through which gender diversity could enhance firm's performance is by strengthening the monitoring of management (Adams and Ferreira, 2009). More recent literature also suggests that female directors bring new and different skills to the board which can also have positive impact on firm's performance by improving the board's advisory effectiveness (Kim and Starks, 2016; Bernile et al. 2018).[5]

The results of our analysis for the three GBI indicators are reported in Table 6. Following the literature, we employ two alternative measures of firm's performance, the *ROA* and the Tobin's Q (*TobinQ*). The coefficient estimates of our GBI indicators appear to be never statistically significant.

We interpret this result as suggesting that implementing stricter GBI is not detrimental to the firm's value which provides further support to our previous findings that the changes to the board structures associated to more stringent GBI do not deteriorate the quality or effectiveness of the board. The finding is also in line with recent evidence provided by Eckbo

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[5] Bernile et al. (2018) show that board diversity more generally has a positive impact on firm's performance as it reduces firm's risk. Their measure of board diversity includes among other gender diversity as measured by the fraction of female directors. In untabulated results we also employ a third measure of firm's performance, the *Volatility* of stock returns. Results are consistent with the others.

et al (2020) in the case of Norway which challenges the previous findings by Ahern and Dittmar (2012).

[Table 6 here]

4. Discussion and robustness tests

One possible concern with our diff-in-diff methodology is that firms could self-select into the treated or control group, presumably to avoid the "treatment" as suggested by Ferreira (2015). Firstly, it is reasonable to expect that this would be a concern only for countries with mandatory regimes. However, the evidence available suggests that this is not the case. Indeed, Eckbo et al. (2020) provide new evidence about the case of Norway showing that firms' change of legal status was uncorrelated to the quota constraint. Similarly, Comi et al. (2020) provide evidence that the number of delisting in Italy over the period 2004-2014 has not been affected by the introduction of the quota in 2011. As our sample includes only publicly listed companies we believe this is likely to hold true for other countries with mandatory regimes included in our sample.

Another possible concern with our analysis is that while Norway is normally considered the first example of a mandatory regime, the country initially introduced a soft quota in 2003 and moved to a mandatory regime after that failed to prompt any significant change in the female representation on boards. In our classification of Norway GBI, we have ignored the period 2003-2005 and, de facto, assumed Norway introduced a mandatory GBI in 2006. However, untabulated results show that our findings are robust if we remove Norway from our sample. Similarly, results continue to hold if we remove the UK from our sample which is the country with the largest number of observations.

4.1 Country controls and country trends

A difficulty with our analysis is that we cannot completely rule out that some of the changes we observe in board structure might be due to other governance reforms introduced over our sample period rather than the introduction of gender balance initiatives. To fully control for this and for other country shocks more generally we would ideally need to include country fixed effects in our regressions. Unfortunately, in our context this is not possible as the country fixed effects would also absorb our GBI indicator (Simintzi et al. 2015). We are confident that gender balance initiatives have represented the most salient governance reforms across Europe in the past ten years. Furthermore, the country controls in our regression mitigate these concerns. As an additional robustness test, we run our models

including other country level controls variables to further reduce the risk that country specific characteristics might be driving our results. Specifically, we augment the regression in Equation 1 to include *Work-women* defined as the ratio of female to male labour force participation rate extracted from the World Bank ESG database, and *Gov-ind* which is a measure of the country's governance effectiveness and quality calculated as the average of the following three governance indicators, Government Effectiveness, Regulatory Quality and Rule of Law, which are compiled annually by the World Bank ESG database.[6] These two additional country variables control for the possibility that the introduction of GBI depends on the quality of the country governance and the participation of women into the labor force. Table 7 reports the results with these additional country controls for our main GBI indicator, GBI^H, and the board structure, which remain consistent with previous ones. We note that a higher *Gov-ind* has a positive and statistically significant impact on the proportion of women on board while the *Work-women* ratio has no significant impact on it. We note that the effect of stricter GBI on the appointment of female CEO exhibits a larger magnitude and is statistically significant at 5 per cent level. The impact on the appointment of chairwoman instead is slightly weaker but positive though not statistically significant.[7]

[Table 7 here]

As a further robustness test, we also check whether different pre-treatment country trends might be driving our results. To this purpose, we run a specification of our baseline regression including country-specific year trends (Correa and Lel, 2016). Despite this being a very challenging specification, the results which are presented in Table 8, are generally in line with the previous ones with the exception of *Experience* and *Board size,* that are positive and no longer significant. Panel B of Table 8 also confirms a positive and statistically significant impact of stricter GBI on the appointment of chairwomen and female CEOs. The magnitude of the effect is also nearly twice as big as that reported in our baseline regression results. The effect of GBI on performance remain positive but not statistically significant. While we do not want to read too much in these results because of the obvious methodological concerns that make it challenge to establish a clean causality between GBI and performance, we are nonetheless reassured that the battery of tests performed so far indicate that stricter GBI do not appear to have a detrimental impact on firm's performance which, as already discussed,

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[6] Sovereign ESG Data Framework | Sovereign Environment Social Governance Data | World Bank
[7] Results hold also for the two other GBI indicators but are omitted for the sake of brevity.

is consistent with the rest of our findings that show an overall positive impact of GBI on board effectiveness.

[Table 8 here]

4.2 Parallel trend assumption

The parallel trend assumption states that, in the absence of treatment, the average change in the dependent variable would have been the same for the treatment and control groups. To assess the validity of the parallel trend assumption underlying our diff-in-diff design, we conduct two tests. The first one is a placebo test that utilizes 2007 as a pseudo treatment year. The pseudo treatment year should be as far as possible from the year of the actual treatment to avoid event-induced contamination in the pseudo treatment sample. With the exception of Norway and Spain, most European countries in our sample introduced gender balance initiatives starting from 2011. Our choice of using 2007 as the pseudo treatment year therefore allows us to have at least 4 years before the majority of European countries introduces a GBI. Analogously, we restrict the analysis to those countries that did not have any GBI in place in the period between 2005 and 2011 and drop all observations happening after 2011. In our sample, the values of the GBI indicators vary depending on the country under scrutiny. To account for these differences we construct a country-specific placebo GBI indicator, $GBI_{Placebo}$, which, starting from 2007, takes the same values as our main GBI indicator, GBI^H. Next we run the baseline regression models in Equation 1 and report the results in Panel A of Table 9. We find no evidence of changes in key dependent variables subsequent to the pseudo treatment years[8]. The coefficients on the placebo GBI indicator are in fact all insignificant at conventional levels. Thus, these findings suggest that, in the absence of treatment, our treatment and control samples exhibit a similar trend in key board characteristics and likelihood of appointing a female CEO.

As an additional test we extend our main diff-in-diff specification to analyse the dynamics of the treatment. To do so, we estimate a variant of Equation 1 in which we replace the multivalued GBI indicators with a set of five dummies: two and one-year lagged GBI dummies (GBI_{-2}, GBI_{-1}), a contemporaneous GBI dummy (GBI_0), and one and two-year forward GBI dummies (GBI_{+1} and GBI_{+2}).

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[8] Because the objective of the tests in this section is to assess that changes in any dependent variables are due to the exposure to the treatment and that in absence of any reform the average change in the dependent variable would have been the same for the treatment and control groups, we restrict our analysis only to those dependent variables that, based on the previous analyses, are consistently significantly affected by our GBI indicators (namely, *WoB*, *Busyness*, *Qualifications*, *Experience*, *Independence*, *Fem CEO*).

