THE REAL EFFECTS OF MANDATING GENDER DIVERSITY DISCLOSURES

A STUDY ON WHETHER FIRMS INCREASE THE SHARE OF WOMEN ON BOARDS IN RESPONSE TO THE EU DIRECTIVE 2014/95/EU

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Abstract:

In this paper the real effects of mandatory non-financial disclosures are examined. More specifically, the effect the Directive 2014/95/EU has on the share of female directors in Swedish companies' boards. The directive obliges certain large firms to disclose board diversity information as of 2017, with the purpose to put indirect pressure on corporations to have more diversified boards. The data sample consists of 353,532 firm-year observations between the years of 2010-2019 and includes 60,725 unique firms. Using a difference-in-difference research design, we find that firms that are subject to the mandatory disclosure requirement increase the share of women on their board at the time of when the directive became effective. The results indicate that a widespread disclosure mandate such as the EU Directive, adopted in Sweden, has real effects at the time of enforcement.

Keywords:

Gender Diversity, Board of Directors, Real Effects, Board, EU Directive, Disclosures

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1 Introduction

> *"The beauty of our fight for gender equality is that every human being will gain from it" - Melinda Gates*

Today, gender equality is at the forefront of global sustainable economic development (United Nations, 2015). Sweden has for a decade ranked first in the Gender Equality Index[1] of the European Institute for Gender Equality (EIGE) (European Union, 2021a). During the same period the number of women in leading positions in publicly listed Swedish firms have more than doubled. A decade ago, gender equal publicly listed firms amounted to 5 percent, a figure which in 2020 reached 19 percent (Allbright, 2021). This fact can be seen from two perspectives; either as if gender equality has quadrupled during the last decade and that Sweden is on the right path or, alternatively, that Sweden still has a majority of firms that are not gender equal, and severely misrepresent the demographic dispersion between men and women. Gender balance is considered achieved when each gender amounts to 40% or more according to the European Union (2021b). Seen from the latter perspective in light of Sweden, as a country being in the forefront of gender equality, a mere 19 percent representation raises questions. Although ranked number one of the EU member states in the Gender Equality Index, the increase in gender equality has markedly slowed down the last couple of years (Allbright, 2021; European Union, 2021a).

As a response to increased social pressure stemming from investors, consumers and other stakeholders, the European Union announced the EU directive 2014/95/EU (hereinafter referred to as the EU directive) on disclosure of non-financial and diversity information. According to the legislators, the directive is an attempt to meet the need for increased transparency of social and environmental information and the impact of businesses on society. According to the European Parliament and the Council of the European Union, the EU directive aims to facilitate the change toward a more sustainable global economy. Consequently, as of 2017, certain large corporations in EU member states are required to report their sustainability related information, which earlier had been voluntary to disclose. One part of the

[1] An indicator measuring the complex concept of gender equality including measures of work, money, knowledge, time, power, health and violence (European Union, 2021a).

EU directive addresses the importance of diversified competences in the administration and supervisory board and stresses the need for disclosing the diversity policy applied. This includes information regarding age, gender, education and professional experience of board members. The EU directive does not require any changes in firms' social policies, or that firms should reach a certain amount of diversity, it solely obligates corporations to disclose the information. According to legislators this will provide the market access to relevant information and as a consequence put indirect pressure on the corporations' diversity on their boards (European Union, 2014).

Following the EU directive, the Swedish government submitted the proposition 2015/16:193 which was incorporated in the Swedish Annual Accounts Act on the 1st of December 2016 (Regeringskansliet, 2016). As mentioned, the boards of Swedish firms still have a long way to go in becoming gender equal and the imposed legislation regarding diversity could potentially contribute. However, it is an empirical question whether mandatory diversity disclosure actually incentivizes firms to increase the number of women, and the question remains unanswered. To this date the real effects, i.e., the actual increase in the share of females on boards, following the mandated gender diversity disclosures have not been studied, opening up a possibility for further research. This paper aims to examine this effect in Sweden by answering the question:

- *Does mandated diversity disclosures have real effects on board gender diversity?*

The paper contributes to the growing literature on accounting and disclosures and its role in sustainability reporting by documenting the effects of including information on social responsibility in corporate reports. Prior literature shows that increased mandated disclosures can lead to changed firm behaviors in the way disclosures reduce information asymmetry (e.g., Biddle and Hilary, 2006), increases awareness among external shareholders and stakeholders (e.g., Christensen et al. 2017; Fiechter et al. 2020), incentivizes firms through public and shareholder pressure (Muller et al. 2021) and through uplifting information of which can cause reputational concerns (e.g., Christensen et al. 2017; Fiechter et al. 2020; Rauter, 2020). For instance, Fiechter et al. (2020) study the same EU directive, however they draw their conclusions from the period when the EU directive was passed (2014) until the disclosure mandate became effective (2017), i.e., during the period when corporations prepared for the mandated disclosure. In addition, they investigate firms in all of the affected EU countries, with

comparable U.S. firms as a control group, as well as look at broader outcomes of CSR activities whereas this study aims to investigate the mandated diversity disclosure more explicitly and in a Swedish setting.

The paper's focus on accounting regulation stems from the fact that financial accounting and firm disclosures are frequently being mandated, regulated and standardized, thus making it a core issue in the field of financial accounting and an important area for further academic research. Building on prior research, this paper investigates and provides evidence on the real effects of nation-wide mandatory non-financial disclosure, specifically diversity disclosure, and how its implementation has affected firm behavior in Sweden. By including yearly treatment effects, to capture the effect of firms moving in and out of the treatment group, in combination with the full-sample control function used, the research design applied can be considered a contribution itself. Additionally, by conducting the research in the context of Sweden this paper captures some interesting country specific factors. Gender equality is already relatively high in Sweden, compared to other EU member states[2] falling under the regulatory requirements which might impact the results. In addition, both pre- and post-board gender diversity data is available for all Swedish firms and includes both publicly listed and private firms. This, in itself, contributes to the existing literature, specifically the implications of whether or not private firms indirectly are affected by mandated disclosure requirements for publicly listed firms. Hence, as the imposed regulation on gender diversity disclosure has not been studied in the specific context of actual changes in firms' behavior within Sweden, the thesis contributes with new research within the area of real effects in response to new directives. As the mandated information has been available prior to the amendment, it allowed for us to estimate the effect of mandating this information. Furthermore, the research contributes to enhancing the understanding of the implications of regulations, requiring firms to disclose information regarding their social responsibility which is of relevance for policymakers, firms and other stakeholders.

The remainder of the paper is structured as follows: Section 2 provides information on gender diversity today in the EU and in Sweden, followed by a background on the EU directive and its

[2] E.g demonstrated in the Gender Equality Index published by EIGE where Sweden scores 84 out of 100 compared to the EU average of 68 out of 100 (European Union, 2021a)

incorporation in the Swedish Annual Accounts Act. Section 3 reviews prior research starting with the literature on disclosures, followed by the paper's hypothesis development and the stated thesis hypothesis. In Section 4 the research design is described as well as the data collection process and the procedure in order to derive the results. In Section 5 the empirical results are presented, and additional analyses are conducted. In Section 6, the results and their implications are discussed. Lastly, Section 7 concludes, as well as put forward, this paper's contributions. In addition, the study's limitations and suggestions for future research are highlighted.

2 Institutional Background

This section elaborates on today's gender diversity situation in order to understand the background of the EU directive, continuing with explaining the basis of the regulatory setting, which includes the EU directive and how it has been incorporated in Swedish law.

2.1 Gender Diversity Today

In 2015, the 2030 Agenda for Sustainable Development was adopted by all United Nations member states. It is a blueprint for sustainable development indicating the world's shared priorities and a call to action. The agenda includes 17 Sustainable Development Goals (SDGs) including SDG 5, focusing on gender equality with the overall goal to "achieve gender equality and empower all women and girls" (United Nations, 2015). The European Commission is committed to the 2030 Agenda and stresses the need for its full implementation in order to strengthen resilience and prepare the world for the future (European Commission, 2021a). In light of this, the EU directive 2014/95/EU was announced. The EU directive emphasizes the importance of firms disclosing not only financial, but also sustainability related information across environmental and social dimensions. Diversity falls within the latter of these. When it comes to SDG 5, the EU is a leader in globally (Equal Measures, 2019).

Gender diversity in the workplace, specifically in corporate boards, continues to attract research attention (Adams and Ferreira, 2009; García Lara et al. 2017; Adams, 2016; Ahren and Dittmar, 2012; Ryan and Haslam, 2005). Despite the leading role EU member states have in regard to SDG 5, EIGE raises concerns about the slow progress in reaching gender equal boards, despite continuous stakeholder and shareholder pressure acknowledging the persistent imbalance among leading decision-makers. In 2021, the gender balance on boards of the largest

publicly listed firms within the EU reached 30.6%, implying that gender balance is not met on an overall level within EU member states (European Union, 2021b; European Union, 2021c). However, France is the only member state fulfilling the gender balance (year 2020 figures), a country of which has an imposed gender quota of 40% (European Union, 2021c).

Statistics show that the share of female board members in the largest companies in Sweden has more than doubled since the beginning of the 21st century (EIGE, 2021b). Since 1993, Sweden has outperformed the EU member state average of female board members (European Union, 2021b). However, EIGE (European Union, 2021b) and Allbright (2021) acknowledge that there is still a long way to go until publicly listed firms will reach gender balance. If development continues at the same pace as today, predictions by Allbright (2021) indicate that gender balance among the top decision-makers in publicly listed firms in Sweden will be reached in 2042 (Allbright, 2021). The slow progress of increasing the share of women on company boards, coupled with the fear of growing discrepancies between member states, regarding actions and legal approaches taken to address this, as well as the lack of transparency in selection procedures and the lack of diverse views and values on boards, were some of the reasons that urged action to be taken. The response was the development of the EU directive (European Union, 2014; European commission, 2012). Evidently, policymakers stressed the need for more diversified boards and the emergence of the EU directive indicates that increased disclosure of the matter can be one way to go in order to increase the share of women on boards.

2.2 Regulatory Setting

2.2.1 EU Directive 2014/95/EU

In October 2014 the EU directive 2014/95/EU was passed, as an amendment to the directive 2013/34/EU. It required public-interest entities[3] with an average number of employees exceeding 500 to disclose certain non-financial information, starting from the financial year of January 1st of 2017. Adding to the prior 2013/34/EU directive, the EU directive includes disclosure of non-financial and diversity information, relating to environmental matters, social matters and treatment of employees, respect for human rights, anti-corruption and bribery. The purpose of the EU directive is to increase transparency of social and environmental information

[3] Entities of which transferable securities are traded on a regulated market within the EU (European Union, 2013)

provided by certain corporations and promote change towards a sustainable global economy, by combining long-term profitability with social justice and environmental concerns. According to the EU directive, non-financial information is a vital part of the change towards a sustainable global economy, where these disclosures facilitate the measuring, monitoring and managing of the performance and impact of the corporations on society. The requirements apply to certain large corporations which are parent companies of large groups, or in the case of a group on a consolidated basis and exempts small and medium-sized enterprises. The EU directive was proposed to provide large corporation's stakeholders with information to assess corporations' non-financial performance (European Union, 2014).

