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ABSTRACT

Using a large sample of EU non-financial firms over the period 2008–2018, this study examines the effect of the 2014 EU Non-Financial Reporting Directive on corporate social responsibility (CSR) and finds that the Directive has led to an increase in CSR transparency and performance. Further, it shows that the association between the Directive and CSR transparency is stronger for smaller firms, firms highly followed by analysts and firms headquartered in countries with strong legal systems. The adoption of CSR reporting after the Directive's enactment, small firm size and investments in research and development strengthen the positive effects of the Directive on CSR performance. However, the mandating of CSR reporting assurance by some EU member states seems not to have any significant impact. Lastly, our study shows that after the Directive's enactment, firms adopting CSR reporting experienced lower systematic risk and cost of equity. Our study contributes to the debate about whether and how non-financial disclosure should be regulated and shows the positive effects of the 'comply or explain' approach. It also provides insights for the EU in relation to the recently approved proposal to extend CSR reporting regulation to listed small and medium-sized enterprises and mandate CSR reporting assurance.

1. Introduction

This study examines the effects of the corporate social responsibility (hereafter CSR)[1] reporting requirements introduced by the EU Non-Financial Reporting Directive (2014/95/EU, hereafter 'EU NFRD' or 'the Directive'). Enacted in 2014, the Directive requires publicly listed companies in EU member states[2] with financial year ends on 31 December 2017 or after to include a non-financial statement in their annual reports. This statement should provide comprehensive information (i.e. policies, risks and outcomes) on environmental, social and employee matters, including respect for human rights, anti-corruption and bribery. The ultimate aim is to encourage the swift movement of EU member states towards a more sustainable global economy (European Commission 2014). The disclosure requirement introduced by the Directive is, however, non-binding and adopted using the 'comply or explain' approach, according to which companies can choose to not disclose the regulated information, but rather explain the reasons for their non-compliance (Alliance for Corporate Transparency 2019). Therefore, it is a priori uncertain whether the Directive has been successful in promoting CSR transparency and, consequently, in improving the social responsibility of the companies targeted by the Directive.

We are motivated to investigate the effects of the EU NFRD on social responsibility transparency and performance as, although the academic research on CSR has expanded greatly, especially in the last 25 years, there is still an on-going debate in the finance literature about the effects of CSR regulation on social responsibility; therefore, more research is needed in this context (Gillan, Koch, and Starks 2021; Sun and Gunia 2018). Previous literature shows that the real effects of CSR are more likely to follow from mandatory than voluntary

disclosures (Christensen et al. 2017). The literature on non-financial reporting is, however, not well-developed in comparison to that of financial reporting. Moreover, there is not a common view about the effectiveness of a non-binding approach, such as the use of the comply or explain principle to improve corporate governance practices and increase accountability (Fasterling and Duhamel 2009; Ho 2017; ICAEW 2013). Therefore, the impacts of CSR disclosures based on the comply or explain approach on real practices are still unclear. In addition, despite several recent studies investigating the effects of the EU NFRD (Chiaramonte et al. 2021; Grewal, Riedl, and Serafeim 2019; Jackson et al. 2020; Mittelbach-Hörmanseder, Hummel, and Rammerstorfer 2020), their focus has been mostly on firm-level effects, in terms of firm value and stock market reaction, and on the period in which the Directive's requirements were not yet applicable. To our knowledge, no study has yet investigated the effects of the Directive using a large sample of EU companies by considering the period in which companies were required to apply the requirements of the Directive.

Our findings reveal the positive effects of the comply or explain approach used by the EU NFRD on the number of companies publishing CSR reports (i.e. CSR transparency) and their social and environmental performance (i.e. CSR performance). These results are in line with the stream of the extant literature on disclosure regulation, which has provided evidence for the effectiveness of regulation and the use of the comply or explain approach to discipline corporate behaviours in terms of compliance (e.g. Ioannou and Serafeim 2019; He and Li 2018) and desirable outcomes (e.g. Bennear and Olmstead 2008; Chen, Hung, and Wang 2018; Christensen et al. 2017; Delmas, Montes-Sancho, and Shimshack 2010). Our findings are robust to several robustness tests, including alternative measures and model specifications. In addition, our study provides supplementary evidence to support the effectiveness of the Directive in achieving its ultimate aim of a more sustainable society by testing the moderating role that the adoption of CSR reporting after the enactment of the Directive has played in the positive effects of the Directive on CSR performance. The results of this analysis show that these effects are significantly stronger for firms that increased their CSR transparency after the Directive was issued, providing further evidence that CSR disclosure is key in the move towards a more sustainable global economy. This study also provides evidence of the potential impacts of the new EU legislation on corporate sustainability reporting. The Corporate Sustainability Reporting Directive (CSRD) aims at extending the 2014 EU NFRD's disclosure requirements to listed small and medium-sized enterprises and mandating CSR reporting assurance (EU 2021). It also tests the moderating roles of firms' size and CSR reporting assurance, which were already mandated by several, but not all, EU member states.

First, our findings show that firms' size moderates the positive effects of the Directive on CSR transparency and performance, with these effects being significantly stronger for smaller firms. This is likely due to the fact that smaller firms were characterised by lower engagement with CSR reporting and performance before the Directive was enacted. Our results suggest that the Directive was effective in stimulating smaller firms to adopt more CSR-oriented practices, which ultimately led to an improvement in their environmental and social performance. Therefore, our findings support the European Commission's decision to extend the Directive's requirements to listed small and medium-sized enterprises. Second, our findings suggest that the mandating of CSR reporting assurance did not play any significant role in the promotion of CSR transparency and performance. In addition, in line with previous literature (e.g. Christensen, Hail, and Leuz 2021; Jackson et al. 2020), this study also provides evidence of the positive impacts played by additional moderating channels – such as firms' investments in research and development (R&D), analysts following a firm and the strength of the legal system in the country in which the firm is headquartered – on the positive association between the EU NFRD and CSR transparency and performance. Last but not least, this study shows that after the enactment of the EU NFRD, firms adopting CSR reporting practices experienced lower systematic risk and cost of equity, thus supporting the literature (e.g. Albuquerque, Koskinen, and Zhang 2019; Cheung 2016; Liu, Ju, and Gao 2021), according to which CSR represents a differentiation strategy which by increasing customer loyalty increases firms' market power and reduces firms' cost of equity and risk.

Our findings make several contributions to the extant literature on CSR and information disclosure regulation and are relevant for policymakers and regulators. First, by providing evidence of the positive effects generated by the Directive in terms of CSR transparency and performance and firms' cost of equity and systematic risk, we answer the calls for more research specifically on the EU NFRD (i.e. Grewal and Serafeim 2020; La Torre et al. 2018, 2020) and extend the emerging CSR literature that has examined the effects of non-financial reporting

regulation, and the EU NFRD more specifically, on CSR transparency and practices (e.g. Chen, Hung, and Wang 2018; Chiaramonte et al. 2021; Grewal, Riedl, and Serafeim 2019; Jackson et al. 2020; Mittelbach-Hörmanseder, Hummel, and Rammerstorfer 2020), an area that is still under-researched. Second, by showing that the comply or explain approach is effective in shaping the behaviour of companies in terms of CSR transparency and performance, this study contributes to the important debate within the literature as to whether and how non-financial disclosure should be regulated (Christensen, Hail, and Leuz 2021; Cooper and Owen 2007; Ho 2017; Lu and Abeysekera 2021; Pizzi et al. 2022). Third, our study provides important contributions to the literature that has investigated the effectiveness of the comply or explain approach with regard to regulating corporate behaviours, which has mostly focused on corporate governance practices (e.g. Andres and Theissen 2008; He and Li 2018; Merkl-Davies and Brennan 2017; Senn 2018; Shrives and Brennan 2017) by providing empirical support for the effectiveness of this approach in disciplining the disclosure of non-financial information (Ho 2017). Last but not least, our study contributes to the literature on CSR regulation (Christensen, Hail, and Leuz 2021) by providing evidence of several channels (i.e. firms' size, firms' investment in R&D, analysts following a firm and the strength of the country's legal system) that increase the effectiveness of disclosure regulation in relation to improving CSR transparency and performance.

The rest of the paper is organised as follows. Section 2 reports our literature review and main hypotheses, while Section 3 describes our research design, data gathering and sample. In Section 4, we discuss our main empirical results. Section 5 presents several additional tests and robustness checks. Section 6 concludes the paper and provides some implications for policy.

2. Selected literature and hypothesis development

2.1. Literature review

A growing body of literature has started investigating the role of non-financial disclosure regulations in shaping corporate behaviours (Chen, Hung, and Wang 2018; Grewal, Riedl, and Serafeim 2019; Ioannou and Serafeim 2019; Jackson et al. 2020; La Torre et al. 2018; Lu and Abeysekera 2021; Pizzi et al. 2022; Mittelbach-Hörmanseder, Hummel, and Rammerstorfer 2020; Stolowy and Paugam 2018). While some studies have focused on the impact of regulations in increasing the quality and quantity of disclosure (Ioannou and Serafeim 2019; Stolowy and Paugam 2018), others have examined its effects in relation to CSR activities (Jackson et al. 2020), corporate performance (Chen, Hung, and Wang 2018), corporate value (Grewal, Riedl, and Serafeim 2019; Ioannou and Serafeim 2019; Lu and Abeysekera 2021), cultural factors (Pizzi et al. 2022) and social impacts (Chen, Hung, and Wang 2018; Jackson et al. 2020). Overall, the issue is far from settled and recent studies report mixed results.

