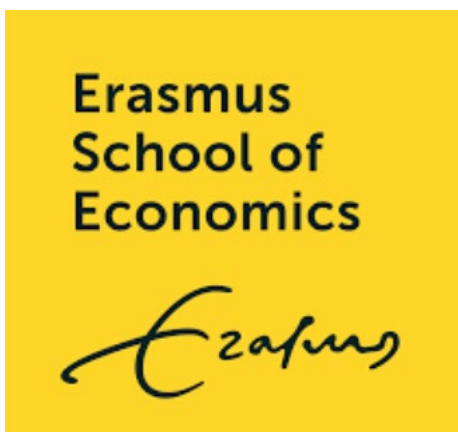


# **Market reaction to mandatory board gender diversity in the European Union**

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## Abstract

This research examines the equity market reaction to events associated with the passage of a directive mandating gender board diversity in the European Union (EU). Three predictions are made, namely (i) there is an average negative market reaction to events increasing the likelihood of mandated board gender diversity (ii) this effect is more negative for firms with a lower percentage of female board members before the events (iii) this effect is more negative for firms in countries that do not have any form of pre-regulation regarding board gender diversity. The results show an insignificant positive market reaction around events increasing the likelihood of mandated board gender diversity, a less positive or negative effect for firms with a lower percentage of female board members when compared to firms with a higher percentage and a less positive or negative effect for firms in countries that have no pre-regulation in place when compared to firms in countries that do. Overall, the conclusion is that the equity market perceives that this directive mandating board gender diversity does not lead to net benefits (costs) for firms.

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## 1. Introduction

Diversity, inclusion and equality are important and still growing topics in modern society. Especially in western societies there is a growing attention and call for awareness and acceptance of diversity in terms of gender, ethnicity and nationality. As a result of this, the role of women and gender diversity in board positions and in corporate governance is receiving increased attention (Martinez-Jimenez, Hernández-Ortiz & Fernández, 2020). Research by Baker et al. (2020) revealed that in 2019 90% more research publications were made about board diversity than were made in 2010. This shows not only the growing attention within modern society, but also that board gender diversity is a growing topic within research. Reflecting the attention in society and research, the European Union also started a debate on gender diversity with a proposal for mandatory quota of women on the board of directors of listed firms in 2012 (Proposal 2012/0299). Back then the proposal was blocked by the European Council (Press Corner, n.d.). Some countries were against regulation in general and were preferring voluntary measures. Other countries thought that this regulation should be based on a national level. Over ten years later at the end of 2022, the European Parliament passed the final directive (Directive 2022/2381). This study researches the reaction of the equity market to events associated with the passage of this directive. The directive requires firms that are affected by it to have at least 40% of their non-executive directors or 33% of their non-executive and executive directors being members of the under-represented gender by June 30, 2026. The research question that is discussed in this study is:

*Is there a stock price reaction to events that increase the likelihood of mandated board gender diversity in the European Union?*

Next to the general question, this research looks for differences in market reaction that could relate to the ratio of female board members of a company and differences between countries that already have a form of mandated board gender quota. One of the contributions of this research is that the study provides first evidence (to current knowledge) of the way equity investors perceive expected costs and benefits to mandatory board gender diversity across the European Union. It also provides first evidence about how this relates to the ratio of female board members of a firm. Lastly it shows how the reaction differs for countries that had mandated board gender diversity quota before the directive. This suggests future research should consider these as distinct constructs. Besides this, most of the preceding research on board gender diversity is about the effects from voluntary board diversity, while with the new directive enforces a more diverse board.

This research is based on three key predictions. The first prediction is that there is an average negative market reaction to the sample events. The substantiation for this is that it is expected that firm costs will increase, that less capable board members will be appointed and an expected decrease of firm value because firms cannot choose a board without restrictions to maximize firm value. Second, there is a cross-sectional prediction that the market reaction to the sample events is less negative for firms having a more diverse board in terms of gender than firms having a less diverse board. It is expected that the costs of the mandatory board gender quota are higher for firms that will need to change their board more due to the quota. Finally, the third prediction is that the market reaction is more negative in countries that prior to the directive had

no form of mandated board gender quota in place in comparison to firms in countries that do have some form of mandated board gender quota. Firms in those countries that do not already need to comply with a quota for their board gender diversity will have higher expected costs of the directive.

To answer the research question and to see if the predictions can be supported with evidence, this research follows the methodology of prior event studies about market-wide regulations (Armstrong et al., 2010; Grewal, Riedl & Serafeim, 2019). The dependent variable is a firm's cumulative abnormal stock return, starting two days prior and ending two days after the sample event dates and aggregated across the three sample events. These events are identified as increasing the likelihood of mandated board gender diversity. The cumulative abnormal returns are used to test whether they significantly differ from zero in the five days around the events. After this, in a linear regression, the effect of the ratio of female board members of a firm is used to test whether the abnormal returns are less negative for firms with an already more diverse board. Lastly, the effect of pre-existing mandated gender quota is tested within a linear regression. For these different test, data from listed firms from 15 countries that belong to the European Union is used.

The results do not provide evidence that the cumulative abnormal returns do significantly differ from zero around the events dates. Despite the fact that the results are not significant, the total cumulative abnormal returns are positive, namely 0.887% (or a gain of €88.7 million). Therefore the prediction that there is a negative stock reaction to events increasing the likelihood of mandated board gender diversity cannot be supported. There is weak evidence found to support the prediction that a more diverse board pre-directive has a significant effect on the cumulative abnormal returns of a firm. The results reveal that firms with a higher ratio of female board members show more positive or less negative abnormal results during the event windows. Lastly, there seems to be a negative effect on the cumulative abnormal returns when a country did not have some form of pre-existing mandated board gender quota as opposed to countries that do.