Diversity disclosures at EU level

The EU directive sheds light on the importance of diversified competences in the administrative, management and supervisory bodies of companies in order to create a more constructive, challenging, open and innovative environment, which in turn, according to the legislators, contributes to a more effective governance. For this reason, the legislators stress the need for increased transparency of the diversity policy applied (including age, gender or educational and professional background) for certain corporations. These diversity disclosures should be part of the corporate governance report, which public-interest entities shall include in their management report. In addition, information on how the company ensures gender equality should be provided in the report (European Union, 2014).

According to the EU directive, the mandated disclosures are motivated by the fact that "diversity of competencies and views of the members (...) facilitates a good understanding of the business organisation and [the] affairs of the undertaking concerned" (European Union, 2014). In addition, the EU directive addresses the risks of "group-think", in case of an undiversified group of board members, and argues that a diverse board is more open to new innovative ideas and is more likely to challenge management decisions. Thus, the EU directive states that diversification contributes to effective oversight of the management and to successful governance of the firm. By enhancing the transparency of the diversity policy applied, the legislators believe that the market will have access to information regarding corporate governance practices. As a result, the legislators wish to put indirect pressure on corporations to have more diversified boards (European Union, 2014). Hence, the EU directive

highlights the relationship between disclosure of diversity and its potential effects on actions for diversity and value for the firm.

2.2.2 Swedish Annual Accounts Act 1995:1554

EU directives differ from EU regulations and decisions, where for EU regulation, member states only need to comply on the date at which they become effective, whereas directives must be incorporated into the respective national legislation of member states (European Commission, 2021). Since this study aims to examine the effect the EU directive has on Swedish firms' board gender diversity, it is of interest how it has been incorporated into Swedish legislation.

As mentioned, the EU directive has been incorporated in the Swedish Annual Accounts Act (SFS 1995:1554) following the proposition 2015/16:193. The act states that certain entities shall prepare a sustainability report, as of the 1st of January 2017, and should include information on issues related to the environment, social conditions, respect for human rights and the fight against corruption. The sustainability report is audited as regards to 1) if the report has been prepared or not and 2) whether or not it includes the content specified in the law. An entity is obliged to prepare a sustainability report if it for the past two financial years has fulfilled more than one of the following requirements (SFS 1995:1554):

1. Average number of employees exceeds 250
2. Balance sheet total exceeding 175 million SEK
3. Net turnover exceeding 350 million SEK

The incorporation of the EU directive in Swedish law is more extensive than the minimum required by the EU directive. The requirements apply to entities of 250 employees and above, compared to 500 employees in the EU directive, as well as to both public and private companies if it is material for the business, compared to only traded or certain financial companies. If a firm's sustainability information is necessary for understanding the underlying development, position or results of the firm, as well as material for the business, then disclosures of environmental and personal issues must be included in the reports too (SFS 1995:1554).

Diversity disclosures in Sweden

If a firm fulfills the aforementioned requirements for preparing a sustainability report and is obliged to set up a Corporate Governance report, then it should include disclosures of the entity's diversity policy in the Corporate Governance report. As mentioned, this includes

disclosures addressing the entity's board diversity policy with regards to age, gender, education and professional background as well as the goal of the policy, its application throughout the financial year and the results of it (SFS 1995:1554).

The aim of the mandated disclosures is twofold according to the legislators. First, to ensure the companies' shareholders that the business is managed sustainably, responsibly and as efficiently as possible and second, to promote positive development in terms of gender equality on boards. This is done through the Swedish Corporate Governance Code (hereinafter referred to as the code), which is a normative supplement to other legislation and regulatory requirements, placing higher demands in specific areas. Part of the code includes information regarding the nomination committee, which is to propose candidates for the board of directors. It addresses the importance of striving towards a more gender balanced board. The nomination committee needs to specifically explain how they have proceeded in order to achieve gender balance (Swedish Corporate Governance Code, 2020).

As the code is normative and voluntary, it gives companies the possibility to deviate under certain circumstances if it results in better corporate governance, applying the comply-or-explain principle (Swedish Corporate Governance Code, 2020). This implies that if firms expected to disclose their diversity policy deviate from it they should clearly explain the reasons why (SFS 1995:1554). Since the auditor is only responsible for ensuring that the Corporate Governance report exists, and if not, ensuring that there is a valid explanation for why it is not included, this implies that the actual content of the diversity policy is not audited (Corporate Governance Code, 2020).

3 Prior Research & Hypothesis Development

This chapter begins with a background of the literature on corporate disclosures and the reason and rationale behind it, as they play an important role in sustainability reporting and in general accounting. Then follows an introduction of the paper's hypothesis development which eventually leads to the hypothesis.

3.1 Disclosures

3.1.1 Benefits and Costs of Disclosures

Prior literature on firm disclosures indicates that increased disclosures are beneficial for the capital market, in the way they, in several ways, mitigate information asymmetries between a firm and its external stakeholders (Christensen et al. 2021). First, through the increase in liquidity within the firm through a decreased required return from investors (e.g., Constantinides, 2005). Second, by the fact that disclosures can lower the cost of capital as predictions of future cash flows are easier to be made (e.g., Easley and O'Hara, 2004; Lambert et al. 2007). Third, as it can increase investor awareness (Merton, 1987; Lambert et al. 2007; Diamond and Verrecchia, 1991). Fourth, by improving risk sharing, and facilitating the monitoring of managers, hence improving managerial decision-making. (e.g., Bushman and Smith, 2001; Lambert et al. 2007). Lastly, increased disclosures of one firm can transfer knowledge and information spillovers to other firms (e.g., Foster, 1980; Dye and Hughes, 2018). However, disclosures might also be costly for firms in the way it can lead to compliance costs, competitive losses, and proprietary costs as the information is made accessible to a broader audience (e.g., Verrecchia, 1983; Feltham and Xie, 1992; Berger and Hann, 2007). The comprehensiveness might also hamper a firm's incentives to innovate (e.g., Breuer et al. 2020). In addition, if disclosures are of poor quality it might result in negative real effects both for the firm and the society as the actions taken by the firms are based on inadequate or poorly disclosed information (e.g., Dranove and Jin, 2010). Concluding, despite the cost of disclosures, the aforementioned literature argues that increased disclosures has several tangible benefits to consider.

3.1.2 Gaining Legitimacy from Stakeholders

Firms can choose to disclose information as a means of achieving legitimacy and hence signal to the general public the actions they take to mitigate behaviors that are commonly scrutinized by the public. One example being that firms in more controversial sectors are more likely to provide environmental disclosures, as a way to signal to the public that they take responsibility and thereby seek to offset the harm their operations might cause (Gamerschlag et al. 2010; Byrd et al. 2017). The timing of disclosures also varies. Prior research finds that the extension of the disclosure is spurred by external factors such as natural catastrophes that causes firms to increase their CSR disclosure as it raises awareness among the general public (e.g., Bebbington et al. 2009; Belal and Owen, 2015). Additionally, external stakeholder groups and the societal

pressures they impose, can have an effect on firms' CSR reporting. This includes pressure from shareholders (Reid and Toffel, 2009); institutional investors demonstrating their requirements of CSR reporting through the institutional owners' preferences (e.g., Dhaliwal et al. 2011), governments and policy-makers pressures through mandates and regulations, or the threat of regulations, as well as through political agendas causing firms to voluntarily disclose (e.g., Doonan et al. 2005; Delmas and Toffel, 2008). Lastly, a firm might disclose for the reason of legitimizing its actions to the broader society, including consumers, employees and NGOs in addition to the aforementioned (e.g., Deegan, 2007; Cho et al. 2015). What can be retrieved from prior literature is that the pressure from external stakeholders might result in increased disclosure as a means to satisfy their stakeholders and gain legitimacy.

3.1.3 The Reasoning Behind Mandatory Disclosures

As outlined above, according to prior literature, non-financial disclosures are beneficial and/or demanded from market participants. The question of whether such disclosures should be mandatory, or whether voluntary disclosure requirements are sufficient is however debatable (e.g., Christensen et al. 2021). Ioannou and Serafeim (2011) find that firms who need to comply with laws that mandate disclosure on environmental, social and governance matters in different countries significantly increased the volume and quality of disclosures following the regulation. Continuing, mandating disclosures can lead to standardization benefits for the users, such as increased comparability and transparency. It can also lead to firms being more committed to its disclosures as well as improving their firms CSR performance by addressing their negative externalities. All these benefits speak in the favor of mandating CSR disclosures (Christensen et al. 2021). On another note, Badia et al. (2021) study the effect of mandatory disclosures in a competitive landscape and conclude that there is a trade-off in the form of accompanied proprietary costs from the disclosure regulation (Badia et al. 2021). Adding to this, it is not always clear whether mandatory disclosures would achieve better outcomes. However, voluntary disclosures could lead to firms only disclosing information favorable to them, and even though mandatory reporting would overcome this problem, mandating disclosures might imply that firms disclose information that they do not wish to share or something immaterial for them (Christensen et al. 2021). Nevertheless, as Christensen et al. (2021) brings forward, mandating disclosures should be seen as a trend toward more standardized CSR disclosures. Thus, the development of such disclosures, which initially might have been voluntary but eventually has become mandatory, could indicate that the market

demands this CSR information (Christensen et al. 2021). Hence, mandating the disclosure of the information can also increase the market's access to the demanded information.

3.2 Reasons Diversity Disclosures could have Real Effects

The following section outlines the hypothesis development and presents the paper's hypothesis. This by describing how mandatory disclosure requirements of diversity information can increase public awareness of firms' board gender diversity. Hence inducing firms to assess their behavior and provide incentives for actions, as a result of increased awareness, investor demands, and reputational concerns.

Increasing awareness

Information regarding gender diversity of a firm's board of directors has been available prior to the EU directive being implemented[4], although somewhat less accessible. In addition, some firms have voluntarily published the information in their corporate governance reports (e.g., Sveaskog, 2013; Swedavia, 2013). However, since it is no longer voluntary for certain large firms, it is more accessible for not only professional investors, which can be assumed to be aware of how to find this information, but also to less "sophisticated" investors, as corporate governance reports are published on a regular basis in conjunction with the annual report.