Chen, Hung, and Wang (2018) examined the impact of the CSR disclosure mandate enacted in China in 2008. They found a decrease in firms' profitability subsequent to the mandate, but also a decrease in industrial wastewater and CO_2 emission levels in the cities where the firms most impacted by the disclosure regulation were based, suggesting that CSR disclosure generates positive externalities for society at the expense of firms' profitability and shareholders. Ioannou and Serafeim (2019) investigated the effect of the mandatory disclosure of sustainability information in China, Denmark, Malaysia and South Africa on firms' disclosure practices and valuations. Their findings show that regulated firms significantly increased CSR disclosure in the post-regulation period and were more likely to voluntarily adopt CSR reporting assurance and reporting guidelines to enhance disclosure credibility and comparability. The authors also showed that the increase in sustainability disclosure driven by the regulation was associated with increases in firm valuations. Grewal, Riedl, and Serafeim (2019) examined the market reaction to events associated with the implementation of the EU NFRD and found that although market reaction to the Directive was on average negative, firms with higher pre-Directive non-financial performance and disclosure levels had fewer negative market reactions. These results support Ioannou and Serafeim (2019)'s findings that non-financial disclosure has positive effects on firm value. Contrasting results were found by Mittelbach-Hörmanseder, Hummel, and Rammerstorfer (2020), who focused on firms listed in the STOXX Europe 600 for the period 2008–2016 and found that the association between topic-specific CSR disclosure and firm share price became significantly negative following the announcement of the Directive. In a

similar vein, the results of Jackson et al. (2020), who examined the effects of the EU NFRD on CSR in 24 OECD countries, show that although the introduction of CSR disclosure regulation led firms to adopt significantly more CSR activities, it did not lower the levels of corporate irresponsibility, thus calling into question the effectiveness of regulation in promoting socially responsible behaviours.

Overall, previous studies have shown both positive and negative effects of non-financial reporting regulation, with a prevalence of studies finding positive effects for corporations. These, however, seem to be associated with some of the characteristics of the firms analysed, such as the level of CSR performance and disclosure before the CSR regulation became applicable (Grewal, Riedl, and Serafeim 2019). The research on non-financial reporting regulation and on the EU NFRD, in particular, is still in its infancy (La Torre et al. 2018), with more studies needed to explore the effects of the EU NFRD on corporations and society (Grewal and Serafeim 2020). The literature indicates that the real effects of CSR are more likely to follow from mandatory than voluntary disclosures (Christensen, Hail, and Leuz 2021). This literature is, however, not developed in comparison to the financial reporting literature, and the effects of CSR disclosures based on a non-binding approach in 'day-to-day' practices, such as the comply or explain approach, are still unclear. Our study aims to contribute to and extend this literature by evaluating the effects of the EU NFRD on CSR transparency and social and environmental performance.

2.2. Hypothesis development

Disclosure regulation seeks to promote corporate transparency by demanding that companies disclose both positive and negative information about themselves that they might otherwise be reluctant to issue (Verrecchia 2001). The more companies comply with such disclosure requirements, the higher the amount of proprietary and non-proprietary information they will make available to investors and corporate stakeholders (Dye 1986). Disclosure regulation aims to protect corporate investors and stakeholders by increasing the information available to them, hence allowing them to undertake better decision-making (Easterbrook and Fischel 1984). By issuing the Directive, the EU has raised the perceived importance of sustainability issues in society with the aim of increasing corporations' transparency and accountability towards their stakeholders (European Commission 2014). Mandatory disclosure is expected to improve corporate transparency, as firms that react positively to disclosure regulations signal that they are committed to transparency, accountable for the actions taken and willing to follow societal norms and expectations (Ioannou and Serafeim 2019). The EU NFRD, however, does not mandate companies to report non-financial information; rather, it relies on the comply or explain approach, according to which companies have the option to comply with the disclosure requirement or to explain the reasons for their non-compliance. The comply or explain approach has been widely used in corporate governance regulations (such as corporate governance codes), and only recently it has been applied in relation to corporate reporting. The literature that has studied the comply or explain approach presents a high degree of scepticism as to its effectiveness (e.g. Andres and Theissen 2008; Senn 2018; Shrives and Brennan 2017), arguing that it provides companies with the opportunity to use cursory explanations to deviate from the regulatory requirements, thus resulting in few firms complying with the requirements. However, other studies (He and Li 2018; Merkl-Davies and Brennan 2017) have pointed out that the comply or explain approach is likely to promote compliance, as companies might be worried about reputational damage and negative investor reactions in the case of non-compliance. Such concerns become particularly relevant in relation to the EU NFRD, since previous studies have found that companies undertake CSR activities to positively influence their reputation (Rothenhoefer 2019). It is, therefore, a priori unclear what the effects of the Directive, using the comply or explain approach, might be on CSR transparency. Based on the above arguments, we propose the following first hypothesis *H1a* with its alternative *H1b*:

H1a: The EU NFRD increases CSR transparency in EU firms.

H1b: The EU NFRD does not increase CSR transparency in EU firms.

By regulating the disclosure of CSR information, regulators can induce firms to alter their behaviour related to CSR and encourage them to adopt more CSR-oriented activities. This because disclosure regulation is likely to pressure companies to increase the disclosure of CSR-related information and provide corporate stakeholders

with valuable information to evaluate their commitment to CSR. Put simply, companies might feel pressured to engage with CSR activities to signal to their stakeholders that they are good performers (Chen, Hung, and Wang 2018). CSR disclosure regulation could also make CSR-related behaviour more attractive to corporations. Thanks to the increase in the information on CSR activities that is available in the market, companies can learn more about CSR activities and use the information published by their competitors to better position themselves among their peers (Russo-Spena, Tregua, and de Chiara 2016; Tomar 2019). Previous studies have indeed shown that disclosure regulation is positively associated with improvements in the metrics used to assess the performance of the regulated practice (e.g. Bennear and Olmstead 2008; Christensen et al. 2017; Delmas, Montes-Sancho, and Shimshack 2010). On the other hand, however, in line with institutional theory, it can be argued that CSR disclosure regulation might create an incentive for managers to respond to regulatory demand with mere symbolic compliance, where they appear to comply without following the spirit of the regulation (Meyer and Rowan 1977). This would result in companies only appearing to follow regulatory expectations, without changing their attitude towards CSR (e.g. Scalet and Kelly 2010). The comply or explain approach could lessen these criticisms, as companies are not obliged to disclose CSR information but can choose not to disclose and instead explain the reasons for non-compliance. Therefore, based on the above arguments, we formulate our second hypothesis *H2a* with its alternative *H2b* as follows:

H2a: The EU NFRD leads to an increase in the social and environmental performance of EU firms.

H2b: The EU NFRD does not lead to an increase in the social and environmental performance of EU firms.

3. Research design and data

3.1. Research design

To test our hypotheses *H1a(b)* and *H2a(b)*, we estimate the following regression model:

$$Y_{i,t} = c + \beta_1 PostDirective_{i,t} + \beta_2 Directive_{i,t} + \beta_3 Size_{i,t-1} + \beta_4 Tobin'sQ_{i,t-1} + \beta_5 Lev_{i,t-1}$$
$$+ \beta_6 Asset\ Turnover_{i,t-1} + \beta_7 CFO_{i,t-1} + \beta_8 PPE_{i,t-1} + \beta_9 RuleOfLaw_{i,t-1} v_i + \gamma_i + \delta_i + \varepsilon_{i,t} \quad (1)$$

For *H1*, our dependent variable *Y* is the CSR reporting score, a dichotomous variable equal to 1 for firms reporting about CSR, and 0 otherwise. This measure answers the following question: Does the company publish a separate sustainability report or publish a section in its annual report on sustainability? Therefore, it allows us to measure the primary objective of the Directive of enhancing CSR transparency in the EU. For *H2*, we use two different dependent variables, *Y*: the level of the environmental (ENV) score and the level of the social (SOC) score. These scores range from 0 to 100 according to firms' level of engagement in sustainable activities. On the right-hand side of the equation, the variable *PostDirective* is a dichotomous variable equal to 1 in the period after the Directive was enacted (2015–2018), and 0 otherwise; *Directive* is a dichotomous variable equal to 1 for the year (2014) of the signature and entry into force of the Directive, and 0 otherwise. In line with the relevant literature (e.g. Jackson et al. 2020; Liang and Renneboog 2017; Lys, Naughton, and Wang 2015; McGuinness, Vieito, and Wang 2017; Sun and Gunia 2018), we control in our models for several firm-level variables as follows: *Size*, calculated as the natural logarithm of the total assets; *Tobin's Q*, as the ratio of the market value of assets to book value of assets; *Lev*, as the total debt to total assets ratio; *Asset Turnover*, as the total revenues scaled by total assets; *CFO*, as the total cash from operations divided by the total assets; *PPE*, as the property, plant and equipment to assets ratio; and *rule of law*, an index that is a proxy for the strength of the legal system, as it captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police and the courts, as well as the likelihood of crime and violence. v_t, γ_i, δ_i and $\epsilon_{i,t}$ represent industry, year and country fixed effects and the error terms, respectively.[3] The definitions of all the variables are provided in Appendix A.1. The inclusion of industry, year and country fixed effects in our baseline models mitigates the concern of correlated omitted variables.

Given the different econometric nature of our dependent variables, we employ the logit regression model to test our hypotheses *H1a(b)*, where the dependent variable is binary (i.e. the CSR reporting score); this is more appropriate when the response variable takes one of only two possible values (Wooldridge 2013). We use the

panel regression models to test hypotheses *H2a(b)*, where our dependent variables are not binary (i.e. ENV and SOC).[4]

3.2. Data

We follow previous studies and rely on Thomson Reuters Refinitiv, an enhancement and replacement of Thomson Reuters ASSET 4, which has been widely used in previous studies on the effects of mandatory CSR disclosure (for a comprehensive review, see Christensen, Hail, and Leuz 2021). We collect firms' accounting and CSR scores for all EU listed firms over the period 2008–2018, except financial firms (e.g. Chen, Hung, and Wang 2018). The sample spans from 2008 to 2018 and can be split into two main periods. The *pre-Directive period* spans from 2008 to 2013. During this phase, the European Commission identified and reiterated the need to increase the level of corporate transparency of social and environmental information to a similarly high level across all EU member states. A legislative proposal was issued on 16 April 2013. The year 2014 was the year of the signing and entry into force of the Directive. The *post-Directive period* spans from 2015 to 2018. Our sample firms included all non-financial EU firms available on the Thomson Reuters Refinitiv database in 2008 with the exclusion of: firm-years with missing data for the variables used in our analysis; firms headquartered in Greece, where non-financial reporting disclosure has been mandated since 2017, one year before the EU NFRD became mandatory in the other EU countries; and firms from countries with fewer than 11 observations per year during the period of analysis (such as firms from Slovenia). This led to a final sample of firms based in 17 EU countries. It includes 5,732 firm-year observations in relation to hypotheses *H1a(b)* and, due to missing data in relation to environmental and social performance for several companies, 4,099 firm-year observations in relation to *H2a(b)*. For the country sample distribution, industry classification and correlation matrix, see Appendices A.2, A.3, and A.4, respectively.