Results from these regressions are reported in Panel B of Table 9. Coefficients of the pre-treatment dummies are all insignificant confirming the absence of different trends in the treatment and control groups. Results also show that the impact of GBI on some board characteristics (i.e., *WoB*, *Busyness*, *Qualifications*) and on the likelihood of appointing female CEOs is stronger in the long run.

[Table 9 here]

5. Propensity Score Matching

A potential concern with our analysis is that treated and control firms may differ in terms of basic firm characteristics. Our results could, therefore, reflect such differences among firms rather that capturing changes due to GBI. To alleviate such concern and assess the robustness of our findings we use a multivariate propensity score methodology to construct a matched sample of firms subject to, and not subject to, GBI and estimate our main specifications on the matched sample. First, we define the variable $Treatment_{y,t}$ as an indicator variable set equal to one for all firms located in a country y that has at time t a GBI – either mandatory or voluntary – in place, and zero otherwise. Then, we estimate a probit model of the probability of being treated as a function of firm-level characteristics (ROA_{-1}, $Cash/TA_{-1}$, D/E_{-1}, $Log(TA)_{-1}$, $Board\ size_{-1}$). For each observation in our sample, we compute a propensity score as the predicted value of the probability of being treated according to the probit model. Our matched sample results in all treated firms and control firms selected within a predefined caliper distance of 1 per cent.

Panel A in Table 10 reports the propensity score matching estimates from the probit regression. To validate our matching procedure and to verify that there is no significant difference in the observable characteristics of the matched pairs other than the treatment itself, in Column 6 of Panel A, we report the t-tests of the difference for all observable covariates between the treated and the matched untreated group. None of the differences are significant. As an additional test, we also perform again the probit regression on the matched sample. Results are reported in Column 2 of Panel A and show that none of the control variables is statistically significant.

We use this set of matched firms to estimate our main regression models and report the results in Panel B and Panel C of Table 10. Consistently with our previous findings, coefficient estimates confirm that stricter GBI are more effective at improving gender balance in corporate boards without deteriorating the effectiveness of the board. As before, stricter GBI lead to less

busy, more independent and more qualified boards. The effect on the size of the board and on board network is positive but not significant. Stricter GBI reduce the average board experience but the impact is still quite small in its magnitude. Panel C of Table 10 also confirms a positive and statistically significant impact of stricter GBI on the appointment of chairwomen and female CEOs and a not statistically significant impact on the firm performance.

[Table 10 here]

6. Conclusions

This paper employs a diff-and-diff strategy to compare the impact of different gender balance regulation in Europe and study their impact on the board structure as well as firm's performance for a sample 18 countries over the period 2005-2018. We use a novel approach that relies on gender balance initiative (GBI) indicators that capture the strictness of the regulation defined by its nature, i.e. mandatory or advisory, the strictness of the sanctions and the ratio of women on board required/recommended.

Our findings document that these regulatory efforts have been effective in increasing the representation of over women on board during our sample period but that the effectiveness appear to be much stronger in stricter regimes. Strict mandatory regimes have been often criticised as potentially inducing distortions and discouraging more structural changes of the corporate culture. In contrast with such conjectures, our paper provides compelling evidence that that stricter GBI have not had a detrimental impact on the effectiveness on the board. In fact, several indicators of board effectiveness, such as busyness and qualification, improved more for stricter GBI. Interestingly, and contrary to some anecdotical evidence, we also find evidence that stricter GBI have a positive and statistically significant effect on appointment of women to senior leadership roles, i.e. CEO and chairwomen, thus suggesting that the benefits of theses regulation extend beyond the boardroom. We further do not find any evidence of a negative association with firm's performance. We are conscious of the methodological challenges to draw conclusion on a causal link between GBI and firm's performance. However, we believe the results convincingly show that stricter gender balance regulation do not have a detrimental impact on firm's performance.

Our findings have important policy implication as they are the first to provide a comprehensive comparison of GBI initiatives in Europe. The conclusion we draw is that enforcing gender quotas with strict sanctions has not generated the distortions that were

expected neither on the composition and characteristics of the board nor on firm's performances. On the contrary, they seemed to have triggered positive changes overall.

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Appendix 1: Institutional Background

Country	Measure description
Austria	From 1 January 2018, appointments and postings to supervisory boards of listed stock companies, and of companies with more than 1000 employees whose boards consist of at least six seats, must consist of a minimum of 30% of the underrepresented sex. Only "single gender" companies (defined as companies that have a workforce with less than 20% employees of one sex) are exempt from the new regulations. The 30% quota is sanctioned with an "empty seat" policy meaning that appointment votes and postings that fail to meet the required minimum are void and board members holding such seats are barred from voting. The new regulations take effect on 1 January 2018 and are applicable to all board elections from that date onward. Current seat holders on company boards will not be affected. (https://www.equalitylaw.eu/downloads/4510-austria-austria-enacts-legislation-for-a-30-quota-of-women-on-supervisory-company-boards-pdf-168-kb).
Belgium	In Belgium the relevant rules were introduced by the Act of 28 July 2011. According to the Act, at least one third of board members of publicly-listed companies and state-owned companies need to be of each sex. As long as the quota is not fulfilled, a person belonging to the minority sex must be appointed to any vacant position and any appointment which does not comply with this rule is void. In relation to listed companies the amended Company Code provides a specific sanction consisting in suspension of any advantage, financial or otherwise, attached to the position of director for all the members of the board as long as the composition of a board does not comply with the quota. (https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52012SC0348&from=en)
Denmark	A requirement for boards of publicly listed companies, large non-listed companies, government-owned limited liability companies, and governmental institutions to set targets for improving the gender balance on boards and in management positions was adopted by the Danish parliament on 14 December 2012 with effect from 1 April 2013. Companies covered by this regulation are under an obligation to implement targets, generally defined as having at least a 40 percent representation of both genders on the board, and policies for the quota of the underrepresented gender in the supreme governing body in 2013. (https://www2.deloitte.com/content/dam/Deloitte/my/Documents/risk/my-risk-sdg5-women-in-the-boardroom-a-global-perspective.pdf)
Finland	There are no quotas in place for women serving on listed company boards in Finland. (https://www2.deloitte.com/content/dam/Deloitte/my/Documents/risk/my-risk-sdg5-women-in-the-boardroom-a-global-perspective.pdf)
France	In France, gender quotas were implemented in January 2011. The law required all listed companies and non-listed companies with more than 500 employees or revenues above EUR 50 million a minimum of 20% of women on boards by January 2014, raised to 40% by January 2017. Sanctions for non-compliant firms are of two types: the appointment of directors in violation of the law is voided, and the payment of attendance fees is suspended (Prat and Mueller, 2016 http://www.remi-delatte.com/promulguees/Egalite_homme_femme_CA.pdf)
Germany	German gender quota legislation passed in 2015 requires listed companies with full employee representation on their supervisory boards to have women hold at least 30 percent of non-executive board seats. Companies that fail to do so must appoint women to fill vacant board seats or leave them empty. The law also provides that medium-sized companies that are either listed or co-determinant would be required to set their own targets to increase the proportion of women on their supervisory boards and boards of directors and at the top management levels. If the quota is not met, the companies will be required to fill any vacant positions with women or leave them empty. (https://www2.deloitte.com/global/en/pages/risk/articles/women-in-the-boardroom-global-perspective.html)
Greece	On 17 July 2020, a new law on corporate management (Law 4706/2020, Nr of the Gazette 136/A/17-7-2020) mandates a 25 percent board gender quota for all the companies registered at the Athens Stock Exchange. (https://www2.deloitte.com/content/dam/Deloitte/my/Documents/risk/my-risk-sdg5-women-in-the-boardroom-a-global-perspective.pdf)
Italy	Italy introduced board gender quotas in July 2011. The law came into force one year after on August 2012. The law mandates that all publicly listed companies should have at least 1/5 of either gender on their boards of directors by the time of the first renewal of the board. The ratio should increase to 1/3 by the second renewal of the board. If a firm does not comply, CONSOB (the