In the article of Christensen et al. (2017) which study the effects of the inclusion of non-financial information in financial reports, the authors argue that one reason why mandatory disclosures could increase awareness, and thus incentivize actions, is that the information in financial reports is more widely spread. Hence, it can be assumed that mandated information in the corporate governance report will be more widely spread as well. Christensen et al. (2017) provide evidence from SEC-registered mine owners, which by new accounting disclosures are mandated to include their mine-safety records (MSR) in their financial reports. On a similar note, in a study regarding mandatory extraction payment disclosures (EPD) Rauter (2020) examines whether this mandated disclosure of fiscal-payment has a real effect on the size of the payment and investment decisions of multinational firms abroad. The author finds that the difference between the new mandated EPD and previous reports, disclosing payments, is that information regarding extraction costs, provided in EPDs, is more detailed. In alignment with

[4] E.g., through Bolagsstyrning.se

Rauter (2020) and Christensen et al. (2017), the relevant information on gender diversity was possible to find before the EU directive was passed. However, it is now presented in a more detailed and accessible way, increasing the transparency and comparability. Therefore, one could argue that investors, financial analysts and other stakeholders are more likely to come across this information and thus the awareness regarding the degree of board gender diversity, and how the firms address this, could actually increase the gender diversity. As a result of increased awareness, one could also expect the disclosing firm to acknowledge this, hence incentivize improvements regarding the firm's board gender diversity.

Investor demands

Prior research by Muller et al. (2021) finds that mandatory disclosures have real effects on firm behavior, in the way certain introduced disclosures of greenhouse gas emissions enhanced accessibility and timeliness of previously hidden information which caused emission rates to fall. The authors argue that this effect is partially explained by shareholders' and stakeholders' pressure or/and by firms' anticipation of this pressure (Muller et al. 2021). Moreover, increased disclosures and disclosures of higher quality increases transparency and hence reduces information asymmetry (Biddle and Hilary, 2006). Li (2010) finds that mandatory adopters of the IFRS significantly reduced their cost of equity thanks to increased disclosure and enhanced information comparability. In light of findings by (Friedman and Heinle, 2016), evidence shows that CSR performance can help investors choose between similar investment opportunities. Hence, there is reason to assume that the increased transparency, making diversity information more comparable, could have implications for the firms being compared. This can be motivated by the fact that firms want to outperform their competitors as a response to investor demands, or at least not fall behind, and therefore want to increase their level of CSR performance, in this case increase their board gender diversity.

In addition, firms' commitment to CSR performance can be seen as a response to investor sentiment (Naughton et al. 2019; Martin and Moser, 2016). As all shareholders to some degree want to maximize their returns (Friedman, 1970), research suggests that non-financial disclosures are linked to benefits on the capital market, in the form of expected future cash flows, lowering the cost of equity as well as lowering the analyst forecast error (Plumlee et al. 2015; Dhaliwal et al. 2012; Dhaliwal et al. 2014). Ioannou and Serafeim (2011) states that an increase in sustainability disclosure and transparency of organizations regarding their impact

on society, improve not only disclosure quantity and quality, but can also increase firm value. Diversity, and especially gender diversity, has been studied before (e.g., Lins et al. 2019; Adams and Ferreira, 2009; Ahern and Dittmar, 2012; Kim and Starks, 2016) and the empirical evidence regarding its effect on firm performance is mixed. It has been actively debated whether or not gender diversity contributes to higher firm value, and if there even is a relation between them. However, as aforementioned, the increase in firm value as an indirect response of non-financial disclosures, in conjunction with the increase in transparency, could result in firms, seeking to satisfy investors, improves the performance of the non-financial information as well. In this light, firms might increase the share of women on the board following the demand from investors.

To address board diversity more specifically, a study by Upadhyay and Zeng (2014) indicates that more diverse boards are also more transparent. This is further developed by Gul et al. (2011) and Adams and Ferreira (2009) stating that board gender diversity can increase confidence and ownership for uninformed investors as it improves the board's deliberations and public disclosures through increased monitoring. Building on their conclusions, it might be the case that firms seek to satisfy investors by not only disclosing diversity related information but also take action and increase the diversity of the board, as it would appeal to investors' demand for increased transparency. This would in turn mean that if diversified boards are prioritized by investors, due to increased transparency, then the disclosure of diversity could be argued to have real effects on board gender diversity, as actions are taken to increase the gender diversity in the board.

Reputational costs

According to Christensen et al. (2017) it is possible that mandated disclosure, in addition to increasing firm value, affects firm behavior and decision-making. This is strengthened by Moser and Martin (2012) who address the importance of adopting a broader view on CSR disclosures, to also include the societal benefits of CSR. Their study finds that investors putting a value premium on CSR can make managers take unprofitable investment decisions for the benefit of society, despite potential negative effects on their personal- or shareholder wealth. On a similar note, Hart and Zingales (2017) state that one needs to separate "market value" from "shareholder welfare", where the latter also implies internalizing externalities such as ethical and social concerns, as this is something companies would want to maximize apart from

just their financial performance. If the same logic was to be applied to the case of gender equality, there is reason to believe that firms would not only want to improve their gender diversity due to monetary preferences, but also for the societal benefit.

In light of the societal context, additional findings by Rauter (2020), Christensen et al. (2017) and Graham et al. (2014) suggest that non-monetary preferences, such as reputational concerns of managers, result in changed behaviors as an outcome of mandatory disclosures. Rauter (2020) states that the change in firm behavior is caused by the mandated EPD increasing a firm's reputational costs. On a similar note, Graham et al. (2014) provide evidence that firms are even inclined to pay additional tax in order to avoid reputational cost, affecting future cash flows negatively. Similarly, Christensen et al. (2017) states that potential reputational costs, such as the investment in a firm owning an unsafe mine, might increase as a result of the disclosure requirement. The authors argue that this could have real effects on firm behavior, as managers would be faced with the public revelation of operating a firm with poor safety. Despite there being several differences between unsafe operations and an undiversified board room, applying this argument in the context of board gender diversity would imply that a firm governed by an undiversified board would raise public attention and the reputational consequences would hence incentivize action.

Further elaborating on reputational costs, Dewatripont et al. (1999) address managers' career concerns and personal reputation which also provide incentives in a decision-making context. An example is Christensen et al.'s (2017) article where firms with poor safety records could be seen as less attractive employers and therefore incentivize the affected corporations to improve. In the context of diversity, this would imply that firms operating with limited board gender diversity would be less attractive employers, incentivizing managers to improve the diversity.

Additionally, Dyck et al. (2008) provide evidence that revealing something that stakeholders are likely to criticize can be a reason for reform and changed behavior. This is further strengthened in the article by Christensen et al. (2020) where the authors examine the effect of charge-price-transparency regulation (PTR) on hospital pricing. They find a real effect through reduced charges, following regulatory implementation and an accompanied increase in transparency, argued to partially be explained by the desire to retain social legitimacy and to avoid public scrutiny i.e., addressing the reputational concerns caused by the legislation. This

implies that if the increased transparency, caused by the mandated disclosure requirement, does not align with stakeholder perceptions of the firm or being condemned by the public, then, as shown by prior research, a reform can be in place. This in order to remain socially legitimate and to avoid public scrutiny. Hence, the mandatory diversity disclosures could have real effects due to accompanied societal benefits as well as concern of the firms' reputation.

Potentially limited effect or contradicting effect

Although a vast majority of previous research predicts the presence of real effects, following new disclosures regarding board diversity, some tensions have been identified which could imply that mandating these disclosures would have limited, contradicting or no effect. For instance, Fiechter et al. (2020) study the effects of the mandated EU directive and whether firms increase their CSR activities in response to the disclosure mandate. Conclusions drawn by Fiechter et al. (2020) indicate that the real effects, shown through increased CSR activities for EU firms, were larger for the firms that prior to the announcement of the EU directive had low CSR performance as well as for the firms domiciled in jurisdictions where public enforcement was high. Due to Sweden having a high level of CSR performance (e.g., Strand, et al. 2015) as well as a high level of board gender diversity (EIGE, 2021a) it would, on the one hand, imply that the effects could be limited. On the other hand, the limited effect could also be offset by the high public enforcement existing in Sweden (World Economic Forum, 2021).

As Fiechter et al. (2020) identified real effects in terms of change in behavior already during the period before the legislation became effective, one could argue that the effects from 2017 and onwards might be limited. On the contrary, Grewal (2021) investigates real effects following Mandatory Carbon Reporting (MCR) focusing on firms voluntarily disclosing information before the law was passed and provides evidence of additional reductions in emissions for these voluntary disclosures also after the MCR was enacted. This suggests that although the effect might be smaller for firms with high CSR performance, it is possible to see additional reductions after the EU directive became effective. Correspondingly, Christensen et al. (2021) provide evidence that firms with already good CSR performance could react more if they have a valuable brand and hence would lose more from a CSR disaster, implying that if firms have a valuable brand one could expect additional effects in response to the EU directive. Conclusively, Fietcher et al. (2020), Grewal (2021) and Christenson et al. (2021) findings

support that CSR disclosure after an implementation, in this case diversity disclosure, could have real effects on actions for changed behaviors, despite being somewhat limited.

There is also empirical evidence which could imply contradicting results. In 2003, regulation promoting that 40% of Norwegian firms' directors should be women was passed in Norway. Due to failed voluntary compliance to the regulation, the law became mandatory in 2006. The authors investigate the impact on firm valuation following the mandated female board representation and find that firm value is noticeably negatively impacted (Ahern and Dittmar, 2012). The results of these findings could potentially discourage firms to increase the share of women in response to a mandated disclosure requirement. There are however several differences between the regulation in Norway and the EU directive in the way the law in Norway required a certain percentage of female directors, while the EU directive only requires the disclosure of the actual composition.

3.2.1 Hypothesis Formulation

Prior research suggests that mandatory disclosure requirements can provide incentives for actions and result in changed firm behavior due to increased awareness, investor demands and reputational concerns. Although some tensions could potentially limit the results, this paper hypothesize that the diversity disclosures encourage firms to increase their gender diversity on boards, consequently the hypothesis sums up to the following:

H1: Gender diversity disclosures increase the share of women on company boards.

4 Research Design

4.1 Model and Variable Measurement and Definition

In order to investigate whether the gender diversity of boards increased in response to the EU directive, a difference-in-difference analysis (DiD) is performed. The chosen research design enables comparison of the impact the mandatory disclosure has on the gender diversity of boards in Sweden. It allows for determining whether firms, obligated to disclose their diversity policy, behave differently than those firms that are not subject to the regulations.

To answer the paper's research, question the following DiD regression (without time and firm subscripts) is estimated:

$$y = \beta_0 + \sum_{n=1} \beta_n Year \times Treated_n + \sum_{j=1} \beta_J Controls_J + \sum_{i=1} \beta_i Fixed\ Effects_i + \varepsilon \qquad (1)$$

The dependent variable, *y*, represents the ratio of females in the board. Continuing, yearly treatment effects[5] (*Year×Treated)*, for the sample period 2010-2019, are examined, including years both prior to- and post the implementation of the directive. In addition, controls, which are further elaborated on in section "4.2 Control Variables" are applied. In section "4.3 Fixed Effects & Clustering" the firm- and year fixed effects and firm clustering are introduced and described. The error term *ε*, represents the unobservable random margin of error, which captures the unobservable factors explaining *y*.