Table 1 reports the summary statistics for EU firms from the pre-Directive period (2008–2014) to the post-Directive years (2015–2018). It shows that over the period before the passage of the Directive 42% of EU firms were CSR reporting adopters, while the ENV and SOC score reaches the mean values of 0.62 and 0.60, respectively. Interestingly, during the period 2015–2018, all firm-level measures of CSR reporting and practices increase: 66% of EU firms are CSR reporting adopters, with mean values of 0.64 and 0.62 for the ENV and SOC score, respectively. Looking at the control variables, they are consistent with previous research investigating the determinants of the adoption of CSR practices (Chen, Hung, and Wang 2018; Jackson et al. 2020; Lys, Naughton, and Wang 2015) for both pre- and post-Directive periods.

4. Main results

4.1. The effect of the EU NFRD on firms' CSR transparency and CSR performance

Table 2 reports the results of the models used to test our set of hypotheses, namely *H1a(b)* and *H2a(b)*. It shows that the coefficient of the term *PostDirective* is positive and statistically significant in all our models, demonstrating the positive effect of the EU NFRD on CSR transparency and corporate environmental and social performance during the post-Directive period. Our results provide support for *H1a* by showing that the Directive led to an increase in firms' CSR transparency during the post-Directive period. They also provide support for *H2a* by showing that the Directive encouraged companies to commit more to sustainable activities that led to an increase in environmental and social performance scores. In line with the literature (Ioannou and Serafeim 2019), these results indicate that EU firms reacted positively to the Directive, signalling their commitment to transparency, addressing societal norms and expectations. Overall, our results confirm the importance of the European Commission (as regulator) in increasing and harmonising CSR disclosure in companies in the same region (the EU).

5. Additional tests and robustness checks

To better understand the mechanisms underlying the effects of the Directive on CSR transparency and performance, we perform a number of cross-sectional analyses.

Table 1. Descriptive statistics.

Variables	Pre-Directive (2008-2014)							Post-Directive (2015-2018)						
	Mean	Median	St. Dev	Min	p25	p75	Max	Mean	Median	St. Dev	Min	p25	p75	Max
CSR Reporting	.427	.413	.494	0	0	1	1	.665	1	.471	0	0	1	1
ENV	.628	.651	.200	.100	.507	.793	.987	.642	.658	.196	.049	.523	.805	.995
SOC	.607	.625	.199	.053	.501	.781	.990	.629	.644	.192	.031	.503	.794	.990
Resource Use	.657	.703	.247	.002	.517	.867	.998	.675	.717	.234	.002	.530	.880	.998
Emission Score	.651	.691	.245	.004	.5	.864	.998	.657	.702	.244	.001	.508	.872	.998
Environmental Innovation	.574	.544	.256	.004	.370	.824	.997	.591	.593	.260	.001	.385	.825	.997
Workforce	.668	.715	.239	.004	.529	.886	.998	.669	.708	.229	.001	.534	.870	.998
Human Rights	.649	.724	.268	.116	.363	.899	.997	.705	.781	.247	.053	.584	.921	.997
Community	.489	.466	.288	.002	.273	.756	.998	.525	.523	.304	.002	.249	.820	.998
Product Responsibility	.575	.614	.283	.002	.398	.842	.997	.607	.652	.283	.001	.408	.859	.998
SIZE	14.948	14.750	1.830	1.945	13.749	16.116	22.322	1.508	14.977	1.757	6.306	13.905	16.296	22.243
ROA	.039	.048	.123	−.766	.015	.084	.338	.036	.047	.126	−.766	.014	.085	.338
TOBIN'S Q	.548	.139	.101	−.994	.008	.799	5.432	.667	.260	1.030	−.994	.032	.935	5.432
LEV	.062	.045	.015	.003	.090	.190	.644	.527	.496	.136	.003	.091	.221	.644
ASSET TURNOVER	.954	.844	.607	.004	.580	1.21	3.313	.909	.797	.588	.004	.525	1.146	3.313
PPE	.141	.011	.348	.001	.002	.056	1.523	.120	.012	.301	.002	.002	.059	1.523
Rule of Law	1.594	1.627	.245	.401	1.443	1.854	2.120	1.566	1.618	.272	.268	1.398	1.805	2.089

This Table reports the summary statistics (mean, median, standard deviation, minimum, p25, p75 and maximum values) of all variables used to test the effects of the Directive enacted in 2014. All continuous variables are winsorized at the 0.1% level. The detailed variable definitions are provided in Appendix A.1.

5.1. Channel analyses on the effectiveness of the EU regulatory requirements

The first set of cross-sectional tests aim to evaluate: (a) the effectiveness of the EU NFRD's requirements in improving social and environmental performance via the issuance of CSR reporting, and (b) the effectiveness of the proposed regulatory changes, introduced via the CSRD proposal (EU 2021), regarding extending the scope of CSR reporting requirements to listed small and medium-sized enterprises and requiring mandatory CSR reporting assurance.

5.1.1. The moderating role of CSR reporting

By regulating CSR reporting, the EU NFRD aims at encouraging companies to adopt more sustainable practices, resulting in an increase in corporate social and environmental performance. Previous studies have shown that disclosure can alter firms' behaviour in relation to CSR activities, as it pressures companies to engage with CSR activities to signal to their stakeholders that they are good performers (Chen, Hung, and Wang 2018). To evaluate whether the EU NFRD has been effective in achieving its ultimate aims, it is therefore necessary to test whether the positive effects of the Directive on firms' social and environmental performance are higher when firms used CSR reporting for the first time as the result of the EU NFRD's disclosure requirement. To test for this, we create a dichotomous variable, *CSR reporting after Directive*, which equals 1 if a firm adopted CSR reporting after the enactment of the Directive, and 0 otherwise. We then interact this variable with the *PostDirective* variable and test its statistical significance on the variables ENV and SOC. Our results, reported in Table 3, show that the effects of the Directive on the ENV and SOC scores were positive and significantly higher for companies that adopted CSR reporting after the Directive was enacted. These results confirm the importance of regulating CSR reporting to promote the adoption of more sustainable practices and support the issuance of CSR reporting regulation by the European Commission (as regulator), which aims to increase and/or harmonise CSR transparency and performance in companies and in countries that are members of the same region (EU).

5.1.2. The moderating role of firms' size

Larger firms are more able to invest in CSR practices (Jackson et al. 2020; Liang and Renneboog 2017) because of their higher amount of assets and resources and thus economic capabilities. The extant literature has indeed

Table 2. The effects of the EU NFRD on CSR transparency and performance (ENV and SOC).

Hypotheses	H1	H2	H2	H1	H2	H2
Variables	CSR reporting	ENV	SOC	CSR reporting	ENV	SOC
PostDirective	1.964***	0.0601***	0.0661***	1.490***	0.0504***	0.0441***
	(0.0877)	(0.00846)	(0.00878)	(0.177)	(0.0110)	(0.0111)
Directive	1.193***	0.0244***	0.0311***	0.695***	0.0153	0.0149
	(0.0708)	(0.00797)	(0.00825)	(0.160)	(0.00990)	(0.0105)
SIZE (−1)				1.424***	0.0730***	0.0681***
				(0.0964)	(0.00455)	(0.00415)
ROA (−1)				0.925**	0.0121	0.0460
				(0.428)	(0.0391)	(0.0364)
QTOB (−1)				0.125	0.00794	−0.00167
				(0.0835)	(0.00707)	(0.00737)
LEV (−1)				−0.00574	−0.00116	−0.000643
				(0.00753)	(0.000741)	(0.000645)
ASSET TURNOVER (−1)				0.255	0.0386***	0.0146
				(0.165)	(0.0130)	(0.0106)
PPE (−1)				0.405	0.0180	−0.00173
				(0.335)	(0.0288)	(0.0223)
Rule of Law (−1)				0.837	−0.0203	−0.0392
				(0.624)	(0.0433)	(0.0423)
Industry fe	Yes	Yes	Yes	Yes	Yes	Yes
Year fe	Yes	Yes	Yes	Yes	Yes	Yes
Country fe	Yes	Yes	Yes	Yes	Yes	Yes
Cluster S.E firm	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,594	6,642	6,642	5,732	4,099	4,099
Adj R-squared		0.125	0.118		0.376	0.364

This Table reports results of cross-sectional regressions to study the effects of the EU NFRD on CSR transparency and performance over the 2008–2018 period. The dependent variables are CSR reporting, ENV and SOC. *PostDirective* is a dichotomous variable equal to 1 when the Directive was enacted, and 0 otherwise; Directive is a dichotomous variable equal to 1 for the year of the signature and entry into force of the Directive (2014), and 0 otherwise. The detailed variable definitions are provided in Appendix A.1. The models include industry, year and country fixed effects. All continuous variables are winsorized at the 0.1% level. Firm level clustered standard errors in parentheses. ∗, ∗∗, and ∗∗∗ indicate significance at 10, 5, and 1% levels, respectively.

provided evidence that larger firms are more likely to engage with more sustainable practices when compared with smaller firms (see Christensen, Hail, and Leuz 2021 for a review of these studies). Larger firms are therefore expected to have engaged with CSR reporting even before the enactment of the EU NFRD. Consequently, we expect the positive effects of the EU NFRD on CSR reporting and performance and the level of environmental performance at country level to be driven by smaller firms, as these were less likely to have voluntarily adopted sustainable practices before the enactment of the EU NFRD. This expectation is also shared by the European Commission; it has recently approved the CSRD proposal, which aims at extending the CSR reporting requirements to all large companies and all companies listed on regulated markets, including listed small and medium-sized enterprises (EU 2021). Motivated by this regulatory change, we therefore test whether firm size has any impact on the association between the enactment of the EU NFRD and CSR reporting and performance. To empirically test this moderating role, we create a dichotomous variable, *Small_firm*, which is equal to 1 for firms whose total assets have a value below the median value of the sample before the Directive was enacted, and 0 otherwise. We then interact this variable with the *PostDirective* variable, and finally test the statistical significance. Table 4 shows the results of this test. We observe a positive and statistically significant correlation between the coefficient of *PostDirective × Small_firms* and CSR reporting and the ENV and SOC variables, respectively, suggesting that the Directive produced stronger positive effects on CSR transparency and performance for smaller firms. Overall, these findings suggest that the EU NFRD encouraged companies that were less prone to engage with CSR practices to engage more, resulting in a significant increase in their environmental and social performance. These findings support the recent European Commission decision to extend the EU NFRD's requirements to listed small and medium-sized enterprises, as smaller companies seem to benefit more from the EU NFRD's disclosure requirements.