regulatory body of the Italian stock exchange) in the first instance issues a warning to the company, which then has four months to comply. Failure to comply within this period, would trigger fines to the company (ranging from EUR 100,000 to EUR 1,000,000) and, if persisting, could lead to void the appointment of all directors (Ferrari et al. 2016).

Luxembourg	There are no quotas in place for women serving on boards in Luxembourg. (https://www2.deloitte.com/global/en/pages/risk/articles/women-in-the-boardroom-global-perspective.html)
Netherlands	The 2013 Dutch Management and Supervisory Act recommends, on a comply-or-explain basis, that large legal entities have at least 30 percent men and women on management and supervisory boards. The Dutch Parliament has extended the act, which would have expired in 2016, until January 1, 2020, under the same terms. (https://www2.deloitte.com/global/en/pages/risk/articles/women-in-the-boardroom-global-perspective.html) In February 2020 the Dutch Government announced a bill that included a hard gender quota on board-level appointments. Pursuant to this bill, Dutch companies listed on Euronext Amsterdam that do not have enough women directors to meet the 30% gender balance may only appoint a woman to a vacant position on the supervisory board; if proposed nominees do not lower the gap towards compliance, such appointments will be annulled. (https://www.glasslewis.com/board-gender-diversity-hard-quota-introduced-in-the-netherlands/)
Norway	In December 2005, Norway became the first country in the world to impose a gender quota, requiring public limited companies to raise the proportion of women on their boards to 40 percent. The penalty for not complying consists in the dissolution of the company (Eckbo et al., 2021).
Poland	There are no quotas in place for women serving on boards in Poland. (https://www2.deloitte.com/global/en/pages/risk/articles/women-in-the-boardroom-global-perspective.html)
Portugal	The Law 62/2017, passed in August 2017 and effective from January 2018, mandates that: (i) the supervisory boards of state-owned enterprises have 33.3 percent representation of women by 2020; (ii) publicly traded companies reach 20 percent representation by their first general meeting in 2018, increasing to 33.3 percent for the first general meeting held in 2020. The new rules apply to the renewal and replacement of mandates, but not to mandates in progress. Noncompliance results in the annulment of the supervisory bodies and the election of new ones for state-owned companies. Publicly traded companies that do not comply will be listed on the websites of the Commission for Citizenship and Gender Equality, the Commission for Equality in Labor and Employment, and the Securities Market Commission. Fines will be imposed for noncompliance that exceeds 360 days. (https://www2.deloitte.com/global/en/pages/risk/articles/women-in-the-boardroom-global-perspective.html)
Ireland	There are no quotas in place for women serving on boards in Ireland. The Balance for Better Business report, commissioned by the Irish Government and released in 2019, outlines a series of progressive board diversity targets for listed companies. The targets are 33 percent representation of women on ISEQ 20 boards and 25 percent for all other listed company boards by 2023. (https://www2.deloitte.com/global/en/pages/risk/articles/women-in-the-boardroom-global-perspective.html)
Spain	There are no quotas in place for women serving on boards in Spain. However, a 2007 law approved by the Spanish parliament (the Law for Gender Equality) recommends equal representation of both genders on boards. (40%??) Noncompliance is not met with sanctions, but the government will review compliance as a factor when assigning certain public contracts. (https://www2.deloitte.com/global/en/pages/risk/articles/women-in-the-boardroom-global-perspective.html)
Sweden	There are no quotas in place for women serving on boards in Sweden. The Swedish Corporate Governance Code requires listed companies to strive for gender balance on their boards on a comply-or-explain basis, and it defines gender balance goals for listed company boards (at least a 40 percent representation of each gender following the 2020 annual general meetings for all Swedish listed companies; at least a 35 percent representation of each gender following the 2017 annual general meetings for Large cap companies; at least a 30 percent representation of each gender following the 2017 annual general meetings for small and mid-cap companies). (https://www2.deloitte.com/global/en/pages/risk/articles/women-in-the-boardroom-global-perspective.html).
Switzerland	Currently, there are no quotas in place for women serving on boards in Switzerland. However, on June 19, 2020, the Swiss parliament adopted a provision requiring large companies to introduce a

	gender quota of 30% for their boards of directors and of 20% for their executive boards from January 1, 2021.
	Noncompliance is not met with sanctions, but non-compliant companies are required to comply or to explain why the target was not met. (https://www.loc.gov/law/foreign-news/article/switzerland-gender-quotas-for-boards-of-large-companies-to-take-effect-january-1-2021/)
United Kingdom	In February 2011, the British government issued the Davies Report which recommended FTSE100 companies to reach a voluntary ratio of women on boards of 25% by 2015. A subsequent review in 2015 raised the voluntary ratio to 33% and extended it also to FTSE250 companies to be achieved by 2020.

Appendix 2: Variable definitions

Variable	Definition
WoB	The ratio of female directors to the total number of directors sitting in the board.
Board size	The number of directors sitting on the board.
Independence	The ratio of independent directors to the total number of directors sitting on the board.
Qualifications	The log of the number of qualifications held by the board measured as the average number of qualifications held by the firm's directors.
Experience	The experience of the board measured as the average number of the directors' past directorships in listed and/or unlisted firms.
Network	The size of the board network measured as the log of the average network size of the firm's directors.
Busyness	The busyness of the board measured as the average number of board positions held by the firm's directors in other listed and/or unlisted firms.
Chairwoman	An indicator variable equal to 1 if the firm has a chairwoman, and 0 otherwise
Fem CEO	An indicator variable equal to 1 if the firm has a female CEO, and 0 otherwise
Log(TA)	The log of dollar firm's total assets
Cash/TA	Cash holding scaled by total assets
ROA	Industry adjusted ROA defined as net income scaled by total assets
TobinQ	Industry adjusted Tobin's q defined as the ratio of the firm's market value to its book value. The market value is the book value of assets minus the book value of equity plus the market value of equity.
Log(GPD pc)	The log of the GDP per capita in the country as reported by the International Monetary Fund.
Govt Party	An index equal to 3 if the government is left oriented, 2 if the government is centre oriented, and 1 if it is right oriented as reported by Cruz et al. (2018)
GDPg	The real annual growth rate in gross domestic product (GDP) as reported by the International Monetary Fund.
Gov-ind	A composite index of a country's governance effectiveness and quality calculated as the average of the following governance indicators Government Effectiveness, Regulatory Quality and Rule of Law, compiled annually by the World Bank.
Work-women	The ratio of female to male labour force participation rate, calculated by dividing female labour force participation rate by male labour force participation rate and multiplying by 100 (Source: the World Bank).