A standard DiD analysis captures two differences, the first one being the change in outcomes before and after it is subject to the treatment, and secondly the difference between treated- and control firms, as follows (Goodman-Bacon 2021):

$$(\bar{y}\text{POST TREATED} - \bar{y}\text{PRE TREATED}) - (\bar{y}\text{POST CONTROL} - \bar{y}\text{PRE CONTROL})$$

In this study however, the pre- and post-periods are further divided into yearly effects as firms might move between the groups on a yearly basis, which is further described below. The "treatment" group is the set of private and public firms fulfilling at least two out of the three requirements for two consecutive years, following the Swedish Annual Accounts Act. The control group consists of firms fulfilling only one, or none, of the requirements. The assignment rule can, following Breuer et al. (2018), be summarized as follows:

$$Treatment\ firms_{i,t} = g(Size_{i,t}, Size_{i,t-1}) = \begin{cases} 1 & \min\left[\sum_{n=1}^{3}\sum_{m\neq n} I_{i,t}^{n} I_{i,t}^{m}, \sum_{n=1}^{3}\sum_{m\neq n} I_{i,t-1}^{n} I_{i,t-1}^{m}\right] > 0 \\ 0 & \min\left[\sum_{n=1}^{3}\sum_{m\neq n} I_{i,t}^{n} I_{i,t}^{m}, \sum_{n=1}^{3}\sum_{m\neq n} I_{i,t-1}^{n} I_{i,t-1}^{m}\right] = 0 \end{cases} \qquad (2)$$

[5] "Treatment effect" refer to the average difference between the treatment- and control group

where $I_{i,t}^{1} = 1\left(Size_{i,t}^{EM} > T_{t}^{EM}\right)$ is an indicator variable, it takes the value of 1 if a firm *i*'s number of employees ($Size_{i,t}^{EM}$) exceed the respective firm size-related threshold (T_{t}^{EM}). In the same way, $I_{i,t}^{2} = 1\left(Size_{i,t}^{NT} > T_{t}^{NT}\right)$ and $I_{i,t}^{3} = 1\left(Size_{i,t}^{TA} > T_{t}^{TA}\right)$ are variables indicating whether firm *i* exceeds the thresholds of net turnover and total asset, respectively (Breuer et al. 2018).

Depending on the fulfillment of the requirements, companies can belong to the treatment group in one year, and by the next year be a part of the control group. Hence, in the case studied, firms can move in and out from the treatment and control group during the studied time period. This implies that the number of firms per year, and their belonging to either the treatment- or control group is not fixed as seen in Table 1. 2010 is excluded from the table, and in the following regressions, as the treatment rule relies on observations for two consecutive years.

Table 1. Number of observations by year and group

	Total	Treatment	Control
2011	33,178	1466	131,712
2012	33,589	1507	32,082
2013	33,837	1,516	32,321
2014	34,483	1,556	32,927
2015	35,738	1,634	34,104
2016	36,933	1,699	35,234
2017	37,585	1,814	35,771
2018	38,219	1,925	36,294
2019	38,063	2,031	36,032

Table 1 shows the treatment- and control groups per year.

Conducting the main analysis, the variable *Treatment firms* that equals one (1) for a given firm (*i*) for all the years (*t*) in the sample are therefore not used, as there will be within firm variation[6]. In a regular DiD analysis, firms are assigned to either the treatment- or the control group, where they always will remain. In these cases, there are no variations within the firms, meaning that there is no deviation from the mean, hence all of the values for a given firm are either 1 or 0 throughout the period. In our case, whether a firm belongs to the treatment (1), or control group (0) is indicated by the variable *Treatment firms* which distinguishes the two groups. In this paper it is estimated on a yearly basis by multiplying with an indicator for each

[6] Variation across time within single entities in the panel dataset

specific year (*T_year*Treatment firms)*. The sample period ranges from 2010 to 2019, as the years prior to the EU directive became effective are compared with the years following the implementation. Observations already from 2010 are included to be able to investigate a potential anticipation effect in 2014 when the EU directive was put forward. Years before 2010 are excluded as we, in line with Fiechter et al. (2020), considered including them would increase the risk of other events, unrelated to the EU directive, affecting the board gender diversity.

Table 1 shows that the size of the treatment- and control group remain fairly stable over the years. A low percentage of the firms move between the two groups. In addition to the paper's main analysis, a supplementary analysis is conducted, to compare the pre- and post-period in line with a regular DiD analysis. In this supplementary analysis, the fact that firms might move between the groups are not taken into account. Hence, three different independent variables are constructed and used. This includes two dummy variables of which represent the post-treatment period (2017-2019) and the treated firms, and a third independent variable representing the interaction term between the two other independent variables. In this case, the interaction term captures the difference between the treatment and control group and the pre- and post-period, in line with Goodman-Bacon (2021).

4.2 Control Variables

Gender diversity of boards can be influenced by factors other than the mandated disclosure requirement, which needs to be taken into consideration as well. For this reason, the regulatory size determinants following Breuer et al. (2018) are controlled for. In addition, controls used in prior research on gender diversity of boards as well as commonly used control variables, of which might affect the dependent variable, are added. Hence, controls for firm size, board size, leverage, firm profitability, and gender of the CEO are included (Fietcher et al. 2020; Adams and Ferreira, 2009; García Lara et al. 2017; Adams, 2016; Ahren and Dittmar, 2012; Ryan and Haslam, 2005). The chapter continues with descriptions and motivations of the variables used.

4.2.1 Controlling for the Assignment Rule

Firms in the treatment and control groups differ in terms of size as a result of the regulatory assignment, and a firm is not randomly assigned to any of these groups. The probability to be assigned to the treatment group is higher for large firms than for smaller ones. Larger firms

also differ from smaller firms in several ways, for example in terms of leverage, growth opportunities and access to finance among other things. For this reason, it is necessary to control for determinants of this assignment rule to mitigate the risk of endogeneity bias, due to the prediction of large firms having a larger probability of being assigned to the treatment group. As the different determinants of the variable *Treatment firms* is known, it is possible to control for these, as they individually and relatively might affect the proportion of female directors. Controlling for this ensures that the groups are assigned as good as randomly.

Following the approach used by Breuer et al. (2018), a parameterized control function is created:

$$\varphi f(Size_{i,t}) = \sum_{n=1}^{3} \varphi_n \, I_{i,t}^{n} + \sum_{n=1}^{3} \varphi_{3+n} h(Size_{i,t}^{n}) + \sum_{n=1}^{3} \varphi_{6+n} h(Size_{i,t}^{n}) I_{i,t}^{n} \qquad (3)$$

This control function includes a variable $I_{i,t}^{n}$ indicating whether a firm crossed one of the thresholds of size (employees, net turnover or total assets). By including this factor, firm heterogeneity is accounted for, by capturing the isolated effect of crossing each individual threshold. The second factor in the control function, $h\left(Size_{i,t}^{n}\right)$ is the natural logarithm of $(Size_{i,t}^{n})$ over (T_t^n) capturing firms' relative distances to the respective thresholds. The ratio will be larger than 1 if firms cross the threshold, and less than 1 if firms do not cross the threshold, meaning that the natural logarithm of the number that is smaller than 1 will be negative and that of the number larger than 1 positive. Thirdly, the interaction of these variables is included for each size dimension $(h(Size_{i,t}^{n}) I_{i,t}^{n})$. The relative distance to the threshold and the fact that they cross the threshold are used to control for the assignment rule. This due to the fact that the distance to the threshold is also going to determine the likelihood of firms being in the treatment- or in the control group (Breuer et al. 2018). The phi correlation coefficient (φ) represents the strength of association between the variables.

By including the aforementioned control variables, we avoid limiting the sample to firms within a narrow bandwidth around the thresholds which is complicated by the multiple assignment variables and threshold combinations. By limiting the sample around the threshold, we would have had more comparable firms throughout the sample. However, following prior literature adopting a full-sample control function approach we manage the complications of

determining the explicit determination of closeness to relevant thresholds (e.g., Breuer et al. 2018).

Including control variables of firm size is further motivated by previous research and the fact that larger firms tend to have at least one or more women on the boards according to prior literature (Adams, 2016; Ahren and Dittmar, 2012). One explanation for this is that larger firms (by number of employees) also have a larger pool of potential board members to access. Contradicting this, Adams and Ferreira (2009) find no significant effect of firm size and the number of females on the board. Hence, controlling for firm size is, in different aspects, crucial for the analysis of this paper.

4.2.2 Additional Controls

Board size

The total number of directors on the board are controlled for. Prior literature shows that firms with larger boards have a positive and significant effect on how many women are represented on the board (Adams and Ferreira, 2009; Ahern and Dittmar, 2012). This implies that there is a greater probability of women being part of the board, the larger the board size, making board size a considerable variable to control (Ahern and Dittmar, 2012).

Firm profitability

A control for firm profitability is included as well, measured by firm return on assets (ROA). Prior literature indicates that there is an increased probability for women to be appointed to positions within board rooms in less profitable firms (Ryan and Haslam, 2005). ROA as a representation of firm profitability relative to the total assets is commonly used as a measure of financial performance (e.g., Adams and Ferreira, 2009; García Lara et al. 2017).

Leverage

Following Fietcher et al. (2020), Lys et al. (2015) and Chen et al. (2018) a control for leverage is added, in terms of the ratio of total debt to total assets, for the rational anticipation and reasoning of leverage having implications for firm decision-making and performance (Adams and Ferreira, 2009).

Gender of CEO

In accordance with previous research a control for CEO characteristics and more specifically the gender of the CEO is included (Adams and Ferreira, 2009). It has been found that female CEOs are leading a shift in diversity efforts, improving gender equity among board members (BoardEx, 2021).

In the Appendix a description of all variables used in the regression are provided.

4.3 Fixed Effects & Clustering

In addition to the chosen control variables, both time trends in development of diversity and time invariant unobservable differences between firms, are controlled for by adding firm- and year fixed effects. By using only Swedish firms in the dataset there is no need to control for time-invariant characteristics of different countries.

When adding firm fixed effects (FFE), anything that does not change within the same firm should be absorbed. FFE absorbs all of the variation except the within firm variation. In a regular DiD analysis, as mentioned above, the treatment variable is assigned either 1 or 0 for all years, and hence there is no within-firm variation. As the variation is needed to make an observation, the treatment variable in these cases is on its own (due to no variation) absorbed by the FFE. However, in the studied case, the treatment variable on its own is not going to be absorbed or dropped by the FFE estimation. This due to the variation, coming from firms moving between the treatment and control group.