Table 3. The moderating role of the adoption of CSR reporting after the enactment of the NFRD.

Variables	ENV	SOC
PostDirective × CSR reporting after Directive	0.0246**	0.0268***
	(0.0106)	(0.00967)
PostDirective	0.0350***	0.0272**
	(0.0133)	(0.0126)
Directive	0.0147	0.0144
	(0.00996)	(0.0105)
CSR reporting after Directive	0.0887***	0.0809***
	(0.0191)	(0.0190)
Control (−1)	Yes	Yes
Industry fe	Yes	Yes
Year fe	Yes	Yes
Country fe	Yes	Yes
Cluster S.E firm	Yes	Yes
Observations	4,099	4,099
Adj R-squared	0.390	0.377

This Table reports results of DID regressions to study the effects of the EU NFRD over the period 2008–2018 on CSR performance between companies that adopted CSR reporting for the first time after the enactment of the NFRD and companies that did not. The dependent variables are ENV and SOC. *PostDirective* is a dichotomous variable equal to 1 when the Directive was enacted, and 0 otherwise; Directive is a dichotomous variable equal to 1 for the year of the signature and entry into force of the Directive (2014), and 0 otherwise. Each variable of interest is interacted to the dichotomous variable *CSR reporting after Directive* which equals 1 if companies adopt CSR reporting in the post directive period and 0 otherwise. The detailed variable definitions are provided in Appendix A.1. All continuous variables are winsorized at the 0.1% level. Firm level clustered standard errors in parentheses. ∗, ∗∗, and ∗∗∗ indicate significance at 10, 5, and 1% levels, respectively.

5.1.3. The moderating role of CSR reporting assurance

Given the voluntary nature of the content of CSR reporting, CSR reports have been questioned for lacking completeness and credibility (Adams and Evans 2004; Cho et al. 2012). To address these concerns, companies have started requesting a third-party produces an assurance statement about the reliability and accuracy of the information disclosed in their CSR reports (De Beelde and Tuybens 2015; Simnett, Vanstraelen, and Chua 2009). With this aim in mind and following the approval of the CSRD proposal, the European Commission will modify the EU NFRD and mandate all EU corporations to assure the information reported in their CSR reports. This requirement is, however, not completely new, as several EU countries have already mandated this requirement when transposing the EU NFRD into their national regulations before the CSRD proposal was approved. We explore whether the mandate for CSR reporting assurance in place in some EU countries has had any impact on the effects of the Directive on CSR transparency and CSR performance during the period 2008–2018. To empirically test this moderating role, we create a variable, namely *CSR reporting assurance*, which equals 1 if in a year γ a country δ has mandated CSR assurance when transposing the EU NFRD into its national regulations; it is equal to 0 otherwise. We then interact *CSR reporting assurance* with the *PostDirective* variable and test its statistical significance on CSR reporting, ENV and SOC. Table 5 reports the results of this analysis and shows that mandating CSR assurance has no significant impact on the effect that the Directive has on CSR reporting and performance. These results are important, as they inform the EU that mandating CSR assurance is unlikely to have significant impacts on the use of CSR reporting and on the social and environmental performance of EU corporations.

5.2. Additional channel analyses

The extant literature on CSR have found that CSR transparency and performance are affected by important moderating factors at the firm and country levels (see Christensen, Hail, and Leuz 2021 for a comprehensive review). Drawing from this literature, this section shows the results of additional analyses which investigate how

Table 4. The moderating role of firms' size: Larger vs Smaller firms.

Hypotheses	H1	H2	H2
Variables	CSR reporting	ENV	SOC
PostDirective × Small_firms	0.538***	0.0270**	0.0199*
	(0.155)	(0.0119)	(0.0116)
PostDirective	1.088***	0.0434***	0.0395***
	(0.167)	(0.0118)	(0.0122)
Directive	0.628***	0.0195*	0.0190*
	(0.138)	(0.0104)	(0.0110)
Small_firms	−2.833***	−0.167***	−0.148***
	(0.205)	(0.0166)	(0.0155)
Control (−1)	Yes	Yes	Yes
Industry fe	Yes	Yes	Yes
Year fe	Yes	Yes	Yes
Country fe	Yes	Yes	Yes
Cluster S.E firm	Yes	Yes	Yes
Observations	5,732	4,099	4,099
Adj R-squared		0.268	0.260

This Table reports results of DID regressions to study the effects of the EU NFRD on CSR reporting and performance over the 2008–2018 period between smaller and bigger firms. The dependent variables are: CSR reporting, ENV and SOC. *PostDirective* is dichotomous and equal to 1 when the Directive was enacted, and 0 otherwise; Directive is a dichotomous variable equal to 1 for the year of the signature and entry into force of the Directive (2014), and 0 otherwise. Each variable of interest is interacted to the dichotomous variable *Small_firms*, to capture the moderating role of firms' size on CSR reporting and performance. *Small_firms* is a dichotomous variable equal one for firms below the median value of the size before the Directive was enacted and 0 otherwise. The detailed variable definitions are provided in Appendix A.1. The models include industry, year and country fixed effects. All continuous variables are winsorized at the 0.1% level. Firm level clustered standard errors in parentheses. *, **, and *** indicate significance at 10, 5, and 1% levels, respectively.

the association between CSR disclosure regulation and CSR transparency and performance is affected by firm-level effects, in terms of firms' investments in R&D and analysts following a firm, and by country-level effects, in terms of the strength of the legal system of the countries in which firms are headquartered.

5.2.1. The moderating role of firms' investments in R&D

According to the resource-based view (Wernerfelt 1984), firms that possess rare and valuable assets have a competitive advantage that can benefit both themselves and society. Investments in R&D are considered to be one of these assets. They generate knowledge enhancement and lead to product and process innovation, which can help companies to improve their social and environmental impacts (Padgett and Galan 2010). Indeed, CSR reporting and practices have been found to be associated with the degree of firms' innovation (Jackson et al. 2020), with more innovative companies putting in place more sustainable practices. The positive effects of the EU NFRD on the CSR practices adopted by corporations are likely to be explained by this resource-based view and will depend on the resources that companies can access. Firms that invest highly in R&D are likely to have the resources necessary to adopt the CSR practices promoted by the new regulation (Jackson et al. 2020). We therefore explore whether the level of R&D expenses enhances the effect of the Directive on CSR transparency and performance. To empirically test this moderating role, we create a variable, *R&D*, which equals the firm level of R&D expenses as a percentage of total sales before the Directive was enacted. We then interact *R&D* with the *PostDirective* variable and test its statistical significance on CSR reporting, ENV and SOC. Table 6 reports the results of this analysis. In line with expectations, firms that have invested more in R&D are more likely to be more transparent regarding CSR and have higher environmental and social performance. Our results also show that the level of R&D expenditure positively moderates the effect of the Directive on firms' social and environmental performance, while it has no significant impact on the effect of the Directive on CSR reporting. These results are important, as they highlight the key role that firms' innovation plays in promoting the development of more sustainable practices and in boosting the positive effect of regulations in improving corporate sustainability.

Table 5. The moderating role of CSR reporting assurance.

Variables	CSR Reporting	ENV	SOC
PostDirective × Assurance	0.218	−0.0118	−0.0172
	(0.145)	(0.0111)	(0.0106)
PostDirective	1.180***	0.0599***	0.0560***
	(0.139)	(0.0141)	(0.0136)
Directive	0.580***	0.0255**	0.0246**
	(0.118)	(0.0107)	(0.0114)
Assurance	1.432***	−0.00520	0.0185
	(0.457)	(0.0313)	(0.0440)
Control (−1)	Yes	Yes	Yes
Industry fe	Yes	Yes	Yes
Year fe	Yes	Yes	Yes
Country fe	Yes	Yes	Yes
Cluster S.E firm	Yes	Yes	Yes
Observations	5,732	4,099	4,099
Adj R-squared		0.177	0.186

This Table reports results of DID regressions to study the effects of the EU NFRD on CSR reporting and performance over the period 2008–2018 between countries that mandated CSR reporting assurance and countries that did not. The dependent variables are CSR reporting, ENV and SOC. *PostDirective* is a dichotomous variable equal to 1 when the Directive was enacted, and 0 otherwise; Directive is a dichotomous variable equal to 1 for the year of the signature and entry into force of the Directive (2014), and 0 otherwise. Each variable of interest is interacted to the dichotomous variable *Assurance*, which equals to 1 for firms headquartered in countries that mandated assurance when transposing the EU NFRD into their national regulations, and 0 otherwise. This to capture the moderating role of CSR reporting assurance on CSR reporting and performance. The detailed variable definitions are provided in Appendix A.1. The models include industry, year and country fixed effects. All continuous variables are winsorized at the 0.1% level. Firm level clustered standard errors in parentheses. *, **, and *** indicate significance at 10, 5, and 1% levels, respectively.

5.2.2. The moderating role of analysts following a firm

Financial analysts are among the main users of CSR disclosure, and they incorporate this information in the evaluation of the firms they follow. Previous studies (see Christensen, Hail, and Leuz 2021 for a comprehensive review) have found the use of CSR reports and the disclosure of positive (negative) CSR information to be negatively (positively) associated with analyst forecast errors. Therefore, in line with agency theory, companies can feel pressured to disclose more CSR information and to put in place processes to improve their CSR performance to obtain more positive evaluations from the analysts that follow them. This pressure is likely to be stronger when scrutiny from financial analysts is greater. We therefore explore whether the number of analysts following a firm enhances the effect of the Directive on CSR transparency and performance. To empirically test this moderating role, we create a variable, *High_Analysts*, which is equal to 1 for firms being followed by a number of analysts above the median value before the Directive was enacted, and 0 otherwise. We then interact *High_Analysts* with the *PostDirective* variable and test its statistical significance on CSR reporting, ENV and SOC. Table 7 reports the results of this analysis and shows, as expected, that firms that are followed by a higher number of analysts are more likely to be more transparent on CSR. No impacts are found in relation to environmental and social performance. These results highlight the monitoring role played by important users of non-financial information, namely financial analysts, in encouraging firms to disclose CSR information via CSR reporting. However, they also show that this monitoring role does not lead to real effects in terms of CSR performance in the absence of specific regulations on the content of CSR reporting. Our findings are interesting for regulators, as they indicate that it might be important to regulate the content of CSR reporting to increase social and environmental performance.