Figure 1. GBI by country and year
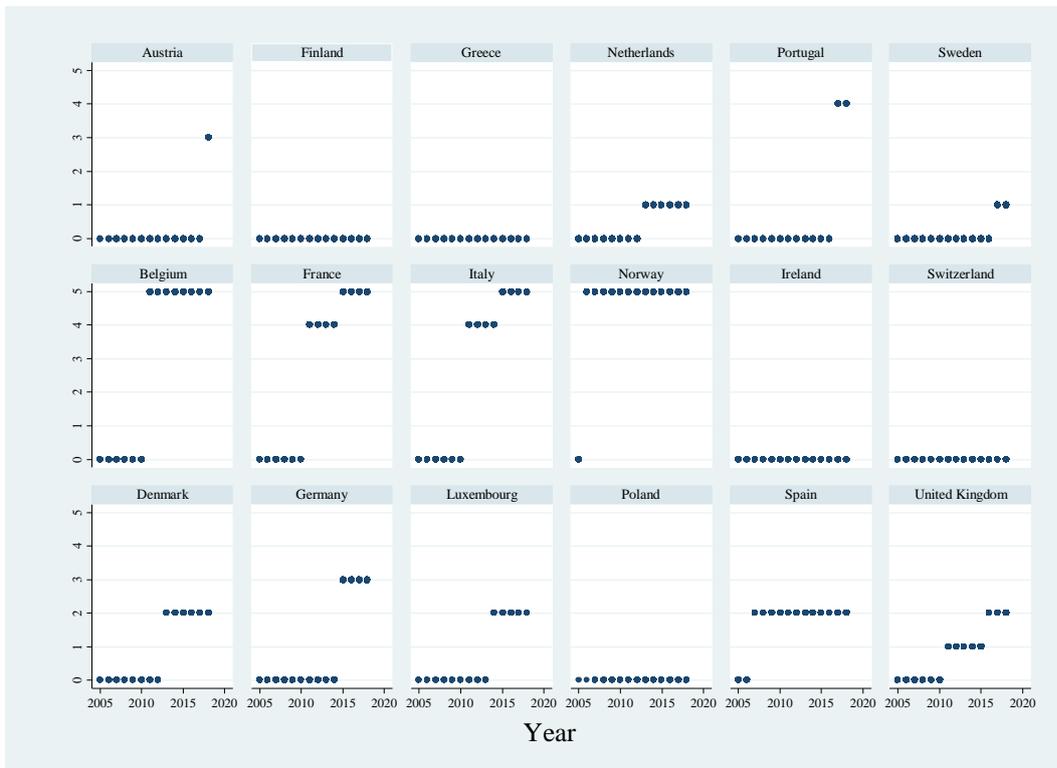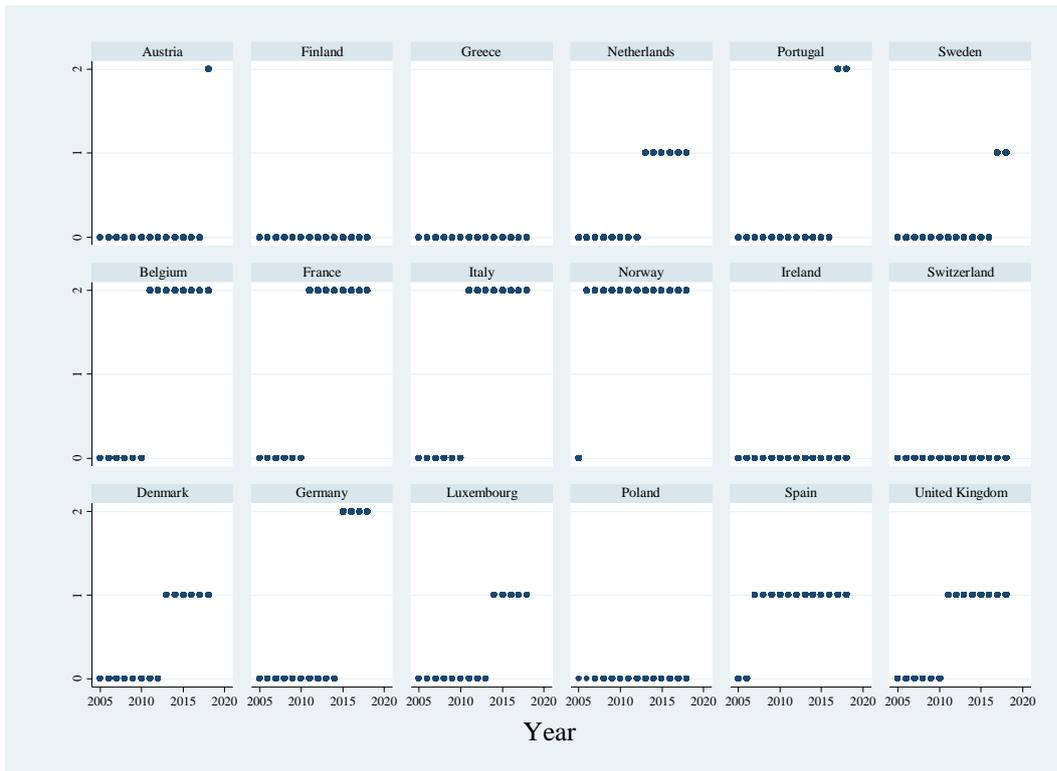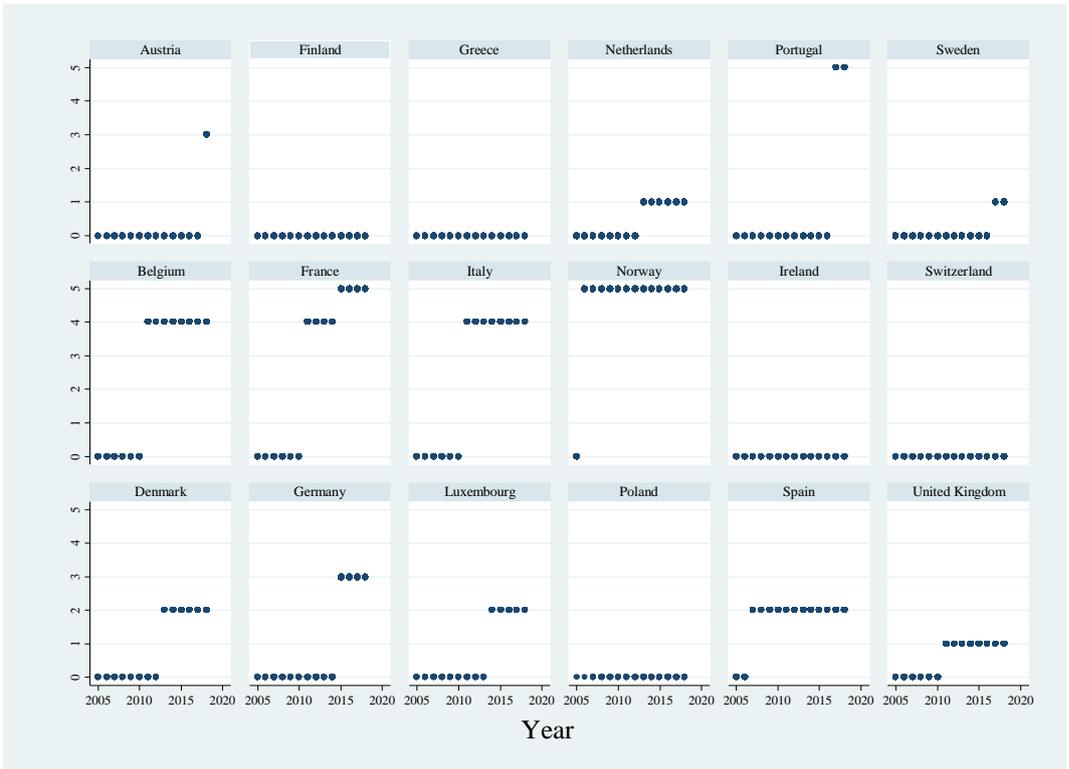
Figure 2. Year changes in WoB ratio