Since the regulation is only due in 2026, this research is unable to study how consumers and other stakeholders respond to the directive. However, by studying the reaction from the stock market it allows insights in stockholders expectations about future costs (and benefits) associated with the directive. Opposed to this fact, this study does not take the potential social welfare of the directive into account (only for the part that may be reflected in the stock price), which is for a large part the justification for the directive. This research is structured following Grewal et al. (2019). Section 2 explains the theoretical background and provides the hypothesis development. Section 3 shows the research design and describes the event and sample selection. Section 5 presents the results of the research. Lastly, section 6 concludes.

## 2. Background and hypothesis development

### 2.1 Economic implications of board gender diversity

The board of directors has a crucial role in a company. They are important in providing advice and monitoring management decisions. The board also helps ensure that the interests of

shareholders and managers are closely aligned and helps to discipline or can decide to remove management teams (Wellalage & Locke, 2013). This power can influence the company's policy and in which direction the company will go and therefore can also influence certain firm outcomes. These decisions are important to shareholders because shareholders are left with the effects from management's risky decisions on investment value.

Prior research revealed that a more or less diverse board of directors in terms of gender can create different firm related outcomes (e.g. Brahma, Nwafor & Boateng, 2021; Chen, Gramlich & Houser, 2019; Davis & García-Cestona, 2021; Lenard et al., 2014). It is important to distinguish studies in a setting with a regulated mandatory quota and studies in a voluntary setting. The results from studies with firms that voluntarily have a diverse board may differ from research where a certain quota is forced upon the firms (e.g. by law). Research by Davis and García-Cestona (2021) showed that firms with a greater presence of female board members are less likely to restate their financial statements. They find a more diverse board in terms of gender increases the information value of financial reports. Subsequent to this, Chen, Eshleman and Soileau (2016) found that firms with a higher proportion of women on the board of directors are less likely to report having weak internal controls. This could also indicate higher financial reporting quality. Thus having more women on the board of directors seems to have a positive effect on the financial reporting quality of a firm. This is an example of how board gender diversity can influence firm outcomes. Another outcome where there is a positive link found between board gender diversity and the outcome is financial performance (Brahma et al., 2021). This research also showed that the positive effect on financial performance appears unambiguously and significant when there are three or more female board member compared to a lower number. This could advocate for a higher proportion of women within boards. Reguera-Alvarado, De Fuentes and Laffarga (2017) presented a similar conclusion. Their findings revealed a positive relationship between board gender diversity and having a positive economic result. They argue that the results suggest having more women in board positions increases firm performance, because gender-diverse boards ensure new ideas and different skills and views within the board. Board gender diversity can also have a positive effect on the risks taken by a firm, as found by Chen et al. (2019). The evidence they found indicates that board gender diversity seems to be effective at stimulating managers to take financing risk that could increase firm value, while at the same time it discourages the same managers in accepting reputation risks that could decrease firm value. The findings suggest that board gender diversity ensures more risk awareness within the board when compared to a board that consists of all male members. This fact creates a situation where a firm's risk exposure is closer to risk-neutral shareholders and their preferences, because it enables needed financial risk exposure while simultaneously decreasing reputation risk exposure. Other than the firm outcomes mentioned above, research by Gul, Srinidhi and Ng (2011) showed that there is a positive association between board gender diversity and stock price informativeness. The suggested explanation for this link is that gender diversity within the board increases voluntary public disclosures in large firms. The several firm outcomes that are suggestively influenced by a more diverse board of directors found in prior research show that not only the reputation of a firm is affected, but also important firm outcomes that can result in different market reactions. Some reasons for these positive effects could be that more women on the board of directors improves overall meeting

attendance rates, discussions within the board consist of a broader range of alternatives and are less political and the monitoring of managers is stronger (Adams & Ferreira, 2009; Chen et al., 2019). Regarding market reactions, Lenard et al. (2014) found that a bigger proportion of women on the board is linked with lower variability of stock market return. However, some research also shows negative effects from a more diverse board. Board gender diversity could lead to more conflicts within the board and this results in slower decision-making (Del Carmen Triana, Miller, & Trzebiatowski, 2014). The evidence also revealed that a more diverse board could lead to less strategic change when change is needed.

All the studies mentioned above researched situations without a mandatory gender diversity quota for the board of directors required by law and thus without penalties for non-compliance. This ensures that the director appointments in these researches are the result of firm choice rather than legal obligation. Based on these studies, it can be stated that firms overall profit from a more diverse board in terms of gender in a voluntary setting. Reguera-Alvarado et al. (2017), who researched the effect of the mandatory gender quota in Spain, argue that firms benefit more from a gender diverse board not by external coercive measures, like a mandatory gender quota, but if it comes from within companies. This would mean that the effect could differ if the change is forced upon the firms by law. Assuming that firms are choosing their board to maximize firm value, imposing binding quota or other constraints on these choices will lead to a decline in firm value (Demsetz & Lehn, 1985). Appointing a diverse board voluntarily will probably lead to appointment of experienced female directors, rather than finding women to fill gaps to meet the requirements of legislative quota (Brahma et al., 2021). Norway was the first European country to introduce a law mandating a minimum of 40% representation of each gender on the board of directors of firms. Lara, Penalva and Scapin (2021) researched the effect of the Norwegian quota on the financial reporting quality of the affected firms. The Norwegian setting is good to analyze whether financial reporting quality is affected by forced changes in board composition. Their hypothesis was that the fast and forceful implementation of the law led to the fact that companies selected board members that were less capable of monitoring managerial financial reporting decisions. The evidence they found shows that financial reporting quality decreased in firms that needed to change their board more significantly because of the law, meaning the firms that had a less diverse board before the mandatory quota was implemented saw their financial reporting quality decrease. However, their results also suggest that the decrease in financial reporting quality is only a short-time effect of the quota. Ahern and Dittmar (2012) also researched the Norwegian gender quota. Their results show a large negative impact on firm value of the mandated board changes. They also found evidence that the quota led to a change of multiple characteristics of boards. The newly appointed female board directors were younger and had significantly less CEO experience than the male directors that already were on the board. The quota led firms to grow in size but also realize worse accounting returns while making more acquisitions. These results implicate that the quota led the board of directors to be less effective in monitoring and advising. There is also some evidence that in firms with strong governance mandated gender quotas for board members could decrease shareholder value (Adams & Ferreira, 2009). A possible explanation for this evidence could be that more gender diversity could lead to overmonitoring in firms with strong governance. Their research also states that there is no evidence that suggests