5.2.3. The moderating role of the strength of the country's legal system

The way companies comply with regulation may depend on the strength of the legal system in which they operate, particularly when the regulatory requirements are not binding, as in the case of a regulatory approach based

Table 6. The moderating role of firms' R&D expenditure.

Variables	CSR reporting	ENV	SOC
PostDirective × R&D	0.422	0.183*	0.167*
	(1.748)	(0.105)	(0.0950)
PostDirective	1.555***	0.0481***	0.0417***
	(0.182)	(0.0110)	(0.0112)
Directive	0.745***	0.0154	0.0150
	(0.162)	(0.00990)	(0.0105)
R&D (−1)	12.25***	0.414**	0.209
	(2.120)	(0.169)	(0.132)
Control (−1)	Yes	Yes	Yes
Industry fe	Yes	Yes	Yes
Year fe	Yes	Yes	Yes
Country fe	Yes	Yes	Yes
Cluster S.E firm	Yes	Yes	Yes
Observations	5,732	4,099	4,099
Adj R-squared		0.383	0.366

This Table reports results of DID regressions to study the effects of the EU NFRD on CSR reporting and performance over the 2008–2018 period among R&D intensity firms. The dependent variables are CSR reporting, ENV and SOC. *PostDirective* is a dichotomous variable equal to 1 when the Directive was enacted, and 0 otherwise; Directive is a dichotomous variable equal to 1 for the year of the signature and entry into force of the Directive (2014), and 0 otherwise. Each variable of interest is interacted to the variable R&D which equals to R&D expenses to sales before the Directive was enacted, to capture the moderating role of innovation on CSR reporting and performance. The detailed variable definitions are provided in Appendix A.1. The models include year, country and industry fixed effects. All continuous variables are winsorized at the 0.1% level. Firm level clustered standard errors in parentheses. ∗, ∗∗, and ∗∗∗ indicate significance at 10, 5, and 1% levels, respectively.

on the comply or explain approach. Previous studies have found compliance to be higher in countries characterised by higher adherence to the rules of society and where the law is highly regarded as a source of authority. In addition, enforcement plays a key part in any form of regulation, and it is even more important if the regulatory approach is based on the comply or explain approach (Fasterling and Duhamel 2009; Pietrancosta 2011). Based on these arguments, we explore whether the strength of the legal system in the countries in which firms are headquartered enhances the effect of the Directive on CSR transparency and performance. To empirically test this moderating role, we create a variable, *High_Rule of law*, which equals 1 for firms headquartered in countries with a rule of law score above the median value of the sample before the EU NFRD, and 0 otherwise. We then interact *High_Rule of law* with the *PostDirective* variable and test its statistical significance on CSR reporting, ENV and SOC (see Table 8). In line with our expectations, our results show that the positive impact of the EU NFRD on CSR transparency is significantly stronger for companies based in countries with a stronger legal system. No impact has been found on the association between the EU NFRD and environmental and social performance. In line with the extant literature, these results show that the comply or explain approach is more effective in countries characterised by a stronger legal system.

5.3. Additional analyses of the impacts of the EU NFRD on the cost of equity and firms' risk

Thus far, our paper has explored the effect of the EU NFRD on CSR transparency and performance. In this section, we aim to investigate whether the documented increase in CSR reporting practice led to lower equity risk and cost of equity. This is because, according to the literature (see, for example, Albuquerque, Koskinen, and Zhang 2019), firms' CSR engagement may be considered as a product differentiation strategy, which by increasing customer loyalty increases firms' market power and reduces firms' cost of equity and risk (Albuquerque, Koskinen, and Zhang 2019; Cheung 2016; Liu, Ju, and Gao 2021). More precisely, the rationale behind the CSR–cost of equity relationship lies in the assumption that investors choose to avoid investing in non-CSR stocks, thus requiring higher expected returns for non-CSR firms (Heinkel, Kraus, and Zechner 2001). From the

Table 7. The moderating role of analysts following a firm.

Variables	CSR Reporting	ENV	SOC
PostDirective × High_Analyst	0.427**	−0.00579	0.00177
	(0.179)	(0.0112)	(0.0111)
PostDirective	1.553***	0.0559***	0.0446***
	(0.219)	(0.0139)	(0.0139)
Directive	0.801***	0.0155	0.0151
	(0.166)	(0.00991)	(0.0105)
High_Analyst	1.040***	0.0147	0.0156
	(0.207)	(0.0157)	(0.0144)
Control (−1)	Yes	Yes	Yes
Industry fe	Yes	Yes	Yes
Year fe	Yes	Yes	Yes
Country fe	Yes	Yes	Yes
Cluster S.E firm	Yes	Yes	Yes
Observations	5,732	4,099	4,099
R-squared		0.377	0.365

This Table reports results of DID regressions to study the effects of the EU NFRD on CSR reporting and performance over the 2008–2018 period among companies with high vs low number of analysts following a firm. The dependent variables are CSR reporting, ENV and SOC. *PostDirective* is a dichotomous variable equal to 1 when the Directive was enacted, and 0 otherwise; Directive is a dichotomous variable equal to 1 for the year of the signature and entry into force of the Directive (2014), and 0 otherwise. Each variable of interest is interacted to *High Analyst* which equal to 1 for firms being followed by a number of analysts above the median value of the sample before the Directive was enacted, and 0 otherwise. The detailed variable definitions are provided in Appendix A.1. The models include year, country and industry fixed effects. All continuous variables are winsorized at the 0.1% level. Firm level clustered standard errors in parentheses. ∗, ∗∗, and ∗∗∗ indicate significance at 10, 5, and 1% levels, respectively.

equity risk side, the 'risk mitigation view' based on stakeholder theory argues that CSR engagement acts as an insurance mechanism for socially responsible firms by creating moral capital or goodwill among stakeholders (El Ghoul and Karoui 2017). Consistent with this, a recent paper by Bannier, Bofinger, and Rock (2022) finds that the CSR–risk relationship is moderated by the non-financial disclosure framework in which a firm operates, with a stronger effect for firms operating in countries with higher investor attention to sustainable issues.

In Table 9 we explore if, after the enactment of the EU NFRD, firms adopting CSR reporting practices experienced lower systematic risk, idiosyncratic risk and cost of equity.[5] Additionally, we are interested in showing which of the equity risk components (systematic or idiosyncratic) should be considered the channel for the CSR–cost of equity relationship. To empirically test the effect of the directive on CSR reporting firms, we interact the *PostDirective* variable with the dichotomous variable, *CSR Reporting*, which equals 1 for firms adopting CSR reporting practices, and 0 otherwise. We then test its statistical significance on cost of equity, systematic risk and idiosyncratic risk.

Table 9 shows that the EU NFRD reduced the cost of equity and systematic risk for CSR reporting firms. On the contrary, we do not find any relationship with idiosyncratic risk; the CSR–cost of equity relationship is channelled only by systematic risk. Our results are therefore supportive of the 'risk mitigation view' stated by stakeholder theory, as well as the importance of the non-financial disclosure framework in enhancing the CSR–cost of equity and risk relationship.

5.4. Robustness checks

We also conduct several robustness tests using alternative measures and model specifications. First, we re-estimate our baseline model (1) employing alternative measures of environmental and social scores to test *H2*. Following previous studies (Liang and Renneboog 2017), we run additional models by using the individual components of the following scores: the resource use score, emission score and environmental innovation score (components of the ENV score); and the workforce score, human rights score, community score and product responsibility score (components of the SOC score). Similar to the aggregate variables, these components are

Table 8. The moderating role of the strength of the country legal system.

Variables	CSR Reporting	ENV	SOC
PostDirective × High Rule of Law	0.257**	−0.0126	−0.0128
	(0.122)	(0.0113)	(0.0110)
PostDirective	1.037***	0.0623***	0.0538***
	(0.135)	(0.0140)	(0.0139)
Directive	0.543***	0.0228**	0.0189*
	(0.112)	(0.0105)	(0.0111)
High Rule of Law	−0.316	0.0344	−0.0316
	(0.882)	(0.0646)	(0.0753)
Control (−1)	Yes	Yes	Yes
Industry fe	Yes	Yes	Yes
Year fe	Yes	Yes	Yes
Country fe	Yes	Yes	Yes
Cluster S.E firm	Yes	Yes	Yes
Observations	5,977	4,275	4,275
Adj R-squared		0.169	0.180

This Table reports results of DID regressions to study the effects of the EU NFRD on CSR reporting and performance over the 2008–2018 period among companies operating in countries with high vs low rule of law. The dependent variables are CSR reporting, ENV and SOC. *PostDirective* is a dichotomous variable equal to 1 when the Directive was enacted, and 0 otherwise; Directive is a dichotomous variable equal to 1 for the year of the signature and entry into force of the Directive (2014), and 0 otherwise. Each variable of interest is interacted to *High Rule of Law* which equal to 1 for firms headquarters in countries above the median value of the score before the EU NFRD, and 0 otherwise. The detailed variable definitions are provided in Appendix A.1. The models include year, country and industry fixed effects. All continuous variables are winsorized at the 0.1% level. Firm level clustered standard errors in parentheses. *, **, and *** indicate significance at 10, 5, and 1% levels, respectively.

ranked from 0 to 100 and reflect the degree of firms' engagement with CSR practice analysed from worst (0) to best (100) practices. Table 10 shows the detailed effects of the EU NFRD on the abovementioned individual components. In terms of environmental performance, we document a statistically significant increase for all the three components of the ENV score (resource use, emissions and environmental innovation) after the EU NFRD was enacted. In terms of social performance, after the EU NFRD was enacted, companies recorded statistically significant increases for the scores related to human rights, community and product responsibility, but not for the workforce score. Overall, these additional findings suggest that the EU NFRD has a positive impact on corporate social and environmental performance regardless of the specific social and environmental performance measures used, hence confirming our second hypothesis, *H2a*.