When including year fixed effects, anything that does not have variation within a given year is absorbed. The result is that the variables indicating treated firms post-2017 (*Post_treatment,* when grouped) are always taking the value of 1 for the years 2017-2019, while it prior to 2017 always is 0, for all firms. This will not change and hence there is no variation within those observations. Whatever does not have variation within one given year, will be absorbed (omitted). There will still be interaction between the treatment (needing to disclose) and the years 2017-2019 which will indicate the DiD average treatment effect.

In addition, in alignment with Fietcher et al. (2020), Petersen (2009), Gow et al. (2010) standard errors are clustered at firm level.

4.4 Sample & Data

In this section the data collection process is described, including information on where and how the data have been extracted as well as why. Thereafter the process leading up to the sample and variables are outlined.

4.4.1 Data Collection & Sample

Our initial sample of firms is obtained from the Serrano database containing board data of both private firms and publicly listed Swedish firms, between the period of 2010 to 2019. The board data includes information regarding board size and gender of board members on a firm-year level. This dataset was merged with an additional dataset from Serrano containing consolidated financial data, necessary for additional variables required for the analysis of this paper. Consolidated numbers are used as the disclosure requirement of diversity policy, of which the paper concerns, is aimed at consolidated figures. Serrano is a database covering most legal entities in Sweden. The additional dataset from Serrano consists of financial history of financial statements and bankruptcy data from the Swedish Companies Registration Office (Bolagsverket), general company data from Statistics Sweden (SCB), and group data from Bisnode's group register. When these datasets have been merged, all data necessary for the main analysis is gathered which results in a firm-level panel dataset with data containing both a time and a cross-sectional dimension. Hence, the panel dataset includes data both regarding boards, needed to derive the variable *Ratio of females* in the board per company and year, and financial information needed to extract the thresholds and control variables.

There are several reasons why both publicly listed and private Swedish firms are included in the main analysis. By using Swedish firms "cross-countries factors" are avoided, which otherwise might have had an impact on the results. Furthermore, Sweden provides excessive data availability and coverage both pre- and post the regulatory requirements, and for both private and public firms, which gives a robust dataset. Lastly, Sweden has a well-developed and functioning juridical system including strong reporting standards and shareholder governance (World Economic Forum, 2020). However, in order to conduct the paper's additional analysis with public firms as the treatment group, the panel dataset is merged with data from the Nordic Compass database, which include information on publicly traded Nordic companies between the years 2014-2019, where Nordic companies other than Swedish were dropped.

The merged datasets give a dataset of 7,010,076 firm-year observations. From this dataset firm-year observations lacking board gender diversity data are dropped as this data is central for the study. Continuing, firms in the finance and real estate sector (SXB2FMT 40 = Finance & Real estate) are excluded as these firms have different financial reporting incentives and are subject to different trading market mechanisms (Cheng et al. 2016). In addition, micro firms[7] are removed, justified by the fact that these firms make the treatment- and control group less comparable, as well as can deviate the results. Observations having missing values for relevant variables are then dropped (Cheng et al. 2016). This results in the final main sample, consisting of 353,532 firm-year observations and includes 60,725 unique firms. Table 2 reports the sample selection process.

Table 2. Sample selection

Total number of firm-year observations from 2010-2019	7,010,076
Less missing board gender diversity data	*(2,077,892)*
Subtotal	4,932,185
Less financial services and real estate firms	*(669,827)*
Subtotal	4,262,358
Less micro-firms < 9 employees	*(3,766,083)*
Subtotal	492,275
Less missing values (employees, net sales, total assets, ROA, CEO)	*(142,743)*
Sample firms	**353,532**
Number of unique firms	60,725

Table 2 presents the firm-year observations leading up to the main sample of firms

4.4.2 Data Processing

As a panel data set-up of the observations is required in order to perform the analysis, the set-up of the Serrano board data file is transformed and built on director-firm-year observations. Before dropping the director-level observations this information was used to retrieve how many females and males each board per year consisted of. From this information the dependent variable is created, which describes the number of female board members in relation to the total number of board members on a firm-year basis. At this stage the variable expressing the gender of the CEO for each year and firm are retrieved as well, to be used as a control variable. This is done by multiplying the variables indicating whether the individual director is the CEO

[7] Firms having less than ten employees (OECD, 2021)

or not, and whether he/she was a male or female. Thereafter the information was sorted by group and year. *Year* was kept as a time-identifying variable and organizational number (*orgnr*) as firm-identification to retrieve the unique year-firm observations. Information regarding individual directors is dropped at this stage, as this information was not deemed necessary for the analysis.

When merging this dataset with the Serrano file containing the financial information, the variables indicating the yearly treatment groups are derived and the control variables are constructed. In order to derive the treatment group from the control group, new variables are created. Variables indicating whether a firm meets each of the individual requirements for two consecutive years, are constructed. This information is, in an additional variable (*Treatment firms*), used to display whether at least two requirements are met for two consecutive years (1) or not (0). Finally, this variable is used to derive the treated firms on a yearly basis, by using *T_year*Treatment firms*. By assigning each firm-year observation a 1 or 0 it is possible to identify the treatment and control group per year (see Table 1), resulting in a treatment group containing in total 15,206 firms and a control group which contains in total 338,326 firms over the time period.

In order to gain an understanding of how many firms move between the treatment- and control groups and hence its impact, variables indicating the difference between two *T_yearxTreatment firms* variables are created. If the newly created variable indicates 0 it means that a firm was either in the control group or treatment group for both of these years. However, if it indicates 1 or -1 it means that the firm had moved from being in the treatment group to the control group or initially in the control group to the treatment group the following year.

To be able to conduct an additional analysis on public firms, the data which was merged with Nordic Compass is assigned a “1” indicating a publicly listed firm.

5 Empirical Results

In this section, the descriptive statistics are presented. Thereafter the outcome of the introduction of the diversity disclosure mandate is assessed by testing the paper's hypothesis. In the first set of analysis the overall research question is addressed, whether firms within the scope of the diversity disclosure on average increase in the share of women in the board in response to the regulation, as intended by regulators. This by looking at the year-by-year treatment effect of the regulation. Additionally, the pre- and post-period of the regulation is studied. Two additional tests, independent of each other, are conducted which are made to enhance the validity of the paper's results.

5.1 Descriptive Statistics

5.1.1 Summary Statistics

In order to better understand, and to get an overview of the data, a summarizing table was created which presents the number of observations, means, standard deviation and different percentiles. The summary statistics demonstrate values for the whole dataset as well as for the treatment- and control group respectively.

Table 3. Summary statistics

	N	Mean	Std. Dev.	p25	Median	p75
Panel A: All firms						
Ratio of females	353,532	0.302	0.272	0	0.333	0.5
Size (EM)	353,532	-2.339	0.865	-2.957	-2.577	-1.966
Size (NT)	353,532	-2.246	1.280	-3.14	-2.46	-1.56
Size (TA)	353,532	-2.3	1.498	-3.311	-2.496	-1.52
IEM(Size >TEM)	353,532	0.023	0.150	0	0	0
INT((Size >TNT)	353,532	0.053	0.224	0	0	0
ITA(Size >TTA)	353,532	0.066	0.247	0	0	0
Size (EM) x IEM	353,532	0.014	0.104	0	0	0
Size (NT) x INT	353,532	0.048	0.250	0	0	0
Size (TA) x ITA	353,532	0.079	0.366	0	0	0
Board size	353,532	3.664	2.176	2	3	4
ROA	353,532	0.056	0.149	0.002	0.047	0.12
Leverage	353,532	0.625	0.236	0.455	0.633	0.801
Female CEO	353,532	0.064	0.244	0	0	0
Panel B: Control group						
Ratio of females	338,326	0.299	0.272	0	0.333	0.5
Size (EM)	338,326	-2.437	0.720	-3.037	-2.631	-2.056
Size (NT)	338,326	-2.393	1.091	-3.17	-2.523	-1.709
Size (TA)	338,326	-2.46	1.310	-3.351	-2.564	-1.679
IEM(Size >TEM)	338,326	0.003	0.054	0	0	0
INT(Size >TNT)	338,326	0.011	0.103	0	0	0
ITA(Size >TTA)	338,326	0.025	0.156	0	0	0
Size (EM) x IEM	338,326	0.001	0.027	0	0	0
Size (NT) x INT	338,326	0.004	0.050	0	0	0
Size (TA) x ITA	338,326	0.025	0.205	0	0	0
Board size	338,326	3.542	2.003	2	3	4
ROA	338,326	0.057	0.151	0.002	0.048	0.122
Leverage	338,326	0.626	0.237	0.455	0.634	0.803
Female CEO	338,326	0.061	0.240	0	0	0
Panel C: Treatment group						
Ratio of females	15,206	0.362	0.269	0.158	0.333	0.5
Size (EM)	15,206	-0.169	0.960	-0.768	-0.047	0.715
Size (NT)	15,206	1.023	0.665	0.49	0.975	1.678
Size (TA)	15,206	1.262	0.854	0.548	1.125	2.029
IEM(Size >TEM)	15,206	0.469	0.499	0	0	1
INT((Size >TNT)	15,206	0.989	0.103	1	1	1
ITA(Size >TTA)	15,206	0.97	0.169	1	1	1
Size (EM) x IEM	15,206	0.305	0.384	0	0	0.711
Size (NT) x INT	15,206	1.033	0.619	0.488	0.975	1.677
Size (TA) x ITA	15,206	1.269	0.842	0.547	1.125	2.029
Board size	15,206	6.366	3.639	4	5	8
ROA	15,206	0.039	0.102	0	0.023	0.074
Leverage	15,206	0.6	0.219	0.445	0.619	0.766
Female CEO	15,206	0.113	0.316	0	0	0

Table 3 presents descriptive statistics of the sample. The sample period is from 2010-2019. Panel A provides descriptive statistics for the total sample of 353,532 firm year observations. Panel B and C provide descriptive statistics for the control- and treatment groups respectively. See variable description in the Appendix.

When analyzing the values in the dataset, outliers were identified which can be explained by some variables having very high maximum values or low minimum values, which would have

affected the mean and standard deviation. In order to avoid such extreme levels, the data was winsorized on a one percent level, meaning that one percent of the highest values with the 99th percentile-value and the lowest one percent is to be replaced with the 1st percentile value. This implies that extreme values are replaced by less extreme values, without removing the observations (Pusparum et al. 2017).

When comparing the two tables, the different sizes of the treatment and control groups should be mentioned. However, as both groups are considered large enough to conduct the tests this is not considered an issue.