that mandated gender quota would improve average firm performance. The foundation for a mandated gender quota should be motivated by other reasons than improvements in firm performance.

## 2.2 European Union regulations

Due to the growing attention and demand for gender equality on the workplace, some countries made laws about mandatory quota for diversity within the board of directors of firms. As stated before, Norway was the first European country to introduce a law mandating a minimum of 40% representation of each gender on the board of directors of firms. France and Italy are currently the only countries within the European Union that mandate 40% of gender diversity in firms' boards with also penalties for non-compliance in place. Other EU countries may have implemented a law regarding board gender diversity, but they implemented a soft law with no penalties for non-compliance (e.g. Spain), a law with a comply or explain consequence (e.g. the Netherlands) or the mandated quota is less than 40% (e.g. Portugal). Many countries did not implement a similar law but made recommendations in their Corporate Governance Code and other countries did neither. An overview of the EU countries and their (non)mandatory quota can be found in Appendix A.

In 2021 only 30.6% of board members in the largest listed companies in the EU were women (Institut Jacques Delors, 2022). This also differs significantly between member states. For example in France 45.3% of board members were women, but in Cyprus this number was only 8.5%. The EU countries all together are not expected to achieve 40% of women on boards even by 2040 (Proposal 2012/0299). This shows that firms in some countries will not (yet) implement this change just because of intrinsic motivation. There might be less awareness of gender equality within these countries. To change the situation in those countries more rapidly, mandatory change might be needed. In 2020, in European countries with mandatory quotas in place, 37.6% of the board members were women within listed firms (Del Carmen Valls Martínez & Román, 2022). Countries that had either soft measures or no measures in place only had female representation of 24.3%. This shows the effectiveness of mandatory quota in terms of gender diversity. The underrepresentation of women on corporate boards is often rooted in a lack of transparency in board appointment processes, classical gender stereotypes in recruitment and a male-dominated business culture (Proposal 2012/0299). Altogether these elements are often referred to as a 'glass ceiling'. Throughout the EU, this leads to not optimally functioning labor markets for top management positions. The difference or even absence of regulation at a national level does not only lead to differences in the percentage of women among the board of directors, but also leads to different corporate governance requirements on European listed firms (Proposal 2012/0299). This effect then translates into inconsistent legal obligations, confusion and higher costs for companies. The discrepancies in requirements for the composition of the board can lead to complications for listed firms that operate across borders.

At the end of 2022, the European Parliament passed a directive about mandatory board gender diversity (Directive 2022/2381). It states that companies listed in any regulated EU market, with exception of certain small companies, must ensure that members of the underrepresented sex, currently women, must hold at least 40% of non-executive director positions or at least 33.3% of non-executive and executive positions in total by June 30, 2026. Which one will be



implemented is up to the individual member states. It also states that member states must implement a penalty system for companies that fail to meet these new standards by June 30, 2026. The process of the ultimate directive started over ten years before the directive was officially implemented. The first proposal was handed in in November 2012. The European Parliament already adopted its position in 2013, but the Council could not reach an agreement with some member states. Some member states disagreed that mandatory measures at the EU level would be the best way forward.

### 2.3 Hypothesis development

The regulation of gender diversity within the board of directors can have a number of effects on the stock prices of the affected firms. The first hypothesis is about the average effect of mandating board gender diversity on the stock price of the affected firms. The second hypothesis is about the cross-sectional effect on certain firm characteristics of which it can be substantiated that they will lead to observable variation in the market reaction. The third and last hypothesis is about the effect of existing gender quotas in some countries.

For the first hypothesis about the average effect, it can be argued that there are both positive and negative effects expected from the point of view of an investor. As mentioned before, gender diversity within the board of directors can lead to several positive effects for the firm such as positive economic results, higher financial reporting quality and lower variability of stock market return. However, many firms will need to change their board significantly in order to meet the mandatory quota. If they do not meet the quota in time, there will possibly be financial penalties for the firm. Besides this, previous research shows that to meet the deadline of the quota, board members can be chosen that are less capable of monitoring managerial financial reporting decisions (Lara et al., 2021; Ahern & Dittmar, 2012). This results in lower financial reporting quality and lower firm value. In addition to this effect, investors can also expect costs associated with the recruitment of new board members, costs for changing the board and costs for the transfer of knowledge between old board members and new members. Besides this, the directive creates possible uncertainty and usually the market reaction to uncertainty is negative. Research by Grewal et al. (2019) shows the market reacts to events that increase the likelihood of mandatory ESG reporting. Their results reveal that there is a negative market reaction around events that increase the likelihood of mandatory ESG reporting, because of the expected costs and uncertainty. As mentioned above, results from the mandated gender diversity quota in Norway showed a decline in firm value (Ahern & Dittmar, 2012). As opposed to Lara et al. (2021), who saw the decline in financial reporting quality as a short-term effect, research by Adams and Funk (2012) suggests that the change of the composition in terms of gender of boards may have long-lasting effects, and some of these effects are negative. Together with this evidence and the expectation that firm costs will increase, that less capable board members will be appointed and the decrease of firm value because firms cannot choose a board without restrictions to maximize firm value, it can be expected that the reaction of the market regarding events that increase the likelihood of regulation of gender diversity within boards will be negative. Therefore the first hypothesis will be:

*H1: There is a negative stock price reaction to events increasing the likelihood of mandated board gender diversity.*

Secondly, the average effect could differ with certain firm characteristics. The expected costs, uncertainty and other effects can vary based on the current percentage of women in the board of directors of a firm. Lara et al. (2021) also report that within the Norwegian sample, the negative effect on the financial reporting quality of the mandated quota was smaller for firms that already had a higher percentage of female board members. It can be expected that stock prices of firms that are less affected by the quota will show a smaller negative market reaction. Therefore the following hypothesis will be tested:

*H2: Stock price reactions to events increasing the likelihood of mandated board gender diversity become more negative as the percentage of female board members decreases.*

Lastly, the stock market reaction could differ between countries that already have regulations in place about board gender diversity and countries that do not. It seems logical to expect stronger effects in countries with less pre-regulation, because the change for those countries and the firms will be bigger and more impactful. This research distinguishes between countries that already have some kind of mandated board gender quota and other countries. The following hypothesis will be tested:

*H3: Stock price reactions to events increasing the likelihood of mandated board gender diversity are more negative in countries without pre-existing diversity requirements when compared to countries that do have some sort of mandated gender quota.*

### 3. Research design

#### 3.1 Dependent variable

In a well-functioning market, a stock price reflects all available information and expectations about the future. Assuming this is true, looking at the stock price of an affected company can show the impact of a certain event on the stock. By analyzing the impact on the abnormal returns for the affected firms it is possible to make statements about the market reaction to events that increase the likelihood of mandated board diversity. The dependent variable is  $CAR_i$ . This represents the cumulative abnormal return for firm  $i$  to events that increase the likelihood of passing or are the actual passing of the directive about mandatory gender diversity in the board of directors of firms in the EU. The data is derived from Wharton Research Data Services' (WRDS) Event Study tool. The Event Study tool uses Market Adjusted Model (MAR) as the risk model. This means that the abnormal return is defined as the difference between stock daily return and the country market return. Since the Event Study tool from WRDS is used, the index to calculate the abnormal returns cannot be changed and may include firms from the sample, which could influence the results. Consistent with the research by Grewal et al. (2019) the return measure accumulated is over days (-2, +2), where day 0 is the day of the actual event. By taking two days prior and two days after the event into account this research captures any leakage prior to the events and also allows the market to confine the effects into the stock prices. By adding up the abnormal returns from the five-day event windows, the cumulative abnormal returns can be calculated. Using test statistics, the prediction that CARs around the event dates are significantly different from zero will be tested.

### 3.2 Cross-sectional analyses

To assess the cross-sectional variation in the market responses to the sample events for H2, the following model will be used:

$$CAR_i = \alpha_1 + \beta_1 \times GenderDiversity_i + \beta_2 \times SIZE_i + Country\ Fixed\ Effects + Industry\ Fixed\ Effects + \varepsilon_i. (Model\ 1)$$

The dependent variable is  $CAR_i$  as defined above. This represents the cumulative abnormal return for firm  $i$  to the three identified events that affect the passage of the EU directive about mandated board gender diversity. The experimental variable  $GenderDiversity_i$  is added, as it represents the ratio of women on the board of directors of firm  $i$ . This variable is relevant because it shows the diversity of the board at the time of the event. Firms that already have a diverse board will possibly have a smaller market reaction to the directive than firms with low gender diversity on their board. The regression also includes one firm-level control variable:  $SIZE_i$ . This variable controls for certain firm characteristics that could lead to variation in the market reaction. An overview of all variables can be found in Appendix B. Finally, the regression includes industry and country-fixed effects to control for average differences in abnormal returns. In the case that H2 cannot be rejected, the effect from the variable  $GenderDiversity_i$  on the dependent variable should be significantly positive.

To assess the cross-sectional variation in the market responses to the sample events for H3 the following model will be used:

$$CAR_i = \alpha_1 + \beta_1 \times GenderDiversity_i + \beta_2 \times SIZE_i + \beta_3 \times No\_Quota_j + Industry\ Fixed\ Effects + \varepsilon_i. (Model\ 2)$$

This model differs from the first one, because when looking at differences between countries the control for country-fixed effects needs to be left out. Also the variable  $No\_Quota_j$  is added. This represents a dummy variable which equals 1 for countries that have no preliminary mandated board gender quota in place and 0 for countries that do have some sort of mandated board gender quota at the time of the events. In the case that H3 cannot be rejected, the effect from the variable  $No\_Quota_j$  on the dependent variable should be significantly negative.

### 3.3 Identification of sample events

In this research, three events are assessed as having a major impact on the likelihood of mandated board gender diversity in the EU. The potential events are identified by examining press releases by the European Commission (EC), European Parliament (EP) and the European Council. This yields fifteen potential events (Appendix C). By evaluating the timing, content, and directional effect on the likelihood of mandated board gender diversity, some events are eliminated. Events that confirm earlier events, events that relate to voluntary board gender diversity and events that are assessed as not significant enough for a relevant effect on the likelihood of mandated board gender diversity are excluded. This process leaves three sample events.