Second, we re-run our baseline model using a balanced sample, removing all firms with at least one missing data on CSR reporting information during the period of interest (2008–2018). The objective of this additional test is strengthening our results to ensure that our findings are not driven by an unbalanced sample or firms entered in the Thomson Refinitiv database after the Directive was implemented. The results, reported in Table 11, confirm our baseline model, suggesting that our results are not driven by unbalanced data or new entrants in the sample.

Third, we employ the Bloomberg sustainability scores as alternative measures of CSR transparency to test *H1*. The Bloomberg sustainability scores have been widely used in previous studies as measures of the level of firms' environmental and social transparency disclosure and communication scores (BENV and BSOC, respectively). Therefore, we use these additional measures of firms' environmental and social engagement and re-run our models to validate our findings.[6] Table 12 reports the results of this robustness check and confirms the positive effect of the Directive when using these alternative measures to test the effect of the Directive on CSR transparency. Overall, our findings are robust after using alternative measures to test *H1*.

Fourth, we test our first and second hypotheses using the difference in difference (DiD) model, as follows. We first create a large sample of EU firms subject to the Directive (the 'treated' group). We then identify a 'control' group of non-financial firms, over the same period, which are not subject to the Directive. Specifically, we use comparable US firms that are not subject to mandatory CSR disclosure as a control group to help 'difference out' possible confounding factors and isolate the effects of the EU NFRD. We employ US firms as a control

Table 9. NFRD Effect of directive on Cost of Equity (COE), Idiosyncratic Risk and Systematic risk.

Variables	COE	Idiosyncratic Risk	Systematic Risk	COE	COE
PostDirective × CSR reporting	−0.00264***	−0.00321	−0.0016**	−0.00266***	−0.00266***
	(0.000798)	(0.00392)	(0.001)	(0.000822)	(0.000789)
PostDirective	−0.0153***	−0.0548***	0.0810	−0.0151***	−0.0145***
	(0.000972)	(0.00533)	(0.0950)	(0.000994)	(0.000990)
Directive	−0.0118***	−0.0588***	−0.017***	−0.0114***	−0.0108***
	(0.000591)	(0.00398)	(0.0048)	(0.000620)	(0.000661)
CSR Reporting	0.0001	0.00210	0.00770**	−0.0001	0.0002
	(0.000371)	(0.00271)	(0.00363)	(0.000374)	(0.000365)
Systematic risk (−1)				0.0514**	
				(0.0212)	
Isiosyncratic risk (−1)					0.0207***
					(0.00489)
Control (−1)	Yes	Yes	Yes	Yes	Yes
Industry fe	Yes	Yes	Na	Na	Na
Year fe	Yes	Yes	Yes	Yes	Yes
Country fe	Yes	Yes	Yes	Yes	Yes
Cluster S.E firm	Yes	Yes	Yes	Yes	Yes
Observations	3,206	3,255	3,252	3,163	3,193
Adj R-squared	0.665	0.242	0.111	0.663	0.669

This Table reports results of DID regressions to study the effects of the EU NFRD on Cost of Equity (COE), Idiosyncratic Risk and Systematic risk over the 2008–2018 period. The dependent variables are: COE, Idiosyncratic risk and Systematic risk. *PostDirective* is a dichotomous variable equal to 1 when the Directive was enacted, and 0 otherwise; Directive is a dichotomous variable equal to 1 for the year of the signature and entry into force of the Directive (2014), and 0 otherwise. Each variable of interest is interacted to the variable *CSR Reporting*, to capture the moderating role of CSR reporting on COE, Idiosyncratic risk and Systematic risk. The detailed variable definitions are provided in Appendix A.1. The model includes year, country and Industry fixed effects. All continuous variables are winsorized at the 0.1% level. Firm level clustered standard errors in parentheses. ∗, ∗∗, and ∗∗∗ indicate significance at 10, 5, and 1% levels, respectively.

Table 10. The effects of the EU NFRD on ENV and SOC component scores.

Variable	Resource Use	Emissions	Environmental Innovation	Workforce	Human Rights	Community score	Product responsibility
PostDirective	0.0689***	0.0405***	0.0461***	0.00373	0.0931***	0.0863***	0.0787***
	(0.0143)	(0.0144)	(0.0163)	(0.0160)	(0.0154)	(0.0168)	(0.0168)
Directive	0.0198	0.00534	0.0219	−0.0116	0.0268*	0.0648***	0.0190
	(0.0134)	(0.0133)	(0.0155)	(0.0153)	(0.0144)	(0.0159)	(0.0161)
Control (−1)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fe	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fe	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fe	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster S.E firm	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,099	4,099	4,099	4,099	4,099	4,099	4,099
Adj R-squared	0.322	0.298	0.195	0.210	0.327	0.296	0.24

This Table reports results of OLS regressions to study the effects of the EU NFRD on ENV and SOC component scores over the 2008–2018 period. The dependent variables are the Resource Use score, the Emission score, the Environmental Innovation score, the Workforce score, the Human Rights score the Community score and the Product responsibility score, representing firms' engagement in specific ENV and SOC component scores. *PostDirective* is a dichotomous variable equal to 1 when the Directive was enacted, and 0 otherwise; Directive is a dichotomous variable equal to 1 for the year of the signature and entry into force of the Directive (2014), and 0 otherwise. The detailed variable definitions are provided in Appendix A.1. The model includes industry, year and country fixed effects. All continuous variables are winsorized at the 0.1% level. Firm level clustered standard errors in parentheses. ∗, ∗∗, and ∗∗∗ indicate significance at 10, 5, and 1% levels, respectively.

group for two main reasons. First, CSR reporting is not mandatory for US firms and relatively fewer CSR-related mandatory disclosure regulations applicable to corporations have been issued in the US between 2011–2018 (UN PRI, 2021). Hence, we consider US firms the 'cleanest' control group, as, for the years included in our sample, they have not been subject to mandatory CSR reporting. The second reason relates to consistency with previous studies on the effects of mandatory CSR reporting that employ US firms as control group; the availability of large amounts of CSR and financial data allows us to find firms that have not been subject to mandatory CSR reporting and are qualitatively similar to EU firms (Christensen, Hail, and Leuz 2021; Ioannou and Serafeim 2019). We are also consistent with studies on the effects of EU Directives (Fiordelisi et al. 2020). To obtain a comparable

Table 11. The effects of the EU NFRD on CSR transparency and performance using a balanced sample.

Hypotheses	H1	H2	H2
Variables	CSR reporting	ENV	SOC
PostDirective	3.181***	0.0668***	0.0572***
	(0.353)	(0.0113)	(0.0113)
Directive	2.078***	0.0333***	0.0200*
	(0.346)	(0.0101)	(0.0109)
Controls (−1)	Yes	Yes	Yes
Industry fe	Yes	Yes	Yes
Year fe	Yes	Yes	Yes
Country fe	Yes	Yes	Yes
Cluster S.E firm	Yes	Yes	Yes
Observations	2,840	2,918	2,918
Adj R-squared		0.380	0.369

This Table reports results of OLS regressions to study the effects of the EU NFRD on CSR transparency and CSR performance over the 2008–2018 period with the use of a balanced sample. The dependent variables are CSR reporting, ENV and SOC. *PostDirective* is a dichotomous variable equal to 1 when the Directive was enacted, and 0 otherwise; Directive is a dichotomous variable equal to 1 for the year of the signature and entry into force of the Directive (2014), and 0 otherwise. The detailed variable definitions are provided in Appendix A.1. The models include industry, year and country fixed effects. All continuous variables are winsorized at the 0.1% level. Firm level clustered standard errors in parentheses. *, **, and *** indicate significance at 10, 5, and 1% levels, respectively.

Table 12. The effects of the EU NFRD on CSR performance using Bloomberg ESG scores.

Variables	BENV	BSOC
PostDirective	0.0680***	0.0927***
	(0.00854)	(0.00907)
Directive	0.0523***	0.0731***
	(0.00805)	(0.00849)
Control (−1)	Yes	Yes
Industry fe	Yes	Yes
Year fe	Yes	Yes
Country fe	Yes	Yes
Cluster S.E firm	Yes	Yes
Observations	4,070	4,070
R-squared	0.457	0.380

This Table reports results of OLS regressions to study the effects of the EU NFRD on CSR performance over the 2008–2018 period using Bloomberg ESG scores. The dependent variables are: BENV score and BSOC score representing firms' engagement in CSR practices measured by employing the Bloomberg sustainability scores. *PostDirective* is a dichotomous variable equal to 1 when the Directive was enacted, and 0 otherwise; Directive is a dichotomous variable equal to 1 for the year of the signature and entry into force of the Directive (2014), and 0 otherwise. The detailed variable definitions are provided in Appendix A.1 The model includes industry, year and country fixed effects. All continuous variables are winsorized at the 0.1% level. Firm level clustered standard errors in parentheses. *, **, and *** indicate significance at 10, 5, and 1% levels, respectively.

EU and US sample, we apply 1:1 propensity score matching (PSM) using nearest-neighbour matching without replacement, common support and a caliper constraint of 0.01, obtaining a final sample of 656 comparable EU and US firms to test our hypotheses. Figure 1 shows the parallel trend of our dependent variables between the treated (EU) and control group (US) firms from 2011 to 2018. Moreover, the post-estimation tests for parallel
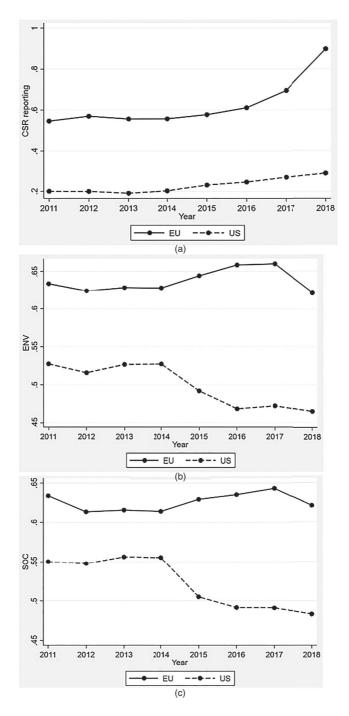
Figure 1. Parallel trends. This figure shows the trend of our dependent variables between EU (treated) and US (control) firms for the period 2011–2018 between EU and US firms for (a) CSR reporting, (b) Environmental performance score (ENV) and (c) Social performance score (SOC).

trend support the parallel assumption between the control and treatment groups (see Appendix A.5). In addition, a falsification test confirms the reliability of the DiD regressions using 2011 as a placebo year of the signature and entry into force of the Directive and data over the 2008–2013 period (see Appendix A.6).