5.1.2 Correlation Matrix

In addition, a correlation matrix is presented in order to assess potential correlation between the variables, by displaying the linear relationship between each and every variable of consideration. Looking at the dependent variable, it is positively correlated with the dummy variable representing female CEOs. This implies that the share of women in the board seems to be higher when the CEO is a female, which is in line with prior studies.

Table 4. Correlation matrix

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Ratio of females	1.000													
2 Size (EM)	0.023	1.000												
3 Size (NT)	**-0.001**	0.756	1.000											
4 Size (TA)	**0.001**	0.673	0.841	1.000										
5 IEM(Size >TEM)	0.033	0.525	0.396	0.362	1.000									
6 INT((Size >TNT)	0.042	0.530	0.583	0.512	0.552	1.000								
7 ITA(Size >TTA)	0.052	0.492	0.515	0.619	0.469	0.683	1.000							
8 Size (EM) x IEM	0.029	0.494	0.375	0.344	0.894	0.522	0.443	1.000						
9 Size (NT) x INT	0.039	0.508	0.542	0.484	0.666	0.819	0.661	0.687	1.000					
10 Size (TA) x ITA	0.045	0.452	0.451	0.586	0.535	0.608	0.812	0.546	0.733	1.000				
11 Board size	-0.049	0.366	0.364	0.458	0.209	0.258	0.353	0.200	0.250	0.351	1.000			
12 ROA	-0.021	-0.029	0.039	-0.019	-0.021	-0.018	-0.040	-0.018	-0.020	-0.030	-0.074	1.000		
13 Leverage	-0.030	0.009	-0.064	-0.193	-0.006	-0.011	-0.066	-0.003	-0.004	-0.060	-0.080	-0.404	1.000	
14 Female CEO	0.287	0.061	0.039	0.030	0.036	0.041	0.041	0.031	0.043	0.037	0.009	-0.010	**0.001**	1.000

Table 4 presents the correlation between the dependent and control variables included in the regression. The values that are not significant on a 1%, 5% or 10% level are highlighted in bold.

The correlation matrix can further indicate possible multicollinearity-problems, i.e., the problem of two or more control variables being highly correlated and hence not providing

independent information for interpretation. When testing for multicollinearity (demonstrated in Table 5) an average value of 3.70 is derived, with the highest value (5.72) being generated by the relative distance from the threshold of number of employees. As the majority of the values range between 1 and 5, which indicates moderate correlation between a given explanatory variable and other explanatory variables in the model, multicollinearity is not considered to have a large impact on the interpretation of the regression.

Table 5. Multicollinearity test

Variables	VIF	1/VIF
Size (NT)	5.716	.175
Size (EM) x I_{EM}	5.644	.177
Size (TA)*	5.592	.179
Size (NT) x I_{NT}	5.563	.18
I_{EM}(Size >T_{EM})	5.399	.185
Size (TA) x I_{TA}	4.516	.221
$I_{NT(}$(Size >T_{NT})	3.931	.254
I_{TA}(Size >T_{TA})	3.876	.258
Size (EM)	2.851	.351
Leverage	1.365	.733
Board size	1.309	.764
ROA	1.272	.786
Female CEO	1.005	.995
Mean VIF	3.695	.

5.2 Real Effects of the Diversity Disclosure Mandate

In this section the results are presented. To begin with the results of the main analysis are presented, which display the yearly treatment effect followed by a presentation of a regular DiD analysis indicating pre- and post-periods and lastly the results of the additional tests.

5.2.1 Yearly Treatment Effect of the Mandated Disclosures

Table 6. Difference-in-difference analysis of yearly treatment effects

Dependent variable		**Ratio of females**	
2011xTreated		-0.0205***	(0.00494)
2012xTreated		-0.0160***	(0.00469)
2013xTreated		-0.00790*	(0.00435)
2014xTreated		-0.00623	(0.00397)
2015xTreated		-0.00278	(0.00347)
2017xTreated	*Entry-into-force*	0.00725**	(0.00349)
2018xTreated		0.00601	(0.00404)
2019xTreated		0.00533	(0.00420)
Size (EM)		-0.00640***	(0.00219)
Size (NT)		-0.00946***	(0.00175)
Size (TA)		0.00756***	(0.00155)
I_{EM}(Size >T_{EM})		0.00297	(0.00766)
I_{NT}((Size >T_{NT})		0.0146***	(0.00434)
I_{TA}(Size >T_{TA})		0.0146***	(0.00427)
Size (EM) x I_{EM}		0.00586	(0.0132)
Size (NT) x I_{NT}		-0.0158***	(0.00604)
Size (TA) x I_{TA}		0.0132***	(0.00404)
Board size		-0.00390***	(0.000746)
ROA		-0.00553	(0.00367)
Leverage		-0.00834**	(0.00370)
Female CEO		0.159***	(0.00404)
Firm-fixed effects		Included	
Year-fixed effect		Included	
Number of clusters		52,946	
adj. R^2		0.825	
N		345,753	

Table 6 displays the results from the DiD regression analysis on a yearly basis with *Ratio of females* being the dependent variable. 7779 singleton observations (i.e., groups with only one observation) are dropped in the regression. All coefficients are estimated using cluster-robust standard errors. Standard errors are presented in parenthesis. The variables are described in Appendix. ***, **, * indicate statistical significance at 1%, 5%, and 10% level, respectively.

In the main analysis, the research question of whether firms, which have to comply with the regulations, and hence pertain to the treatment group, on average increase their ratio of females, as intended by the regulators, is addressed. The results in Table 6 show the yearly treatment effects from 2011 until 2019. The variables of interest are the respective yearly variables of which capture the treatment effects, where the main one is the coefficient of the interaction term the year the EU directive became effective (*2017xTreated*). A positive (negative) coefficient indicates an increase (decrease) within the treatment group of the dependent variable, ratio of females on the board, after the enactment of the EU directive.

There are two main insights based on Table 6. First, the results suggest that the treatment firms respond to the disclosure mandate in the year of 2017, relative to the group of control firms,

indicated by the positive coefficient of 0.007 which is significant on a 5% level. Thus, there is a positive relationship to be found between the year of when the EU directive became effective and the ratio of females on Swedish boards among the firms in the treatment group, which is in line with prior studies, documenting real effects following mandated non-financial disclosures, for a specific country (e.g., Chen et al. 2018). The positive coefficient is in turn in line with the hypothesis that gender diversity disclosures increase the share of women on company boards.

Secondly, observing the trends of the yearly treatment variables, the coefficients are negatively correlated with the ratio of females in the years 2011-2013, while being significant on a 1% and 10% level. This indicates that the proportion of females decreased by 2.05-, 1.60-, and 0.79 percentage points respectively for firms in the treatment group compared to the control group during these years. The years following the passage of the EU directive in 2014, a negative but not significant correlation is estimated. These results differ from prior findings by Fietcher et al. (2020) who found results of increased CSR performance already before the disclosure mandate became effective. However, although Fietcher et al. (2020), investigates the real effects of the same EU directive, their outcome is different as well as their setting as they study firms across the EU (with US firms as control group) and real effects in terms of whether CSR activities increase. Continuing, as mentioned, a positive and statistically significant coefficient in the year of 2017, when the regulation became effective, are found which also increases confidence due to the insignificance in the years prior to the enforcement, 2014-2015, providing evidence that the ratio of females is not trending ahead of when the regulations became effective. Lastly, the results indicate a positive yet insignificant treatment effect in the years 2018-2019.

These findings show that the treatment firms on average increased the ratio of females in their boards in response to the mandated disclosures at the time when it became effective. However, they do not materialize prior to the EU directive's enforcement, i.e., after the passage of the EU directive.

5.2.2 Pre- & Post Treatment Effect of the Mandated Disclosures

Table 7. Difference-in-difference estimation

	Before	**After**		
Control:	230,229	108,097	338,326	
Treated:	9,436	5,770	15,206	
Total:			353,532	
Dependent variable	**Ratio females**	**Std.Err**	**|t|**	**P> |t|**
Before				
Control	0.297			
Treated	0.353			
Diff (T-C)	0.057	0.003	19.84	0.000***
After	0.304			
Control	0.375			
Treated	0.071	0.004	19.36	0.000***
Diff (T-C)				
Diff-in-Diff	0.014	0.005	3.10	0.002***
R-square		0.00		

Table 7 shows the results of the DiD analysis excluding controls, year- and firm fixed as well as clusters. Means and Standard errors are estimated by linear regression. ***, **, * indicate statistical significance at 1%, 5%, and 10% level, respectively.

As the ratio of female board members might not change from one day to another, the accumulated effects of the regulation on firms' proportion of females are of interest as well, hence empirical tests estimating the average treatment effects over the post regulation period are estimated. The pre-regulation period spans between the years 2011-2016, and post-regulation period being 2017-2019 i.e., after the regulations became effective.

In Table 7 the two differences captured by the DiD analysis are assessed, excluding both controls, year- and firm fixed effects as well as clusters. The first difference being the change in outcomes before and after the introduction of the mandatory diversity disclosure, and secondly the difference between treated firms and control firms. The proportion of female board members increases in both the control group (from 29.7 % to 30.4%) and the treatment group (from 35.3% to 37.5%) between the pre- and post-treatment period. From these ratios it can be derived that on average, it is higher in the treatment group compared to the control group. These two results generate the combined increase in the DiD coefficient of 0.014, which

indicates that the share of female directors increased 1.4 percentage points after the treatment, in comparison with the control group, significant at a 1% level. However, in this table it is not clear whether the observed increase in the share of female directors is attributable to the mandated diversity disclosure or a result of other factors. Therefore, the control variables and fixed effect estimators are introduced, and the regression is presented in Table 8.

Table 8. Difference-in-difference analysis of pre- and post treatment effects

Dependent variable	**Ratio of females**	
Treatment firms	-0.00400	(0.00615)
Post period	0	(omitted)
Post x Treatment firms	0.0136***	(0.00357)
Size (EM)	-0.00644***	(0.00219)
Size (NT)	-0.00950***	(0.00175)
Size (TA)	0.00756***	(0.00155)
I_{EM}(Size >T_{EM})	0.00203	(0.00773)
I_{NT}((Size >T_{NT})	0.0124***	(0.00471)
I_{TA}(Size >T_{TA})	0.0131***	(0.00465)
Size (EM) x I_{EM}	0.00468	(0.0132)
Size (NT) x I_{NT}	-0.0157**	(0.00614)
Size (TA) x I_{TA}	0.0136***	(0.00406)
Board size	-0.00394***	(0.000746)
ROA	-0.00574	(0.00367)
Leverage	-0.00840**	(0.00370)
Female CEO	0.159***	(0.00404)
Firm-fixed effects	Included	
Year-fixed effects	Included	
Number of clusters	52,946	
adj. R^2	0.852	
N	345,753	

Table 8 displays the results from the DiD regression analysis with *Ratio of females* being the dependent variable, and the independent variables indicating the grouped treatment effect i.e., comparing the pre- and post-period. 7779 singleton observations (i.e., groups with only one observation) are dropped in the regression. All coefficients are estimated using cluster-robust standard errors. Standard errors are presented in parenthesis. The variables are described in Appendix. ***, **, * indicate statistical significance at 1%, 5%, and 10% level, respectively.