The first event occurred on November 14, 2012. On this date the EC first presented a proposal to the Council for a directive with the purpose of improving the gender balance among non-

executive directors of companies and related measures (Proposal 2012/0299). The fact that some member states, if addressing the issue at all, address different groups of companies and use different legal approaches ensures going in different directions. The goal of the proposal is to evidently increase the percentage of female representation on corporate boards in the EU by setting an objective of a 40% representation of the underrepresented gender among non-executive directors of companies that are listed on stock exchanges. The set objective of 40% only applies to non-executive directors, because in this way it will ensure a fair balance between the necessity of increasing board diversity on the one hand and the need and will to minimize interference with a company's daily management on the other hand. This proposal applies to all listed companies with its statutory seat within the EU, but excludes micro, small and medium sized firms (SMEs). SMEs are defined as firms that have less than 250 employees and have either an annual turnover of up to €50 million or have a balance sheet total smaller than €43 million. This event marks the first clear commitment of mandated board gender diversity within the EU. The second event occurred on June 7, 2022. On this date, the EP and the Council reached political agreement about the directive. The agreement states that by 2026, listed companies should have at least 40% of their non-executive directors or 33% of their non-executive and executive directors being members of the under-represented gender. The third event took place on December 7, 2022. This day marks the adoption of the final text of the legislation and the publishment in the Official Journal of the European Union. This publication ensured that the legislation will come into force on the twentieth day following the publication. Besides the mandated quota mentioned before, the directive includes that member states must implement a penalty system for companies that fail to meet these new standards by June 30, 2026. The directive applies to all listed companies, excluding SMEs as defined above. All three events are assessed as increasing the likelihood of mandatory board gender diversity. In line with the event study done by Grewal et al. (2019), it is important to examine whether news is issued not related to the directive within the event windows that could also influence the market reaction. To determine whether this is the case, this research looks for the event windows on Google, the Economist, Nasdaq, Reuters and Bloomberg. During the event window of the first event, there was much discussion about the so-called "fiscal cliff" in the United States (Lawder, 2012). This event likely negatively affected the returns of U.S. firms during the event window. On the date of the third event, China announced a major loosening of their COVID-19 restriction. This most likely had a positive effect on the Asian market. The assumption is that these events most likely did have a negligible effect on the European Market.

## 4. Empirical results

### 4.1 Descriptive statistics

Table 1, panel A presents the number of unique firms, number of unique firm-events in the sample and the process of the sample selection. The sample is based on 2,808 firms with BoardEx data for 2011 and 2021. These years were based on the fact that the sample events took place during 2012 and 2022. Therefore this study is using the year-end data from 2011 and 2021 for the ratio of females in the board of directors and the firm size data. From these firms, there is Compustat Global data for 2011 and 2021, which will be used for the control variable, for 2,380 firms. This data is also used to check whether the directive will apply for

those firms, but none of the firms comply with the standards for SMEs and are thus not excluded from the directive. For the event study there is data available from 1,701 firms of the BoardEx population. This difference is mostly due to the fact that there is only data availability for 15 of the 27 EU countries. After merging the data and removing the missing values the final sample contains data from 1,515 firms. Table 1, panel B shows the distribution of observations per sample event. The distribution among the three events is relatively similar, with the first event having slightly less observations.

**Table 1**

*Sample selection*

<b>Panel A. Identification of available firms and unique firm-events</b>		
	<b>No. of unique firms</b>	<b>No. of unique firm-events</b>
<b>BoardEx population Europe 2011 &amp; 2021</b>	2,808	-
<b>Available Compustat data of BoardEx pop.</b>	2,380	-
<b>Available Event study data of BoardEx pop.</b>	1,701	3,475
<b>Merged data without missing values</b>	1,515	3,475
	<b>No. of countries</b>	
<b>Possible EU countries</b>	27	
<b>Countries with Event study data available</b>	15	
<b>Panel B. Distribution per sample event</b>		
	<b>No. of observations</b>	
<b>Event 1 (14-11-2012)</b>	954	
First proposal		
<b>Event 2 (07-06-2022)</b>	1,265	
Political agreement Council and EP		
<b>Event 3 (07-12-2022)</b>	1,256	
Published in official journal		
<b>Total no. of observations</b>	3,475	

Note: This table presents the process of the sample selection. In Panel A the number of unique firms in the sample and the number of unique firm-events is shown. Panel B shows the distribution of observations between the sample events.

Table 2, panel A, presents the descriptive statistics of the variables. This table reveals that the average ratio of women on the board of directors is 26% (*GenderDiversity*). It also shows that boards exist in the sample with no female members, but no boards with only female members. The average cumulative abnormal returns around the event dates are 0.003. Table 2, panel B, shows the correlation between the potential regression variables. Since there is a relatively strong correlation between the number of shares and employees of a firm, only one of these variables is used as a control variable in the regressions. The number of employees shows the strongest correlation of the two potential control variables and will therefore be used as the control variable for firm size. The natural logarithm of the number of employees is being used to deal with outliers.