Table 13. The effects of the EU NFRD on CSR transparency and performance, using a control sample of US firms.

Panel A

Variables		Treated 1. (T)	Control group 2. (C)	T-C	P-Value
SIZE	Unmatched	14.988	14.467	0.521***	0.000
	Matched	14.806	14.794	0.012	0.843
ROA	Unmatched	0.043	0.037	0.006	0.156
	Matched	0.041	0.045	−0.004	0.355
TOBIN'S Q	Unmatched	0.594	0.763	−0.169***	0.000
	Matched	0.629	0.617	0.012	0.745
LEV	Unmatched	0.051	0.065	−0.014***	0.002
	Matched	0.053	0.047	0.006	0.176
ASSET TURNOVER	Unmatched	0.976	1.031	−0.055***	0.010
	Matched	1.001	1.009	−0.008	0.744
PPE	Unmatched	0.120	0.168	−0.047***	0.000
	Matched	0.129	0.126	0.003	0.786

Panel B

Variables	CSR reporting	ENV	SOC
PostDirective × EU firms	1.012***	0.0204**	0.0219***
	(0.205)	(0.00923)	(0.00799)
Directive	0.817***	0.0236**	0.00132
	(0.202)	(0.00977)	(0.00900)
Post Directive	0.746***	0.0467***	0.0166*
	(0.194)	(0.0117)	(0.00986)
EU firms	4.236***	0.175***	0.126***
	(0.932)	(0.0305)	(0.0387)
Control (−1)	Yes	Yes	Yes
Industry fe	Yes	Yes	Yes
Year fe	Yes	Yes	Yes
Country fe	Yes	Yes	Yes
Cluster S.E firm	Yes	Yes	Yes
Observations	7,478	7,478	7,478
Adj R-squared		0.413	0.378

This Table shows the result of the DID regression between EU (Treated) and US (Control) firms. Panel A presents summary statistics for our sample before (Unmatched) and after (Matched) the Propensity Score Matching (PSM) procedure to obtain a matched sample from 2008 to 2013 before the Directive was enacted in 2014 for control variables. Firms included in our sample meet the following requirements: (1) be available on Thomson Reuters Refinitiv database in 2008; (2) report ESG data; (3) be a non-financial firm (financial firms are excluded as they are subjected to different accounting measures). Then we run the PSM procedure to obtain Treated (EU) and Control group (US) comparable firms within Thomson Reuters database for each of EU Firm on their controls variable: SIZE, ROA, TOBIN'S Q, LEV, ASSET TURNOVER, and PPE. We use nearest-neighbour matching without replacement, common support and a caliper constraint of 0.01. Panel B reports results of DID regressions to study the effects of the EU NFRD on CSR and CSR performance over the 2008–2018 period. Post Directive is a dichotomous variable equal to 1 when the Directive was enacted, and 0 otherwise; Directive is a dichotomous variable equal to 1 for the year of the signature and entry into force of the Directive (2014), and 0 otherwise. The dependent variables are CSR reporting, ENV and SOC. The detailed variable definitions are provided in Appendix A.1. All continuous variables are winsorised at the 0.1% level. The difference between two categories of firms in means is tested by a two-tailed test. Firm level clustered standard errors in parentheses. *, **, and *** indicate significance at 10, 5, and 1% levels, respectively.

Table 13 reports the results of the DID models used to strengthen our inference on hypotheses *H1* and *H2*. Specifically, Panel A of Table 13 shows the effectiveness of the PSM procedure in reducing treated and control sample heterogeneity, while Panel B illustrates the result of the DID weighted regression. More precisely, it shows that the coefficient of the interaction term *PostDirective×EUFirms* is positive and statistically significant in all our models, demonstrating the positive effect of the EU NFRD on CSR transparency and environmental and social performance during the post-Directive period. This provides support for hypotheses *H1a* and *H2a*.[7] Figure 1 illustrates the parallel trends analysis.

Fifth, our sample includes European countries (France, Denmark and Sweden) that introduced comparable non-financial reporting regulations before 2014. Our results without firms from these countries confirm the strength of our baseline DID results. Moreover, our sample includes a relatively large number of firms from the United Kingdom, which might affect our results. We test the robustness of our baseline model and re-run it after excluding them, and our results are quantitative similar.[8]

Table 14. Controlling for Greenwashing: ESG combined score and ESG Controversies score.

Variables	ESG Combined	ESG Controversies
PostDirective	0.0452***	−0.0422***
	(0.0110)	(0.0152)
Directive	0.0166*	0.0140
	(0.00987)	(0.0141)
Control (−1)	Yes	Yes
Industry fe	Yes	Yes
Year fe	Yes	Yes
Country fe	Yes	Yes
Cluster S.E firm	Yes	Yes
Observations	4,099	3,540
R-squared	0.087	0.272

This Table reports results of OLS regressions to study the effects of the EU NFRD on ESG combined score over the 2008–2018 period. The dependent variables are the ESG combined score and ESG controversies score. *PostDirective* is a dichotomous variable equal to 1 when the Directive was enacted, and 0 otherwise; Directive is a dichotomous variable equal to 1 for the year of the signature and entry into force of the Directive (2014), and 0 otherwise. The detailed variable definitions are provided in Appendix A.1. The model includes industry, year and country fixed effects. All continuous variables are winsorized at the 0.1% level. Firm level clustered standard errors in parentheses. *, **, and *** indicate significance at 10, 5, and 1% levels, respectively.

Finally, public attention on firms' social performance disclosures can have unexpected negative consequences due to greenwashing practices (Marquis, Toffel, and Zhou 2016; Morris and King 2010). Therefore, CSR disclosure can differ from material involvement in sustainable practices. More precisely, companies can recourse to greenwashing when public pressure increases by strengthening their disclosure of environmentally friendly actions to deflect attention from unethical practices. To control for this potential issue, we run our baseline model using a different proxy of CSR engagement: the environmental, social and government (ESG) combined score. This is a combined score that measures ESG engagement weighted for 23 ESG-related controversial topics and negative events (e.g. scandals) that firms were exposed to, as reflected in the global media. Specifically, when a scandal occurs, the company involved is penalised, and this affects its overall ESG combined score. Table 14 confirms the negative effect of the EU NFRD on the ESG combined score during the post-Directive period, confirming the importance of mandatory regulations in increasing firms' CSR practices. Overall, these findings confirm the effectiveness of the EU NFRD in enhancing CSR practices without increasing the prevalence of greenwashing practices.

6. Conclusion

Recent years have witnessed an increased interest in CSR practices and performance. The new requirements of the EU NFRD aim at increasing corporate transparency, enabling corporate stakeholders to better evaluate the non-financial performance of large EU companies and ultimately encouraging these companies to adopt more responsible approaches to business (European Commission 2014). In this paper, we empirically show the effects of the introduction of the EU NFRD on CSR transparency and the performance of non-financial EU firms. We run both cross-sectional and DID regressions, and our robust evidence supports our hypotheses and reveals the positive effects of the EU NFRD. In particular, our findings reveal that the Directive positively affects the number of companies publishing sustainability reports and those related to corporate social and environmental performance. This study also provides evidence of the moderating roles that the adoption of CSR reporting, firms' size, the mandating of CSR reporting assurance, firms' investments in R&D, the number of analysts following a firm and the strength of the country's legal system play regarding the impacts of the EU NFRD on the socially responsible practices adopted by EU firms. Further, it also shows that firms that adopted CSR reporting

experienced lower systematic risk and cost of equity after the enactment of the EU NFRD. Our findings are robust to several robustness tests and model specifications.

Overall, our study contributes to the ongoing debate about the effects of EU Directives in promoting sustainable development and the effects of mandatory CSR regulations (such as the EU NFRD) on CSR reporting and CSR performance. Our results are of interest to scholars and policymakers wishing to assess the effectiveness of the comply or explain approach to regulate CSR disclosure, as in the case of the EU NFRD, as we show its effectiveness in promoting CSR transparency and more sustainable development. Our results are also relevant for authorities operating in other countries contemplating the introduction of similar regulations aimed at increasing CSR disclosure and practices. Further, our additional findings on the moderating role played by firms' size and CSR reporting assurance are of particular interest to the European Commission, which is currently aiming to revise the Directive and extend its requirements to listed small and medium-sized enterprises and introduce the requirement of the auditing (assurance) of reported information (European Commission 2021).

Further research is needed to study the long-term effects of the EU NFRD on financial performance and firms' value, including that of financial firms. Finally, data constraints mean that we were not able to check whether companies do not disclose CSR information or do not engage with ESG rating agencies because they may not want to disclose what could be commercially sensitive information to their competitors. Therefore, further research is needed to explore this issue.

Notes

1. In line with practice and a number of academic studies (e.g., Dhaliwal et al. 2011), for the purpose of this paper, we use CSR and sustainability interchangeably. We define CSR to include a corporate behaviour aimed at improving social and environmental practices but not necessarily at the expense of profits and value (see also Liang and Renneboog 2017).
2. The EU NFRD applies to all firms listed on EU exchanges or with significant operations in the EU and at least to all large EU companies that are public interest entities exceeding 500 employees.
3. In additional models, we check the robustness of our results by using alterative clustering (*industry×year*, *industry×country*, country and year). Our results are unaffected and available upon request.
4. Our results are virtually unaffected if we use the log transformation of the variables ENV and SOC obtain better distributional properties and to reduce the impact of outliers. These results are available with the authors upon request.
5. Systematic risk, idiosyncratic risk and cost of equity are calculated as the β, residual and expected returns of the Capital Asset Pricing Model (CAPM) one factor model, respectively (Cheung 2016).
6. As additional robustness test, we re-run the analysis using the Bloomberg sustainability scores also using a balanced sample. Overall, this additional robustness test confirms our main results (see Appendix A.7).
7. We re-run the baseline models of the DiD regressions by using nearest-neighbour matching with replacement, common support and a narrower caliper constraint of 0.005 for matching. Our findings are robust after using a narrower caliper constraint of 0.005 for matching, as well as without using a PSM procedure. Moreover, following Buchanan, Cao, and Chen (2018), we test our assumption by changing the matching approach. More precisely, we run the DID regression matching treated and control group firms only on their size and industry. Our results are robust after changing the matching approach. Finally, we re-run the baseline models of the DiD regressions using a balanced sample to address potential concerns about new entrants in the sample. Our findings are robust to this robustness test. These results are available upon request.
8. Excluding all four countries simultaneously does not affect our main results.