Table 8, including the controls, fixed effects estimators as well as clusters, the variable of interest is the *Post x Treatment firms* coefficient, showing the interaction term of which captures the difference in the change of ratio of females between treatment- and control firms, subsequent to when the mandatory disclosure became effective. Looking at the interaction term *Post x Treatment firms*, the results from the DiD regression shows a positive coefficient (0.0136) with a statistical significance on a 1% level. In line with the paper's hypothesis, it implies that the treatment firms have experienced an increase in the ratio of females following the EU directive, as compared to the control group. Continuing, the interaction term shows that

the ratio of females increases by 1.36 percentage points. The variable *Post period* coefficient is omitted, because of the FFE, explained in section "4.3 Fixed Effects & Clustering". The coefficient of the variable *Treatment firms* is negative which implies that the ratio of females on average is negatively correlated with the treated firms, however, these results show no sign of significance on a 1%, 5% or 10% level. All together, these findings indicate that the introduction of the mandated disclosure requirement had an impact on firms' ratio of females also when grouped. The results show that firms pertaining to the treatment group increased their share of women within the board after the enactment of the regulation, as compared to the control group. The findings demonstrate that the regulators' objective with the regulation of increasing the ratio of females has been fulfilled also when assuming the size dimensions to be sticky.

5.3 Additional Analysis

5.3.1 Number of Females in Absolute Numbers

Table 9. Difference-in-difference analysis using number of females as the dependent variable

Dependent variable		**Number of females**	
2011xTreated		-0.136***	(0.0284)
2012xTreated		-0.0885***	(0.0268)
2013xTreated		-0.048*	(0.0251)
2014xTreated		-0.0154	(0.0230)
2015xTreated		0.0112	(0.0190)
2017xTreated	*Entry-into-force*	0.0430**	(0.0183)
2018xTreated		0.0233	(0.0214)
2019xTreated		0.0283	(0.0223)
Size (EM)		-0.0199**	(0.00936)
Size (NT)		-0.0350***	(0.00804)
Size (TA)		0.0246***	(0.00642)
I_{EM}(Size >T_{EM})		0.0541	(0.00425)
I_{NT}((Size >T_{NT})		0.0689***	(0.00212)
I_{TA}(Size >T_{TA})		0.0783***	(0.00226)
Size (EM) x I_{EM}		-0.0395	(0.0746)
Size (NT) x I_{NT}		-0.0847**	(0.0332)
Size (TA) x I_{TA}		0.0109***	(0.0233)
Board size		0.274***	(0.00504)
ROA		-0.173	(0.0142)
Leverage		-0.0188	(0.0146)
Female CEO		0.520***	(0.0161)
Firm-fixed effects		Included	
Year-fixed effect		Included	
Number of clusters		52,946	
adj. R^2		0.855	
N		345,753	

Table 9 displays the results from the DiD regression analysis with *Number of females* being the dependent

variable. 7779 singleton observations (i.e.groups with only one observation) are dropped in the regression. All coefficients are estimated using cluster-robust standard errors. Standard errors are presented in parenthesis. The variables are described in Appendix. ***, **, * indicate statistical significance at 1%, 5%, and 10% level, respectively.

In this additional analysis, the increase in the actual number of female board members is examined, compared to the share of women in the main analysis. From this table it can be extracted that the yearly treatment effect for 2017 is positive to a higher degree (0.043), compared to when the dependent variable was defined as the ratio of females (0.00725). This result is significant at a 5% level. Indicating that the actual number of females increases when the board size increases.

Hence, it is clear that the number of females is highly correlated with the size of the board. This is in line with prior literature (Adams and Ferreira, 2009; Ahern and Dittmar, 2012) showing that firms with larger boards have a positive and significant effect on how many women are represented on the board. In addition, Ahern and Dittmar (2012) states that the probability that a woman is employed is higher for larger boards. This finding further raises the question whether the board size increased in response to the EU directive, and that the newly employed board member is a woman rather than a woman replacing a man in the board. The statistical outcome of this question is out of scope of this paper but will be further discussed in section 7 “Conclusion and Future Research”.

5.3.2 Public firms as the Treatment Group

Table 10. Difference-in-difference analysis with public firms as the treatment group

Dependent variable	**Ratio of females**	
Treatment Public	0.00813	(0.0143)
Post period	0	(omitted)
Post x Public Treated Firms	0.0387**	(0.0153)
Size (EM)	-0.00640***	(0.00219)
Size (NT)	-0.00968***	(0.00175)
Size (TA)	0.00760***	(0.00155)
IEM(Size >TEM)	0.00148	(0.00761)
INT((Size >TNT)	0.0119***	(0.00434)
ITA(Size >TTA)	0.0132***	(0.00417)
Size (EM) x IEM	0.00317	(0.0133)
Size (NT) x INT	-0.0128**	(0.00602)
Size (TA) x ITA	0.0141***	(0.00406)
Board size	-0.00402***	(0.000746)
ROA	-0.00578	(0.00367)
Leverage	-0.00847**	(0.00370)
Female CEO	0.160***	(0.00405)
Firm-fixed effects	Included	
Year-fixed effects	Included	
Number of Clusters	52,946	
adj. R^2	0.825	
N	345,753	

Table 10 displays the results from the DiD regression including only public firms in the treatment group, with the *Ratio of females* being the dependent variable and the independent variables indicating the grouped treatment effect i.e., comparing the pre- and post-period. 7779 singleton observations (i.e., groups with only one observation) are dropped in the regression. All coefficients are estimated using cluster-robust standard errors. Standard errors are presented in parenthesis The variables are described in Appendix. ***, **, * indicate statistical significance at 1%, 5%, and 10% level, respectively.

In this additional test, public firms above the thresholds are assessed. The purpose of this test is to analyze the reasons for the increase in female directors in response to the EU directive and derive the potential difference between public and private firms. Specifically, in terms of investor demands, as public firms are to a higher degree subject to external stakeholder pressure as discussed in Chapter 3. When doing the test with a control group of public firms fulfilling one, or none, of the requirements no results were found, due to a limited sample. Although it would have been the most comparable control group, due to different stakeholder demands depending on whether a firm is privately owned or publicly listed, all other firms, both the public firms not fulfilling the requirements and all privately held firms, constitute the control group. Notably, it is not consistent with a regular DiD analysis as the control and treatment

group should be comparable except the effect of the EU directive. These groups might now be affected by different trends in the dependent variable. However, this test is not part of the main analysis, rather an additional test examining potential reasons for change.

What can be seen is that the average treatment effect for public firms in the treatment period is higher (0.0387 compared to 0.0136), which is significant at a 5% level. This result indicates that firms, that are subject to external stakeholder pressure, respond more to the directive. However, it should be taken into consideration that, as mentioned, firstly that the dependent variable in the treatment versus the control group might be affected by different trends. Secondly, as seen in table 10, the test is based on a pre- and post-period not taking into account that firms might move between the different groups.

6 Discussion

Our results indicate a positive and significant correlation between the share of women and the treated firms which have to comply with the mandated disclosures. This effect is found both when studying the yearly treatment effect in 2017, when the EU directive became effective, as well as the average treatment effect of the pre- and post-period. These results are in line with the prior literature on which the paper's hypothesis is developed. Although not further statistically examined in this paper, there are several reasons provided by prior literature that can explain the results. Firstly, in line with Christensen et al. (2017) and Rauter (2020), the mandated requirement of disclosing such information, which prior to the regulation was available, strengthens the fact that the information, when mandated, becomes more accessible to less "sophisticated" investors, as well as to the general public when included in a report more widely spread. The information is also presented in a more detailed way as it requires firms to disclose their diversity policy, including how they promote and reassure equality within the firm. This increases the firm's exposure of the information, the accessibility to external stakeholders as well as the outreach of the information, for example by also reaching investors that are not particularly interested in the diversity information. Consequently, the results of the mandated disclosure requirements could partially be explained by the fact that the information that was accessible already prior to the EU directive, now is presented in more detail and in a more widely spread report and hence the information is recognized to a higher degree.

Secondly, the results can also be explained by shareholder pressure and firms' anticipation of the pressure. Despite the information being accessible before, the mandated diversity disclosures increase transparency as well as comparability when all firms are mandated to disclose in more widely spread reports. This could be a reason for firms actually increasing the share of women in the year of enforcement as they know that the information will become more standardized and hence comparable with other firms, appealing to investors demands in line with Naughton et al. (2019b) and Martin and Moser, (2016).

Lastly, a reason for the actual increase in the share of women during the year of enforcement can be due to the fact that firms want to avoid potential reputational costs. Due to the size related thresholds, corporations subject to the law are larger firms which potentially are more exposed to external pressure, hence their reputational cost is presumably higher in line with Christensen et al. (2021). Christensen et al. (2021) further states that firms subject to greater public scrutiny are in turn subject to larger negative reactions which might explain the higher degree of correlation found in the additional analysis when using only publicly listed firms as the treatment group. Adding to this, in Sweden where gender diversity has become a highly debated and important subject in society, revealing something which the public would condemn in line with Dyck et al. (2008) might have been the reason for why firms in the year of 2017 increased the ratio of females on boards at the exact time of when this information became available. To conclude, the real effects shown through an increase in the ratio of females might be explained by any of these reasons. Whether increased awareness, investor demands or reputational costs, or a combination of these have had the largest effect on the is an interesting subject for future research.

However, it is important to highlight that the real effects can be considered somewhat limited, showing only a positive and significant yearly treatment effect for the treatment group in the year when the EU directive became effective. The results of this paper neither show an anticipation effect in the years after the announcement, 2014 leading up to 2017, nor after the enforcement, 2018-2019. Notably, the nature of change is sticky, implying that firms do not change the members of the board each year. By conducting the additional analysis regarding the actual number of females, the findings show that the actual number of females is highly correlated with the size of the board, indicating that the actual number of females increases when the board size increases, in line with prior research. This result indicates that firms to

some degree increase the board size in order to increase the number of women, which might be a result of the sticky nature of change. In addition, when it is time to employ a new board member, the pool of suitable female directors to choose between might be limited, compared to the number of suitable men. This was demonstrated in Norway when imposed gender quotas led to firms having to employ female candidates to fulfill the gender quotas, but at the cost of firm value (Ahern and Dittmar 2012). Even if firms might have the intention to increase the number of females on the board following the mandated diversity disclosure, this change might take several years to implement and can explain the potential insignificance in the two years that follow.