**Table 2***Descriptive statistics and correlation matrix*

<b>Panel A. Descriptive data (N=3,475)</b>				
<b>Variable</b>	<b>Mean</b>	<b>St. Dev.</b>	<b>Min</b>	<b>Max</b>
<i>CAR</i>	0.003	0.05	-0.40	0.57
<i>GenderDiversity</i>	0.26	0.16	0.00	0.80
<i>Assets_Total</i>	63,448.17	721,826.90	0.00	27,553,384
<i>Employees</i>	15.54	39.51	0.001	548.04
<i>Revenue_Total</i>	10,567.52	53,706.60	-4,666.41	1,583,451
<i>Shares</i>	577.48	8,990.39	0.16	513,493.10
<i>Log_shares</i>	4.26	1.77	-1.81	13.15
<i>Log_employees</i>	0.72	2.37	-6.91	6.31
<i>No_Quota</i>	0.28	0.45	0	1

<b>Panel B. Correlation Matrix</b>					
<b>Variable</b>	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>	<b>(5)</b>
<i>(1) CAR</i>	1.00				
<i>(2) GenderDiversity</i>	0.01	1.00			
<i>(3) Log_shares</i>	-0.06	0.19	1.00		
<i>(4) Log_employees</i>	-0.08	0.15	0.48	1.00	
<i>(5) No_Quota</i>	-0.05	0.12	0.06	-0.09	1.00

Note: This table presents the descriptive statistics of the variables in the sample (Panel A) and the correlation matrix (Panel B).

#### 4.2 Univariate analyses

The first step is to examine the overall market reaction to the three sample events to assess whether investors perceive a mandatory gender diversity quota for the board of directors as net costly. Table 3 presents the cumulative abnormal returns across all sample firms and all three events. Panel A shows the overall t-test and reveals that the average CAR does not significantly differ from zero. This implies that there is a lack of evidence that events increasing the likelihood of mandated board gender diversity ensure a significant abnormal market reaction. Table 3, Panel A also presents a t-test per sample event. Notable from these results is the fact that the cumulative abnormal returns around the first event are significantly negative on a 0.1 significance level, while the cumulative abnormal returns around the second event are significantly positive on a 0.01 significance level. Despite the fact that the overall t-test is insignificant, it can be interesting to look at the direction of the CAR during the event windows. Table 3, Panel B, presents the average cumulative abnormal returns per firm per country and the total cumulative abnormal returns per country. There is an average positive market reaction of 0.0003, translating into a gain of €3 million of market value on average per firm. The total cumulative abnormal returns for the sample firms during the sample event is 0.8870, translating into a gain of €88.7 million. This implies a positive market reaction during the event windows. Since this results is insignificant and show the opposite of the prediction, H1 has to be rejected. What should however be noted is the fact that the sample for a large part consists of German and France firms. Both countries show a relatively large positive market reaction around the sample events and both countries do already have a form of mandated board gender quota in place. This could influence the results.

**Table 3***Results CAR around sample events*

<b>Panel A. Results two-sided t-test per event, CAR = 0</b>						
Event nr.	Event-date	Mean CAR per firm	t-statistic	df	p-value	Total CAR
1	14-11-2012	-0.003	-1.8612	953	0.06302 *	-3.090
2	07-06-2022	0.005	3.5254	1,264	0.000438 ***	6.276
3	07-12-2022	-0.002	-1.2899	1,255	0.1973	-2.300
Overall	-	0.0003	0.2934	3,475	0.7693	0.887

<b>Panel B. Market reactions around regulation-related events per country</b>			
Country	Obs	Mean CAR per firm- event	Total CAR per country
Austria	89	-0.0039	-0.3456
Belgium	168	-0.0049	-0.8275
Denmark	148	-0.0191	-2.8304
Finland	272	-0.0035	-0.9721
France	698	0.0061	4.2395
Germany	757	0.0031	2.3229
Greece	61	0.0141	0.8615
Hungary	6	0.0159	0.0952
Ireland	58	0.0176	1.0189
Italy	218	-0.0036	-0.7919
Netherlands	149	-0.0083	-1.2404
Poland	57	-0.00001	-0.0001
Portugal	72	0.0008	0.0559
Spain	238	-0.0039	-0.9341
Sweden	484	0.0006	0.2695
<b>Total</b>	<b>3,475</b>	<b>0.0003</b>	<b>0.8870</b>

Note: This table shows the cumulative abnormal returns during the event windows per event and overall (Panel A). Panel B presents the cumulative abnormal returns around all three events per country. The results are divided in the mean cumulative abnormal returns during the event windows per firm-event and the total cumulative abnormal returns per country during the event windows.

#### 4.3 Cross-sectional analyses

Table 4 presents the cross-sectional results for discussing H2 and H3. The results from Model 1 show that, on average, a one-unit increase of the *GenderDiversity*-ratio is associated with a 0.010 increase in the cumulative abnormal returns. This implies that a higher ratio of women on the board of directors is associated with more positive or less negative abnormal returns and thus with a more positive or less negative stock market reaction to the events. However, this coefficient is not statistically significant. The results from Model 2 however reveal that, on average, a one-unit increase of the *GenderDiversity*-ratio is associated with a 0.012 increase in the cumulative abnormal returns and this result is significant on a 0.05 significance level. The difference could result from leaving out the country-fixed effect from Model 2 or from adding the *No\_Quota*-variable in Model 2. Since the presence/absence of mandated board gender quota will most likely influence the average board gender diversity, the variable *No-Quota* could be an important control variable. Model 1 does not provide evidence for a significant relationship between the ratio of females on the board of directors and cumulative abnormal returns of a firm, but Model 2 does find significant evidence for this relationship. The p-value from *GenderDiversity* in Model 1 is 0.112, this implies the coefficient is only marginally

insignificant. Based on these results combined, there is weak evidence to support the assumption of a relationship between the ratio of female board members and the cumulative abnormal returns during the event windows. Thus, H2 cannot be rejected.