The chart shows the evolution of the ratio of WoB between 2005 and 2018 for all countries in our sample, and separately for countries with hard GBI, soft GBI and no GBI over the sample period.
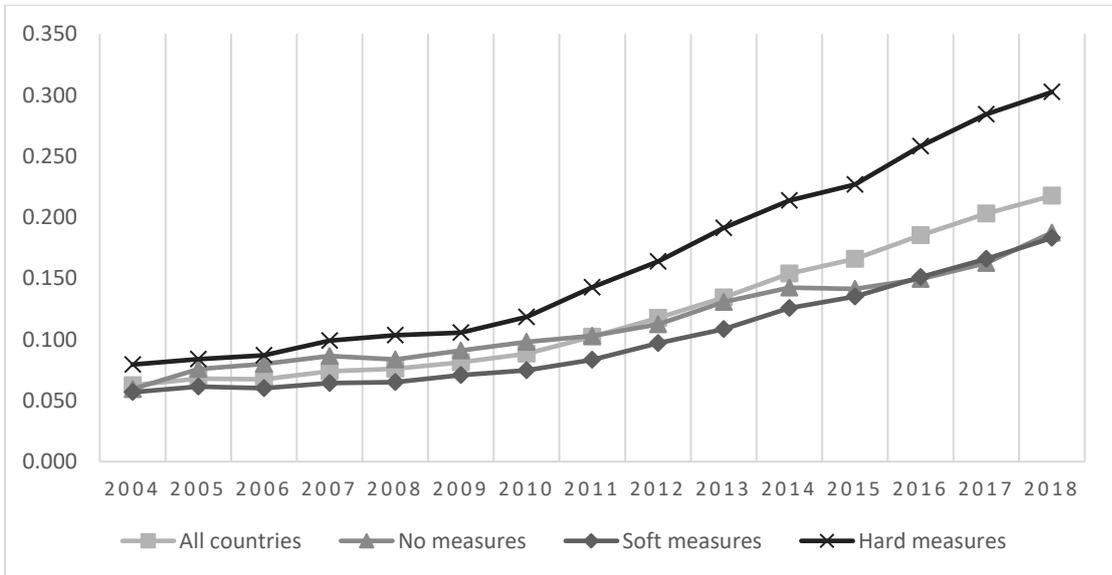
Table 1. Sample description

This table describes our sample of European listed firms for the period from 2005 to 2018 and reports the distribution of observations in our sample across countries and year.

Observations by country		Observations by year	
Austria	271	2005	1,746
Belgium	687	2006	2,056
Denmark	328	2007	2,149
Finland	415	2008	2,107
France	2,755	2009	1,946
Germany	2,011	2010	1,803
Greece	233	2011	1,745
Italy	934	2012	1,800
Luxembourg	198	2013	1,749
Netherlands	864	2014	1,736
Norway	684	2015	1,774
Poland	173	2016	1,968
Portugal	210	2017	1,946
Ireland	490	2018	1,543
Spain	765		
Sweden	1,260		
Switzerland	1,106		
United Kingdom	12,684		
	26,068		26,068

Table 2. GBI indicators

This table provides details on the GBI indicators we use in our analysis. Panel A describes how the indicators are constructed. In any given year, GBI^B takes value 0 if a country has no GBI in place, 1 if a country has soft GBI in place, and 2 if the country has a mandatory GBI in place. We refine this indicator and construct the indicator GBI^H (GBI^{H*}) that can take values from 0 to 5 depending on the "hardness" of the GBI in place in each country the sample in any given year. Panel B reports for each country in the sample the year when the relevant GBI was introduced and its subsequent amendments, and the corresponding value of the three GBI indicators employed in our analysis, GBI^B, GBI^H and GBI^{H*}. Details of the regulation in each country can be found in Appendix 1.

Panel A: definition of GBI indicators

Type of initiative	Target ratio	GBI^B	GBI^H
No GBI	-	0	0
Soft GBI	Tilted[1]	1	1
Soft GBI	Balanced[1]	1	2
Mand. GBI, low enforcement[2]	Tilted/Balanced	2	3
Mand. GBI, strong enforcement[2]	Tilted	2	4
Mand. GBI, strong enforcement	Balanced	2	5

[1] Tilted <33% (40%), balanced >=33% (40%) for GBI^H (GBI^{H*})

[2] Strong enforcement: multiple sanctions (e.g., fines, company dissolution, empty seats). Low enforcement: milder sanctions, such as empty seats

Panel B: GBI indicators by country

Country	GBI year	GBI^B	GBI^H	GBI^{H*}
Austria	2018	2	3	3
Belgium	2011	2	5	4
Denmark	2013	1	2	2
Finland	NA	0	0	0
France	2011; 2015	2	4; 5	4; 5
Germany	2015	2	3	3
Greece	NA	0	0	0
Italy	2011; 2015	2	4; 5	4
Luxembourg	2014	1	2	2
Netherlands	2013	1	1	1
Norway	2005	2	5	5
Poland	NA	0	0	0
Portugal	2017	2	4	4
Ireland	NA	0	0	0
Spain	2007	1	2	2
Sweden	2017	1	1	1
Switzerland	NA	0	0	0
United Kingdom	2011; 2016	1	1; 2	1

Table 3. Descriptive Statistics

This table presents the descriptive statistics of the main variables of our sample which covers 18 European countries between 2005 and 2018. The definition of each variable can be found in Appendix 2.

Variable	Observations	Mean	Median	Std dev.
WoB	26,068	0.123	0.095	0.138
Fem CEO	17,479	0.026	0	0.159
Chairwoman	25,837	0.018	0	0.134
Board size	26,068	8.282	7	3.867
Busyness	26,056	3.886	3.455	1.994
Qualifications	26,068	0.411	0.496	0.451
Independence	26,068	0.422	0.429	0.277
Network	26,068	6.237	6.333	0.996
Experience	26,056	6.094	5.000	4.589
ROA	26,068	0.001	0.027	0.214
Tobin Q	23,403	-0.002	-0.239	1.406
Cash/TA	26,068	0.136	0.077	0.167
D/E	26,068	2.598	1.125	5.275
Log(TA)	26,068	12.938	12.759	2.683
Log(GDPpc)	26,068	10.713	10.679	0.259
Govt Party	26,068	1.999	2.000	0.891
GDPg	26,068	1.318	1.799	2.249
Gov-ind	26,068	91.991	93.542	6.391
Work-women	26,068	80.751	81	4.614

Table 4. GBI and board characteristics

This table reports the coefficient estimates from the OLS regression of board characteristics on the GBI indicators, GBI^H GBI^B GBI^{H*}, and other control variables over the period between 2005 and 2018 described in Eq. (1). The variable of interest is GBI^B in Panel A, and GBI^H and GBI^{H*} in Panel B and Panel C, respectively. All dependent and independent variables are defined in Appendix 2. All specifications include firm and industry-year fixed effects. The t-statistics in parenthesis are computed using firm-year clustered standard errors. *, **, and *** indicate significance at 10, 5, and 1% levels, respectively.