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Appendix A

Table A1. Variable description and data source.

Variable	Definition	Source
CSR reporting	Does the company publish a separate sustainability report or publish a section in its annual report on sustainability? 0 No; 1 Yes.	Thomson Reuters Refinitiv'
ENV	ENV is the Environmental score. An overall company score based on the weighted average of self-reported information in the Resource Use score, Emissions score and Environmental Innovation score.	
SOC	Social score is an overall company score based on the weighted average of self-reported information in the Workforce score, Human rights score, Community score and Product Responsibility score.	
Resource use	Resource use score measures a company's performance and capacity to reduce the use of materials, energy or water, and to find more eco-efficient solutions by improving supply chain management.	Thomson Reuters Refinitiv'
Emissions	Emission score measures a company's commitment and effectiveness towards reducing environmental emission in the production and operational processes	
Environmental Innovation	Environmental innovation score account for a company's capacity to reduce the environmental costs and burdens for its customers, and thereby creating new market opportunities through new environmental technologies and processes or eco-designed products	
Workforce	Workforce score measures a company's effectiveness towards job satisfaction, healthy and safe workplace, maintaining diversity and equal opportunities, and development opportunities for its workforce	
Human rights	Human rights score measures a company's effectiveness towards respecting the fundamental human rights conventions.	
Community	Community score measures the company's commitment towards being a good citizen, protecting public health and respecting business ethics.	
Product responsibility	Product responsibility score reflects a company's capacity to produce quality goods and services integrating the customer's health and safety, integrity and data privacy	
ROA	Net income available to common shareholder deflated by total assets.	Own calculation based on Thomson Reuters Refinitiv'
TOBIN'S Q	The ratio of the market value of assets to book value of assets.	
SIZE	Natural logarithm of total assets.	
LEV	Total liability to total assets.	
ASSET TURNOVER	Total revenues to total assets.	
PPE	Property, plant & equipment divided by total assets.	
Rule of Law	Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Higher values indicate better adherence to and effectiveness of the rule of law.	World Bank Database

Table A2. Country sample Distribution.

	N. of obs.	Percent
Austria	278	2.54
Belgium	350	3.20
Czech Republic	22	0.20
Denmark	366	3.34
Finland	374	3.42
France	1,405	12.84
Germany	1,517	13.86
Hungary	39	0.36
Ireland	218	1.99
Italy	698	6.38
Luxembourg	177	1.62
Netherlands	500	4.57
Poland	298	2.72
Portugal	143	1.31
Spain	575	5.25
Sweden	1,017	9.29
United Kingdom	2,968	27.12
Total	10,945	100.00

Table A3. Industry classification.

GICS industry classification	Freq.	Percent
Communication Services	884	8.08
Consumer Discretionary	1,891	17.28
Consumer Staples	787	7.19
Energy	414	3.78
Health Care	873	7.98
Industrials	3,096	28.29
Information Technology	869	7.94
Materials	1,107	10.11
Real Estate	475	4.34
Utilities	549	5.02
Total	10,945	100.00

Table A4. Correlation matrix.

	CSR Reporting	ENV	SOC	Resource Use	Emission Score	Environmental Innovation	Workforce	Human Rights	Community	Product Responsibility	SIZE	ROA	TOBIN'S Q	LEV	ASSET TURNOVER	PPE	GDP	Rule of Law
CSR Reporting	1																	
ENV	0.6619*	1																
SOC	0.5964*	0.7281*	1															
Resource Use	0.6671*	0.8906*	0.7421*	1														
Emission Score	0.6111*	0.8823*	0.6479*	0.7508*	1													
Environmental Innovation	0.3456*	0.7055*	0.4003*	0.4358*	0.3909*	1												
Workforce	0.5805*	0.6567*	0.8879*	0.6719*	0.6090*	0.3279*	1											
Human Rights	0.5237*	0.6165*	0.6993*	0.6565*	0.5268*	0.3335*	0.5547*	1										
Community	0.1982*	0.3324*	0.5607*	0.3361*	0.2785*	0.2070*	0.2383*	0.2837*	1									
Product Responsibility	0.3671*	0.4866*	0.6808*	0.4745*	0.4072*	0.3235*	0.4294*	0.4259*	0.3079*	1								
SIZE	0.448*	0.465*	0.473*	0.417*	0.384	0.313	0.295*	0.435*	0.424*	0.333*	1							
ROA	0.0279*	0.0059	0.0072	0.0092	0.0003	0.0056	0.0179*	0.0113	−0.0161*	−0.0043	1							
TOBIN'S Q	−0.2169*	−0.1923*	−0.2106*	−0.1682*	−0.1709*	−0.1367*	−0.1559*	−0.1406*	−0.1839*	−0.1491*	−0.0018	1						
LEV	−0.1813*	−0.1467*	−0.1546*	−0.1336*	−0.1376*	−0.0903*	−0.1214*	−0.1182*	−0.1127*	−0.1082*	−0.0147*	0.5243*	1					
ASSET TURNOVER	−0.0751*	−0.0271*	−0.0325*	−0.0267*	−0.0375*	0.0006	−0.0448*	0.0032	−0.0162*	−0.0026	0.0527*	0.0784*	0.0339*	1				
PPE	−0.1848*	−0.1573*	−0.1800*	−0.1515*	−0.1351*	−0.1023*	−0.1373*	−0.1207*	−0.1415*	−0.1350*	−0.0372*	0.6028*	0.5353*	0.0606*	1			
GDP	0.0927*	−0.0187	0.0008	−0.0150	−0.0210	−0.0087	−0.0190	0.0124	0.0239	0.0028	0.0308*	0.0083	−0.0066	0.0022	−0.0095	1		
Rule of Law	−0.0232*	−0.0201*	−0.0422*	−0.008	−0.0175*	−0.0256*	−0.0130	−0.0157*	−0.0179*	−0.1031*	0.0033	0.0164*	0.0158*	0.0751*	0.0284*	0.0089	1	

The symbol ∗ indicates statistically significance at the 5% level.

Table A5. Postestimation tests.

	ATET	Parallel Trends p-value
CSR Reporting	0.118***	0.10
ENV	0.047***	0.25
SOC	0.043***	0.13

Table A6. A falsification test to assess the reliability of DID regressions between EU (Treated) and US (Control) using 2011 as a placebo year of the signature and entry into force of the Directive and data over the 2008–2013 period.

Variables	CSR reporting	ENV	SOC
PostDirective (2012-2013) ×EU firms	0.207	−0.00704	−0.000921
	(0.138)	(0.00975)	(0.00918)
Directive (2011)	0.651***	0.0296***	0.0282***
	(0.125)	(0.00868)	(0.00722)
PostDirective (2012-2013)	0.534***	0.0270**	0.0106
	(0.152)	(0.0107)	(0.00962)
EU firms	1.158	0.186***	0.105**
	(0.752)	(0.0433)	(0.0516)
Control (−1)	Yes	Yes	Yes
Industry fe	Yes	Yes	Yes
Year fe	Yes	Yes	Yes
Country fe	Yes	Yes	Yes
Cluster S.E firm	Yes	Yes	Yes
Observations	2,876	2,876	2,876
Adj R-squared		0.408	0.364

This Table shows the results of a falsification test to assess the reliability of DID regressions between EU (Treated) and US (Control) using 2011 as a placebo year of the signature and entry into force of the Directive and data over the 2008–2013 period. Firms included in our sample meet the following requirements: (1) be available on Thomson Reuters Refinitiv database in 2008; (2) report ESG data; (3) be a non-financial firm (financial firms are excluded as they are subjected to different accounting measures). Then we run the PSM procedure to obtain Treated (EU) and Control group (US) comparable firms within Thomson Reuters database for each of EU Firm on their controls variable: SIZE, ROA, TOBIN'S Q, LEV, ASSET TURNOVER, and PPE. We use nearest-neighbour matching without replacement, common support and a caliper constraint of 0.01. Directive (2011) is a dichotomous variable equal to 1 for the placebo year of the signature and entry into force of the Directive (2011), and 0 otherwise. PostDirective (2012-2013) is a dichotomous variable equal to 1 when the Directive (2011) was enacted, and 0 otherwise; The dependent variables are CSR reporting, ENV and SOC. The detailed variable definitions are provided in Appendix A.1. All continuous variables are winsorised at the 0.1% level. The difference between two categories of firms in means is tested by a two-tailed test. Firm level clustered standard errors in parentheses. ∗, ∗∗, and ∗∗∗ indicate significance at 10, 5, and 1% levels, respectively.

Table A7. The effects of the EU NFRD on CSR performance using Bloomberg ESG scores and a balanced sample

Variables	BENV	BSOC
PostDirective	0.0680***	0.0929***
	(0.0091)	(0.00932)
Directive	0.0587***	0.0811***
	(0.00841)	(0.00834)
Control (−1)	Yes	Yes
Industry fe	Yes	Yes
Year fe	Yes	Yes
Country fe	Yes	Yes
Cluster S.E firm	Yes	Yes
Observations	3,006	3,006
R-squared	0.461	0.420

This Table reports results of OLS regressions to study the effects of the EU NFRD on Bloomberg ESG performance over the 2008–2018 period with the use of a balanced sample. The dependent variables are BENV and BSOC. *PostDirective* is a dichotomous variable equal to 1 when the Directive was enacted, and 0 otherwise; Directive is a dichotomous variable equal to 1 for the year of the signature and entry into force of the Directive (2014), and 0 otherwise. The detailed variable definitions are provided in Appendix A.1. The models include industry, year and country fixed effects. All continuous variables are winsorized at the 0.1% level. Firm level clustered standard errors in parentheses. *, **, and *** indicate significance at 10, 5, and 1% levels, respectively.