**Table 4**

*Results different regression models.*

	Model 1	Model 2
<b>Variables</b>	<b>CAR</b>	<b>CAR</b>
<b>GenderDiversity</b>	0.010 (0.006)	0.012 ** (0.006)
<b>Log_employees</b>	-0.002 *** (0.001)	-0.002 *** (0.001)
<b>No_Quota</b>	-	-0.007 *** (0.002)
<b>Observations</b>	3,475	3,475
<b>R2</b>	0.040	0.029
<b>Adjusted R2</b>	0.023	0.016
<b>Industry-fixed effects</b>	YES	YES
<b>Country-fixed effects</b>	YES	NO

Note: This table shows the results of the OLS regression from Model 1 and Model 2. \*p<0.1; \*\*p<0.05; \*\*\*p<0.01.

As previously stated, some countries already have laws that comply with the EU directive. Besides the fact that some countries already have complying laws, other countries have some form of mandated gender quota for the board of directors of listed firms in place, while other countries have nothing similar to this. Model 3 shows the effect of having a form of mandated quota on the CARs as opposed to having no rules for board gender diversity. The results imply that, on average, the absence of some form of mandated gender quota (*No\_Quota* = 1) is associated with an decrease of 0.007 in the cumulative abnormal returns compared to the presence of gender quota for the board of directors (*No\_Quota* = 0). This coefficient is statistically significant on a 0.01 significance level. This means that there is a potential negative relationship between the absence of mandated gender quota for the board of directors and cumulative abnormal returns during the event windows. The results implicate that the market reaction to the events increasing the likelihood of mandated board gender diversity is more negative or less positive in countries that do not have some form of mandated gender diversity quota for the board of directors as opposed to countries that have mandated quota for this cause. Combining these results to the results in Table 3 means that the average positive market reaction to the sample events is less positive or even negative for firms in countries without pre-existing regulation. Based on this information, H3 will not be rejected.

## 5. Conclusion

This research examines market perceptions of mandated board gender diversity within the EU. Specifically, it examines the market reaction to three events associated with increasing the likelihood of regulating mandated board gender diversity. This regulation, ensured by an EU directive, would affect all listed firms in the European Union, with exception of SMEs. In order to isolate the reaction of the market attributable to mandated board gender diversity and to remove market changes attributable to other factors, the cumulative abnormal returns are used. The prediction is that there is an average negative market reaction to the events increasing the



likelihood of mandated board gender diversity. This is motivated by the expectation that firm costs will increase, that less capable board members will be appointed and an expected decrease of firm value because firms cannot choose a board without restrictions to maximize firm value. Another prediction is that the negative effect will be less negative for firms that already have a more diverse board in terms of gender. To analyze this, the ratio of female board members of each firm is used. The last prediction is that the expected negative market reaction will be less negative in countries that already have some form of mandatory board gender quota in place.

The empirical results confirm some of the expectations. The findings show a positive market reaction of 0.887% of market value (or €88.7 million) across the sample events. However these results are not statistically significant. This suggests that equity investors do not expect mandated board gender diversity to have real cashflow and/or cost of capital implications for affected companies. The results weakly suggest there is a significant difference in market reaction when a firm already has a more diverse board. This means that the prediction of a less negative market reaction for firms that have a higher ratio of female board members cannot be rejected. The last prediction can be supported by the found evidence. The market reaction in countries that do not have some form of mandated board gender quota in place seems to be less positive or more negative than in countries that do have mandatory gender quota. This means the effect of the regulation on the market varies predictably between countries. Since gender diversity is a growing topic in modern society and also in research, the EU may have nonfinancial motivations to regulate board gender diversity. Despite the nonfinancial motives for a more diverse board, little is known about how investors perceive the associated costs and benefits. Researching equity market reactions to key regulatory events that are related to mandated board gender diversity reflects equity holder expectations about the future costs and benefits associated with a more diverse board.

One of the limitations of this research is that there was only available data for 15 of 27 possible EU countries, leaving a relatively big part of the EU out of the research. Especially since none of the 12 countries that are not included in this research have a form of mandatory board gender quota in their law (Appendix A). Based on the findings of this research, including these countries could lead to a (more) negative average market reaction to the sample events. Future research can examine the real effects of the directive. For example changes in certain firm outcomes for firms that already had a diverse board before the regulation came into force, implying that the firm chose this voluntarily, as opposed to firms that were forced to change their board because of the regulation.

Overall, the conclusion is that the equity market perceives that this directive mandating board gender diversity does not lead to net benefits (costs) for firms.

## Appendix A – Gender diversity quota in EU countries

EU country*	Board gender diversity quota	Mandatory	Starting year
<b>Austria</b>	A minimum of 30% representation of both men and women on their boards of directors. This law applies to very little firms.	Penalties for non-compliance	2018
<b>Belgium</b>	At least 33,3% of boards have to be of a different gender than other members of the board.	Penalties for non-compliance	2011
Bulgaria	No law or recommendations for board gender diversity.	-	-
Croatia	No law or recommendations for board gender diversity.	-	-
Cyprus	No law or recommendations for board gender diversity.	-	-
Czech Republic	No law or recommendations for board gender diversity.	-	-
<b>Denmark</b>	No law about quota for board gender diversity, but recommendations in Corporate Governance Code.	-	-
Estonia	No law or recommendations for board gender diversity.	-	-
<b>Finland</b>	No law about quota for board gender diversity, but recommendations in Corporate Governance Code.	-	-
<b>France</b>	A minimum of 40% representation of both men and women on their boards of directors.	Penalties for non-compliance	2011
<b>Germany</b>	A minimum of 30% of women on their boards of directors	“Open seat” sanction	2015
<b>Greece</b>	A minimum of 25% of women on their boards of directors	Penalties for non-compliance	2020
<b>Hungary</b>	No law or recommendations for board gender diversity.	-	-
<b>Ireland</b>	At least 33,3% of boards have to be of a different gender than other members of the board, with future plans for 40%.	Comply or explain	2023
<b>Italy</b>	A minimum of 33,3% (since 2011) representation of both men and women on their boards of directors. This was increased in 2020 to 40%.	Penalties for non-compliance	2020
Latvia	No law about quota for board gender diversity, but recommendations in Corporate Governance Code.	-	-
Lithuania	No law or recommendations for board gender diversity.	-	-