Panel A: The effect of GBI^B on board characteristics

	WoB	Busyness	Qualifications	Experience	Independence	Board size	Network size
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
GBI^B	0.019***	-0.150***	0.009**	-0.051	0.006**	0.044**	0.006
	(13.25)	(-8.64)	(2.53)	(-1.60)	(2.42)	(2.03)	(0.75)
Firm cont.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country cont.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	25,373	25,362	25,374	25,362	25,374	25,374	25,374
Adj. R^2	0.75	0.77	0.81	0.77	0.84	0.93	0.81

Panel B: The effect of GBI^H on board characteristics

	WoB	Busyness	Qualifications	Experience	Independence	Board size	Network size
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
GBI^H	0.014***	-0.090***	0.009***	-0.062***	0.005***	0.022**	0.006*
	(19.09)	(-9.59)	(4.86)	(-3.65)	(3.82)	(1.97)	(1.69)
ROA_{-1}	-0.002	0.125*	0.001	0.209	0.012*	0.157***	-0.009
	(-0.43)	(1.75)	(0.10)	(1.26)	(1.71)	(3.29)	(-0.30)
$Cash/TA_{-1}$	0.006	-0.004	0.009	-0.320	-0.010	0.097	-0.091**
	(1.12)	(-0.04)	(0.45)	(-1.43)	(-1.02)	(1.40)	(2.14)
D/E_{-1}	0.000	0.002	-0.001	0.003	0.000	0.001	0.002
	(0.40)	(0.84)	(-0.95)	(0.54)	(0.69)	(0.36)	(1.19)
$Log(TA)_{-1}$	-0.000	0.019	0.006**	-0.094**	-0.003*	0.020	0.015**
	(-0.32)	(1.25)	(2.13)	(-2.57)	(-1.84)	(1.31)	(2.24)
$Board size_{-1}$	-0.001	-0.019***	0.005***	-0.090***	-0.002***	0.487***	0.010***
	(1.59)	(-3.28)	(4.02)	(-7.04)	(-2.67)	(50.28)	(4.00)
Log(GDPpc)	0.026***	0.299***	-0.027	-1.032***	0.073***	0.617***	-0.034
	(3.21)	(2.64)	(-1.18)	(-4.18)	(4.85)	(5.17)	(-0.67)
GDPg	-0.000	-0.012***	-0.001	0.002	-0.001**	-0.008*	0.002
	(-1.41)	(-2.83)	(-0.63)	(0.16)	(-2.08)	(-1.76)	(0.80)
Govt Party	0.016***	-0.005	0.008***	-0.263***	0.000	0.034***	-0.026***
	(18.52)	(0.46)	(3.81)	(-10.47)	(0.17)	(2.63)	(-5.50)
Constant	-0.193**	0.717	0.551**	19.747***	-0.309*	-2.757**	6.376***
	(-2.21)	(0.59)	(2.26)	(7.37)	(-1.89)	(-2.13)	(11.62)
Observations	25,373	25,362	25,374	25,362	25,374	25,374	25,374
Adj. R^2	0.76	0.77	0.81	0.77	0.84	0.93	0.81

Panel C: The effect of GBI^{H*} on board characteristics

	WoB	Busyness	Qualifications	Experience	Independence	Board size	Network size
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
GBI^{H*}	0.015***	-0.097***	0.010***	-0.080***	0.005***	0.026**	0.003
	(19.43)	(-9.88)	(5.16)	(-4.58)	(3.77)	(2.16)	(0.76)
Firm cont.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country cont.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	25,373	25,362	25,374	25,362	25,374	25,374	25,374
Adj. R^2	0.76	0.77	0.81	0.77	0.84	0.93	0.81

Table 5. GBI and the likelihood of appointing a chairwoman or a female CEO

This table reports results from a probit model of the likelihood of having a chairwoman and/or a female CEO on the GBI indicators, GBI^B, GBI^H and GBI^{H*}, and other control variables over the period between 2005 and 2018 described in Eq. (1). All dependent and independent variables are defined in Appendix 2. All specifications include industry and year fixed effects. The z-statistics in parenthesis are computed using firm-year clustered standard errors. *, **, and *** indicate significance at 10, 5, and 1% levels, respectively.

	Fem CEO	Fem CEO	Fem CEO	Chairwoman	Chairwoman	Chairwoman
	(2)	(1)	(3)	(5)	(4)	(6)
GBI^B	0.078*			0.048		
	(1.70)			(1.27)		
GBI^H		0.040**			0.035**	
		(2.05)			(2.27)	
GBI^{H*}			0.038*			0.036**
			(1.91)			(2.27)
ROA_{-1}	-0.136	-0.139	-0.140	0.223**	0.222**	0.222**
	(-1.36)	(-1.39)	(-1.40)	(1.98)	(1.96)	(1.96)
$Cash/TA_{-1}$	0.420***	0.422***	0.423***	0.083	0.084	0.085
	(3.37)	(3.38)	(3.39)	(0.65)	(0.65)	(0.66)
D/E_{-1}	-0.008	-0.008	-0.008	-0.008	-0.008	-0.008
	(-1.35)	(-1.35)	(-1.35)	(-1.31)	(-1.31)	(-1.31)
$Log(TA)_{-1}$	0.006	0.006	0.006	-0.001	-0.000	0.000
	(0.69)	(0.71)	(0.74)	(0.07)	(0.01)	(0.01)
$Board\ size_{-1}$	-0.015**	-0.016**	-0.016**	-0.025***	-0.026***	-0.026***
	(-2.29)	(-2.40)	(-2.44)	(-4.46)	(-4.64)	(-4.70)
$Log(GDPpc)$	0.391***	0.402***	0.392***	0.096	0.082	0.074
	(3.28)	(3.37)	(3.33)	(1.05)	(0.92)	(0.84)
Govt Party	-0.001	-0.010	-0.013	0.048*	0.038	0.034
	(-0.05)	(-0.34)	(-0.40)	(1.77)	(1.36)	(1.20)
GDPg	0.015	0.015	0.015	0.017	0.020	0.019
	(1.17)	(1.23)	(1.17)	(1.31)	(1.52)	(1.48)
Observations	15,330	15,330	15,330	23,663	23,663	23,663
Pseudo R2	0.09	0.09	0.09	0.07	0.07	0.07

Table 6. GBI and firm performance

This table reports the coefficient estimates from the OLS regression of firm performance on GBI indicators, GBI^B, GBI^{H1} and GBI^H, and other control variables over the period between 2005 and 2018 described in Eq. (1). The dependent variable is ROA in Columns 1 to 3 and Tobin's Q in Columns 4 to 6. The control variable *Performance*$_{-1}$ indicates one year lagged industry-adjusted ROA in Columns 1 to 3 and one year lagged industry-adjusted Tobin's q in Columns 4 to 6. All independent variables are defined in Appendix 2. All specifications include firm and industry-year fixed effects. The t-statistics in parenthesis are computed using robust standard errors clustered by firm and year. *, **, and *** indicate significance at 10, 5, and 1% levels, respectively.