In addition, as a firm can move between the treatment and control group depending on the fulfillment of the required thresholds, this could have implications for the limited effects as firms hovering around the thresholds might be aware that they do not always have to disclose their gender diversity and hence do not address it to the degree it is intended. For this reason, it would be reasonable to assume that the effect will be stronger for firms that are far above the threshold and hence have to comply with the regulations for several consecutive years, and that the effect in turn would become stronger in the years that follow as they know that they will have to disclose this information in the future.

Another reason for the somewhat limited real effects detected in the treatment group could be that the information mandated to be included in the Corporate Governance report following the EU directive, already was available. If investors or other stakeholders emphasize this type of information, they were able to look it up and take it into consideration already prior to it being mandatorily disclosed in the reports. Lastly, the limited results could be explained by the already relatively high level of CSR awareness, disclosure and performance, which also includes a high share of females within the boards in Sweden compared to other EU member states in line with Fietcher et al. (2020). Nevertheless, as results are still found, the limited effect could have been offset by the fact that the author also argues that effects could be larger for firms domiciled in jurisdictions where public enforcement is high, as is the case of Sweden (Fietcher et al. 2020).

Concluding, despite limited effects detected prior to the enforcement and the years that follow after the enforcement, the findings of this paper show a positive and statistically significant

effect in the increase in the share of women on boards for the treatment group in the year of 2017.

7 Conclusion & Future Research

7.1 Conclusion

Gender equality is an area gaining more and more attention. Despite the positive development, there is still a long way to go in achieving full gender balance, even for a country like Sweden. In order for boards to be more diverse, the EU directive was introduced with the aim of providing the market with access to certain relevant information and as a consequence put indirect pressure on certain corporation's diversity of boards. The EU directive includes mandating certain large firms to increase their disclosure and to be more transparent regarding the diversity policy applied, including the gender of board members. This paper examines the effectiveness of this policy and whether it has had real effects on firm behaviors, i.e. if it has increased the share of women on boards. This is done by addressing the research question: *Does mandated diversity disclosures have real effects on board gender diversity?* Based on prior literature the paper hypothesized that the diversity disclosures encourage firms to increase their gender diversity on boards. Using a DiD analysis, enabling both the time aspect and comparison with a control group to be taken into account, this paper provides evidence on the real effects of the policy by demonstrating a positive and statistically significant increase in the ratio of females on company boards in response to the mandated diversity disclosures, and therefore supporting the paper's hypothesis.

The findings of this paper contribute to the existing literature on real effects in response to mandatory disclosures. The paper extends this literature by being the first, to our knowledge, examining the effects of mandated gender diversity disclosures and the effect it has on firm behavior, and whether including such disclosures increase the share of women on boards. Although research on real effects, in response to mandated disclosures, have been studied before, the setting and context has not. Even though studies have explored the association of board of directors and diversity disclosures, no study has explored it in the context of the EU directive, its real effects on increased gender diversity and within the setting of Sweden. By including yearly treatment effects, to capture the effect of firms moving in and out of the treatment group, in combination with the full-sample control function used, the research design applied can be considered a contribution itself. Additionally, the paper adds to the prior

literature by including private firms in the sample. The extensive availability of data allows for taking into account the implications of whether or not private firms indirectly are affected by mandated disclosure requirements for publicly listed firms. Lastly, the results are relevant to the policy makers by demonstrating the effectiveness in the regulation imposed and efficiency in mandating disclosure of information regarding social responsibility. The beauty of the results found, indicating that the mandated disclosures have led to an increase in the share of women on company boards and hence an overall step in reaching gender equality, is that in the end gender equality is something every human being will gain from.

7.2 Limitations & Future Research

There are several limitations with this study, as well as identified areas of potential future research. Firstly, as a standard DiD analysis is not performed, the research design violates the traditional assumptions a standard DiD method entails. One such assumption being the parallel trend assumption, which implies that the treatment- and control groups would follow the same trends in the absence of the mandated requirements. Notably, the comparing groups are not fixed, hence it is not possible to test for comparable trends prior to the directive. This would be interesting as a topic to further research upon, by reducing the dataset to contain only firms staying in the same group throughout the time period. In addition, we cannot control for whether firms that should comply do so, or whether firms not mandated to comply do.

Secondly, it is important to acknowledge that the estimates are specific to Sweden, in terms of how Sweden has decided to implement the EU directive. Swedish firms can be considered to be different to firms in other EU member states, as Sweden has a relatively high CSR performance in comparison to many other member states. However, although this to some extent limits the generalization, it can be argued that the economic mechanisms underlying the results are still useful for other countries or regions making it an interesting study to replicate in countries with lower CSR performance, as well as gender diversity. For future studies it would be interesting to see whether it will show higher results along the lines of Fietcher et al. (2020), who states that firms with poorer CSR performance show stronger results. Additionally, the sample of Swedish firms is restricted to board gender data from the Serrano database which is reliable and extensive. However, by using this dataset firms where this information is missing are excluded. In addition, the use of other databases could have challenged the accuracy in the board gender data used. In terms of data, another topic for future research could have been to

investigate whether it would have been possible to see higher results for firms in more controversial sectors, as these firms according to prior literature are more likely to provide non-financial disclosures, as a way to signal to the public that they take responsibility.

Third, another limitation of the results is the fact that whether women increase in conjunction with the board size or that men instead are being replaced by women are not addressed. In the additional analysis in section 5.3.1 "Number of Females in Absolute Numbers", it is found that the number of females is highly correlated with the board size, however, it is not further looked into whether the board size increases as a consequence of the EU Directive and in what way women increase. In order to elaborate and enhance the understanding of the paper's results, a topic for future research would be to look into whether the board size increased in response to the EU directive, and to what extent this was driven by the intentions of disclosing more gender equal facts i.e., to what extent women replaced their male colleagues or rather was added to the board. The prior research indicates that board size can have an impact on the gender of the directors, hence it would be an interesting topic to study.

Lastly, the paper's approach is limited to gender diversity disclosures and does not address diversity in general, which is what the EU directive includes. Furthermore, although a positive and significant increase in the ratio of females in the boards are found, we are not in position to draw any conclusions regarding the specific reason for the increase or the overall effects of the firms. For instance, the financial implications of the increase in the share of women on the board are not addressed, which could be investigated in future research. The suggested area for future research could, as an example, compare the financial implications of the disclosure requirement in Sweden with a firm domiciled in a country with imposed gender quotas in order to see both the effectiveness of the disclosure requirements as well as its financial implications in relation to gender quotas.

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APPENDIX

Variable Description

Variable	*Variable name Stata*	*Description*
Ratio of females	ratio_females	The ratio of females based on number of females in relation to board size.
Number of females	nr_females	Actual number of females in the board
2011xTreated	T11_treat	Indicator variable taking the value 1 if the year is 2011 and the firm is mandated to disclose its diversity policy according to the EU Directive, and 0 otherwise.
2012xTreated	T12_treat	Indicator variable taking the value 1 if the year is 2012 and the firm is mandated to disclose its diversity policy according to the EU Directive, and 0 otherwise.
2013xTreated	T13_treat	Indicator variable taking the value 1 if the year is 2013 and the firm is mandated to disclose its diversity policy according to the EU Directive, and 0 otherwise.
2014xTreated	T14_treat	Indicator variable taking the value 1 if the year is 2014 and the firm is mandated to disclose its diversity policy according to the EU Directive, and 0 otherwise.
2015xTreated	T15_treat	Indicator variable taking the value 1 if the year is 2015 and the firm is mandated to disclose its diversity policy according to the EU Directive, and 0 otherwise.
2017xTreated	T17_treat	Indicator variable taking the value 1 if the year is 2017 and the firm is mandated to disclose its diversity policy according to the EU Directive, and 0 otherwise.
2018xTreated	T18_treat	Indicator variable taking the value 1 if the year is 2018 and the firm is mandated to disclose its diversity policy according to the EU Directive, and 0 otherwise.
2019xTreated	T19_treat	Indicator variable taking the value 1 if the year is 2019 and the firm is mandated to disclose its diversity policy according to the EU Directive, and 0 otherwise.
Treatment firms	dummy_treatment	Indicator variable taking the value 1 if the firm is mandated to disclose its diversity policy according to the EU Directive, and 0

		otherwise.
Post period	post_treatment	Indicator variable taking the value 1 if s firm-year observation falls in the post-period, i.e. 2017-2019, and 0 otherwise.
Post x Treated firms	post_treated	An interaction term that takes on the value 1if a firm falls in the post-period, and 0 otherwise.
Treatment Public	treatm_public	Indicator variable taking the value 1 if the firm is a public firm and mandated to disclose its diversity policy according to the EU Directive, and 0 otherwise.
Post x Public Treated firms	post_pub_treated	Indicator variable taking the value 1 if s firm-year observation falls in the post-period, i.e. 2017-2019, and 0 otherwise.
Size (EM)*	rel_distance_emp	Relative employees. Natural logarithm of employees over employees threshold (Source: Breuer et al. 2018)
Size (NT)*	rel_distance_nets	Relative net turnover. Natural logarithm of net turnover over net turnover threshold. (Source: Breuer et al. 2018) Net turnover in TSEK.
Size (TA)*	rel_distance_tota	Relative total asset. Natural logarithm of total assets over total assets threshold. (Source: Breuer et al. 2018) Total asset in TSEK.
$I_{EM}(Size > T_{EM})$*	threshold_employees	Indicator variable taking the value of 1 if employees exceed the employee's threshold and 0 otherwise (Source: Breuer et al. 2018)
$I_{NT(}(Size > T_{NT})$*	threshold_turnover	Indicator variable taking the value of 1 if net turnover exceeds the net turnover threshold and 0 otherwise (Source: Breuer et al. 2018) Net turnover in TSEK.
$I_{TA}(Size > T_{TA})$*	threshold_balancetotal	Indicator variable taking the value of 1 if total assets exceed the total assets threshold and 0 otherwise (Source: Breuer et al. 2018) Total asset in TSEK.
Size (EM) x I_{EM} *	interaction_emp	Interaction of relative size variable and the respective threshold indicator. (Source: Breuer et al. 2018)
Size (NT) x I_{NT} *	interaction_nets	Interaction of relative size variable and the respective threshold indicator. (Source: Breuer et al. 2018)

Size (TA) x I_{TA} *	interaction_tota	Interaction of relative size variable and the respective threshold indicator. (Source: Breuer et al. 2018)
Board size	board_size	Number of board members
ROA*	ROA_w1	Profitability measure. Return on assets, calculated as Net income to Total asset
Leverage *	lev_w1	Calculated as Total debt to Total assets
Female CEO	sum_fem_ceo	Indicator variable taking the value 1 if the CEO (firm-year) a female, 0 otherwise

* Value subject to winsorizing at a 1% (99%) level