Luxembourg	No law about quota for board gender diversity, but recommendations in Corporate Governance Code.	-	-
Malta	No law or recommendations for board gender diversity.	-	-
<b>The Netherlands</b>	A minimum of 33,3% representation of both men and women on their boards of directors.	Comply or explain/ “open seat sanction”	2023
<b>Poland</b>	No law about quota for board gender diversity, but recommendations in Corporate Governance Code.	-	-
<b>Portugal</b>	A minimum of 33,3% representation of both men and women on their boards of directors.	Penalties for non-compliance	
Romania	No law about quota for board gender diversity, but recommendations in Corporate Governance Code.	-	-
Slovakia	No law or recommendations for board gender diversity.	-	-
Slovenia	No law about quota for board gender diversity, but recommendations in Corporate Governance Code.	-	-
<b>Spain</b>	A minimum of 40% representation of both men and women on their boards of directors.	Soft (no penalties)	2007
<b>Sweden</b>	No law about quota for board gender diversity, but recommendations in Corporate Governance Code.	-	-

\*Note: The countries that are included in this research are in bold.

Source: *Women on Board Policies in Member States and the Effects on Corporate Governance*. (December 2021). Policy Department for Citizens’ Rights and Constitutional Affairs, European Parliament. <https://www.europarl.europa.eu/committees/en/supporting-analyses>

## Appendix B – Variable definitions

Variable	Definition
<b>Dependent variable</b>	
CAR <sub><i>i</i></sub>	The cumulative five-day abnormal return for firm <i>i</i> to the three events identified as affecting the likelihood of passage for the directive mandating gender diversity within the board of directors
<b>Experimental variables</b>	
GenderDiversity <sub><i>i</i></sub>	The ratio of women on the board of directors of firm <i>i</i>
No_Quota	A dummy variable that equals 1 when country <i>j</i> does not have any form of mandated board gender diversity quota in place and 0 otherwise.
<b>Control variable</b>	
Log_Employees <sub><i>i</i></sub>	Natural logarithm of the number of employees of a firm, which represents the size of a firm

## Appendix C – Important events regarding the passage of the EU directive about mandatory board gender diversity (Directive 2022/2381)

Event	Date	Description of event	Include /exclude	Rationale for exclusion*
<b>1</b>	<b>14-11-2012</b>	<b>First proposal</b> On this date, the EC first presented the proposal to the Council for a directive with as goal improving the gender balance among non-executive directors of companies and related measures.	<b>Include</b>	-
2	20-11-2013	Adoption European Parliament	Exclude	A
3	19-06-2014	Progress report on draft directive The Council received a progress report on a draft directive. The goal of 40% of representation of women on boards is first introduced here.	Exclude	C
4	11-12-2014	Ministers discuss draft directive Ministers discussed the draft including the 40% goal that should be implemented by 2020. This proposal does not include any mandatory quotas, but introduces fairer selection mechanisms to ensure diversity. The Council did not reach an agreement on this draft.	Exclude	C
5	18-06-2015	Progress report on draft directive The Council received a progress report on a draft directive.	Exclude	A
6	07-12-2015	Policy debate in the Council but no agreement	Exclude	A
7	13-06-2019	Progress report on gender balance among non-executive board members Briefing of the ministers by the Commission.	Exclude	A
8	14-03-2022	Council adopted general approach Ministers agreed on a general approach. This common position is the basis of the negotiations between the EP and the Council.	Exclude	A
9	23-03-2022	European Parliament reconfirmed position	Exclude	A
<b>10</b>	<b>07-06-2022</b>	<b>European Parliament and the Council reached political agreement</b> On this date, the Council and EP reached a political agreement on a new EU law, which promotes a more balanced gender representation on the boards of directors of listed companies. The agreement states that by 2026, listed companies should have at least 40% of their non-executive directors or 33% of their non-executive and executive directors being members of the under-represented gender.	<b>Include</b>	-
11	17-10-2022	Endorsed by the Council	Exclude	B (Event 10)
12	22-11-2022	Endorsed by the Parliament	Exclude	B (Event 10)
13	23-11-2022	Adopted by the co-legislators	Exclude	A
<b>14</b>	<b>07-12-2022</b>	<b>Published in the official Journal</b>	<b>Include</b>	-
15	27-12-2022	Directive came into force	Exclude	B (Event 14)

\*Note: the following rationales for excluding an event are used: (A) assessed as not significant enough for a relevant effect on the likelihood of mandated board gender diversity; (B) confirms a prior event (referring to the previous event in parentheses); (C) relates to voluntary board gender diversity. The events included in this research are in bold.

Source: *Timeline - Gender balance on corporate boards*. (n.d.). European Council.

<https://www.consilium.europa.eu/en/policies/gender-balance-corporate-boards/timeline-gender-balance-on-corporate-boards/>

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