	ROA	ROA	ROA	TobinQ	TobinQ	TobinQ
	(1)	(2)	(3)	(4)	(5)	(6)
GBI^H	-0.000			-0.002		
	(-0.15)			(-0.35)		
GBI^B		0.001			0.014	
		(0.74)			(1.16)	
GBI^{H*}			-0.000			-0.001
			(-0.50)			(-0.11)
Performance	0.107***	0.107***	0.107***	0.401***	0.401***	0.401***
	(5.70)	(5.70)	(5.70)	(19.98)	(19.97)	(19.97)
Cash/TA$_{-1}$	-0.022	-0.022	-0.022	0.311**	0.312**	0.311**
	(-1.04)	(-1.04)	(-1.04)	(2.55)	(2.55)	(2.55)
D/E$_{-1}$	-0.000	-0.000	-0.000	-0.002	-0.002	-0.002
	(0.15)	(-0.14)	(-0.15)	(-0.68)	(-0.68)	(-0.68)
Log(TA)$_{-1}$	-0.003	-0.003	-0.003	-0.007	-0.007	-0.007
	(-1.10)	(-1.11)	(-1.10)	(-0.49)	(-0.50)	(-0.49)
Board size$_{-1}$	-0.002***	-0.002***	-0.002***	-0.007*	-0.007*	-0.007*
	(-2.85)	(-2.85)	(-2.85)	(-1.78)	(-1.78)	(-1.78)
Log(GDPpc)	-0.013	-0.013	-0.013	-0.272***	-0.268***	-0.270***
	(-0.83)	(-0.82)	(-0.83)	(-3.18)	(-3.16)	(-3.18)
Gov Party	0.000	-0.000	0.000	-0.011	-0.014*	-0.012
	(0.13)	(-0.03)	(0.24)	(-1.38)	(-1.80)	(-1.43)
GDPg	0.001	0.001	0.001	0.009***	0.009***	0.009***
	(1.21)	(1.24)	(1.20)	(2.78)	(2.84)	(2.79)
Constant	0.193	0.190	0.192	2.318**	2.278**	2.302**
	(1.14)	(1.13)	(1.14)	(2.48)	(2.45)	(2.47)
Observations	25,365	25,365	25,365	22,607	22,607	22,607
Adj. R2	0.51	0.51	0.51	0.69	0.69	0.69

Table 7. Country controls

This table reports the coefficient estimates from the regression model described in Equation (1) including two additional country controls, *Gov-Ind* and *Work-women*. The dependent variables in Panel A are board-specific characteristics. The dependent variables in Panel B are the dummy variables Fem CEO and Chairwoman and measures of firm performance. All dependent and independent variables are defined in Appendix 2. OLS specifications in Panel A and Panel B include firm and industry-year fixed effects. Probit specifications in Panel B control for industry and year fixed effects. The t-statistics in parenthesis are computed using firm-year clustered standard errors. *, **, and *** indicate significance at 10, 5, and 1% levels, respectively.

Panel A: OLS regressions of board-specific characteristics

	WoB	Board size	Busyness	Qualifications	Independence	Network	Experience
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
GBI^H	0.015***	0.021*	-0.090***	0.009***	0.005***	0.006*	-0.066***
	(19.23)	(1.89)	(-9.52)	(5.12)	(3.92)	(1.68)	(-3.90)
Gov-ind	0.003***	-0.006	0.014**	0.004***	0.003***	-0.004	-0.050***
	(5.25)	(-0.72)	(2.03)	(2.77)	(3.30)	(-1.21)	(3.48)
Work-women	-0.001	-0.023**	0.003	0.011***	-0.002*	0.008**	-0.068***
	(-1.06)	(-2.08)	(0.37)	(6.78)	(-1.90)	(2.16)	(3.93)
Constant	-0.199*	-0.534	0.070	-0.551*	-0.193	5.790***	27.092***
	(-1.82)	(-0.33)	(0.05)	(-1.79)	(-0.96)	(8.56)	(8.13)
Firm ctr.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country ctr.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	25,373	25,374	25,362	25,374	25,374	25,374	25,362
Adj. R^2	0.76	0.93	0.77	0.81	0.84	0.81	0.77

Panel B: Probit and OLS regressions of *Fem CEO*, *Chairwoman* and firm performance

	Fem CEO	*Chairwoman*	*ROA*	*TobinQ*
	(1)	(2)	(3)	(4)
GBI^H	0.047**	0.002	-0.000	-0.003
	(2.19)	(0.10)	(-0.22)	(-0.52)
Gov-Ind	0.000	-0.028***	-0.000	-0.002
	(0.04)	(-4.17)	(-0.29)	(-0.50)
Work-wom	0.013	0.028***	-0.002**	-0.009*
	(1.38)	(3.47)	(-2.36)	(-1.80)
Constant	-6.408***	-4.46***	0.380*	3.482***
	(-4.45)	(-4.41)	(1.88)	(3.11)
Firm ctr.	Yes	Yes	Yes	Yes
Country ctr.	Yes	Yes	Yes	Yes
Observation	15,330	23,663	25,365	22,607
Ps. (Adj.) R^2	0.09	0.07	0.51	0.70

Table 8. Country specific trends

This table reports coefficient estimates from the regression model described in Equation (1) including country specific time trends. The independent variable of interest in all specifications is GBI^H. The dependent variables in Panel A are board-specific characteristics. The dependent variables in Panel B are the dummy variables *Fem CEO* and *Chairwoman* and measures of firm performance. All dependent and independent variables are defined in Appendix 2. OLS specifications in Panel A and Panel B include firm and industry-year fixed effects. Probit specifications in Panel B control for industry and year fixed effects. All specifications include year-industry fixed effects. The t-statistics in parenthesis are computed using robust standard errors clustered by firm and year. *, **, and *** indicate significance at 10, 5, and 1% levels, respectively.

Panel A: OLS regressions of board-specific characteristics

	WoB	Busyness	Qualifications	Experience	Independence	Board size	Network size
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
GBI^H	0. 012***	-0.067***	0.004**	0.008	0.005***	0.009	0.014***
	(14.66)	(-6.89)	(2.17)	(0.49)	(3.92)	(0.80)	(3.42)
Constant	-0.049	-0.680	0.829***	0.009***	-0.330*	-2.002	5.913***
	(-0.55)	(-0.55)	(3.42)	(5.84)	(-1.95)	(-1.53)	(10.78)
Firm ctr.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country ctr.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
C-trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.76	0.77	0.84	0.77	0.84	0.93	0.81
Observations	25,373	25,362	25,374	25,362	25,374	25,374	25,374

Panel B: Probit and OLS regressions of *Fem CEO*, *Chairwoman* and firm performance

	Fem CEO	Chairwoman	ROA	TobinQ
	(1)	(2)	(3)	(4)
GBI^H	0.071**	0.067***	0.001	-0.002
	(2.92)	(3.48)	(1.19)	(-0.22)
Constant	-6.850***	-3.004***	0.112	2.571**
	(-5.09)	(-3.11)	(0.66)	(2.74)
Firm ctr.	Yes	Yes	Yes	Yes
Country ctr.	Yes	Yes	Yes	Yes
C-trends	Yes	Yes	Yes	Yes
Ps. (Adj.) R^2	0.09	0.07	0.51	0.69
Observations	15,330	23,663	25,365	22,607

Table 9. Placebo test and dynamic analysis

This table shows the results of the tests used to formally assess the parallel trend assumption of our identification strategy. Panel A reports results from a placebo test that sets 2007 as the pseudo GBI adoption year. The regression specification described in Equation (1) is performed on a subsample of firm-year observations from 2005 to 2009 that excludes countries that already had a GBI in place by 2007 (namely, Norway and Spain). The independent variable $GBI_{Placebo}$ is set equal to zero for all observations before 2007, and equal to the main treatment indicator GBI^H thereafter. Panel B shows estimates from the model described in Equation 1 of board characteristics and CEO gender on the two and one-year lagged GBI dummies (GBI_{-2}, GBI_{-1}), the contemporaneous GBI dummy (GBI_0), and the one and two-year forward GBI dummies (GBI_{+1} and GBI_{+2}). All dependent and independent variables are defined in Appendix 2. OLS specifications in columns 1 to 5 of Panel A and Panel B include firm and industry-year fixed effects. The probit specifications in column 6 of Panel A and Panel B controls for industry and year fixed effects. The t-statistics in parenthesis are computed using robust firm-year clustered standard errors. *, **, and *** indicate significance at 10, 5, and 1% levels, respectively.

Panel A: Placebo test

	WoB	Busyness	Qualifications	Experience	Independence	Fem CEO
	(1)	(2)	(3)	(4)	(5)	(5)
$GBI_{Placebo}$	0.001	-0.041	-0.003	-0.023	-0.005	-0.041
	(0.80)	(-1.93)	(-0.89)	(-0.66)	(1.48)	(-1.18)
Firm ctr.	Yes	Yes	Yes	Yes	Yes	Yes
Country ctr	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8,783	8,776	8,783	8,783	8,783	4,805
Adj. (Ps.) R^2	0.82	0.86	0.89	0.86	0.90	0.11

Panel B: Dynamic analysis

	WoB	Busyness	Qualifications	Experience	Independence	Fem CEO
	(1)	(2)	(3)	(4)	(5)	(5)
GBI_{-2}	-0.000	-0.008	0.013	-0.033	0.001	0.160
	(-0.18)	(-0.22)	(1.61)	(-0.40)	(0.19)	(1.21)
GBI_{-1}	-0.004	-0.055	0.009	0.003	0.001	0.015
	(-1.17)	(-1.34)	(1.02)	(0.03)	(0.23)	(0.13)
GBI_0	0.001	-0.123***	0.008	0.074	0.004	0.220
	(0.28)	(-2.63)	(0.74)	(0.74)	(0.59)	(1.47)
GBI_{+1}	0.015***	-0.203***	0.020*	-0.105	0.007	0.156
	(3.63)	(-4.07)	(1.77)	(-1.01)	(1.00)	(1.13)
GBI_{+2}	0.030***	-0.344	0.028**	-0.146	0.009	0.255**
	(6.76)	(-6.12)***	(2.34)	(-1.28)	(1.14)	(2.07)
Firm ctr.	Yes	Yes	Yes	Yes	Yes	Yes
Country ctr	Yes	Yes	Yes	Yes	Yes	Yes
Observations	17,676	17,668	17,676	17,668	17,676	10,745
Adj. (Ps.) R^2	0.74	0.77	0.82	0.78	0.86	0.09

Table 10. Regressions on the matched sample

This table reports coefficient estimates from the regression model described in Equation (1) on a matched sample of firms subject to, and not subject to, GBIs (*Treatment*). Panel A reports the propensity score matching estimates from the probit model of the probability of being treated as a function of firm-level characteristics (ROA_{-1}, $Cash/TA_{-1}$, D/E_{-1}, $Log(TA)_{-1}$, $Board\ size_{-1}$). In panel B and Panel C we report results from our main regression models run on this set of matched firms. The independent variable of interest in all specifications is GBI^H in panel B and Panel C. The dependent variables in Panel B are board-specific characteristics. The dependent variables in Panel C are the dummy variables *Fem CEO* and *Chairwoman* and measures of firm performance. All dependent and independent variables are defined in Appendix 2. OLS specifications in Panel B and Panel C include firm and industry-year fixed effects. Probit specifications in Panel B control for industry and year fixed effects. All specifications include year-industry fixed effects. The t-statistics in parenthesis are computed using robust firm-year clustered standard errors. *, **, and *** indicate significance at 10, 5, and 1% levels, respectively.

Panel A: Propensity score matching estimates

	Treatment		Treated sample Mean	Control sample Mean (U)	Control sample Mean (M)	t-stat (M)
	Unmatched (U)	Matched (M)				
	(1)	(2)	(3)	(4)	(5)	(6)
ROA_{-1}	-0.162***	-0.015	-0.001	0.011	-0.006	-0.03
	(-3.82)	(-0.32)				
$TobinQ_{-1}$	-0.005	-0.004	0.007	0.012	0.022	-0.71
	(-0.89)	(-0.62)				
$Cash/TA_{-1}$	-0.005	-0.008	0.136	0.130	0.136	0.01
	(-0.09)	(-0.13)				
D/E_{-1}	-0.008***	0.001	2.341	2.848	2.291	0.72
	(-4.66)	(0.56)				
$Log(TA)_{-1}$	0.017***	0.001	13.009	12.936	12.984	0.64
	(5.40)	(0.36)				
$Board\ size_{-1}$	-0.019***	0.002	8.159	8.750	8.147	-0.21
	(-8.81)	(0.69)				
Constant	-0.385***	0.024				
	(-8.93)	(0.48)				
Pseudo R^2	0.005	0.000				
Observations	18,260	18,260				

Panel B: OLS regressions of board-specific characteristics

	WoB	Busyness	Qualifications	Experience	Independence	Board size	Network size
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
GBI^H	0.015***	-0.091***	0.011***	-0.052**	0.006***	0.010	0.006
	(14.12)	(-6.95)	(4.30)	(-2.18)	(3.13)	(0.65)	(1.20)
Firm ctr.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country ctr.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
C-trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.77	0.77	0.82	0.77	0.84	0.93	0.82
Observations	16,373	16,371	16,373	16,371	16,373	16,373	16,373

Panel C: Probit and OLS regressions of *Fem CEO*, *Chairwoman* and firm performance

	Fem CEO	Chairwoman	ROA	TobinQ
	(1)	(2)	(3)	(4)
GBI^H	0.055**	0.047***	-0.000	0.004
	(2.20)	(2.69)	(-0.01)	(0.51)
Firm ctr.	Yes	Yes	Yes	Yes
Country ctr.	Yes	Yes	Yes	Yes
Ps. (Adj.) R^2	0.10	0.08	0.53	0.69
Observations	9,580	15,591	16,366	16,259