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Does the ESG disclosure regulation contribute to the sustainable strategy of companies? The EU and US firms' ESG ratings compared.

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Abstract

The aim of this paper is to analyse the effect of non-financial reporting regulation on firms' ESG performance, commitment and effectiveness. Specifically, we explore the implications of the European Non-Financial Reporting Directive (NFRD) mandating disclosure of non-financial and diversity information by certain large companies. To identify the effect of the EU disclosure regulation on firms' ESG sores, we performed a differences-in-differences estimation using a sample of EU firms as treated group and a sample of US firms as control group in the period 2015-2020. Overall, our findings suggest that regulatory efforts to increase the transparency of the social and environmental impacts of firms' activities on society are effective at improving disclosure commitment and effectiveness. Hence, regulation supports the adoption of ESG strategies to the benefit of the whole society. The study provides a fresh comparison between regulating or not the ESG information market, drawing suggestions for future policy.

Keywords: Disclosure regulation; Sustainability reporting; ESG scores; Corporate Social Responsibility.

1. Introduction

Institutional investors have increasingly become interested in including ESG issues in their investment decisions. Nevertheless, investors themselves often notice that the information needed to perform measurements and take decisions is ill-suited for completing the task efficiently (Ilhan et al., 2021). In order to follow these demands for more ESG information, a number of actors have undertaken different tasks so as to fill these gaps: companies with reports, data providers with ratings and, ultimately, governments with disclosure regulations. The number of companies that have developed governance processes to measure, analyses, drive and communicate sustainability efforts has dramatically increased in the last years. While these trends are partly due to the voluntary actions of individual companies, in many cases they could be the result of regulations.

Regulations can be declined in different ways; some impose disclosure obligations, others set standards to help organizations to measure, understand and communicate their exposure to ESG risks and opportunities. In some cases, there is no regulation at all. The European Union (EU) enact in 2016 the European Non-Financial Reporting Directive (from now on to be referred to as NFRD) mandating the rules on disclosure of non-financial and diversity information by certain large companies. The NFRD requires all the listed firms, along with other non-listed but above certain levels of capital, returns and employees, to include into their financial reports also a sustainability statement. Also, some specific industries are demanded to disclose this kind of information: these industries include banks, insurance companies, and energy sector companies. The report should be entailed with information of the company's pledges and achievements on various issues about the Environmental, Social and Governance topics that are relevant or better "material" to each company's business. Moreover, the NFRD introduces for the very first time a standardization of how the report must be drawn according to specific frameworks (e.g., the GRI Index) not only to create a complete and thorough reporting process but also to make the reports comparable and tackle a great issue of measuring the performance on such qualitative topics. The Directive has been transposed by all member states but also by other countries which decided to adopt the same approach to ESG disclosure (e.g., the UK). For instance, the Italian parliament transpose it with the Legislative Decree 254 in December 2016. The aim of this Directive is to attain a greater level of standardization among the reporting activities as well as to incentivize the adoption of virtuous ESG practices. Indeed, the presence of sustainability reports dates back in time as many firms have always had more attention to ESG issues. However, the present times require a framed approach to ESG problems in order to yield, hopefully, to a substantial change in behaviors.

The effects of such mandatory reporting regulation on companies remain unexplored. On one side, companies might be motivated to pursue better ESG performance. On the other hand, mandatory

sustainability disclosure could prove detrimental to those upstanding companies that were already publishing sustainability reports as they should make greater efforts and perhaps incur higher costs to stand out from the rest of the companies in the post-settlement period. On the other side of the pond, namely in the United States, the situation is different despite being the first market to push for sustainable investing and being a very pioneer of the field also given the volumes of wealth that are invested in this sector (Zhang, Nakajima and Hamori, 2021). Despite the lack of a centralized government law private data providers and ESG ratings have thrived and have been carrying out their job efficiently. Indeed, most American companies do disclose to specific data providers like Bloomberg or Thomson Reuters their ESG information in order to be assigned a score and given no government intervention it is clear that they do so to get more attention by institutional funds but there is a tendency of lower adoption of sustainability information by companies and investors in the U.S. market (Kaiser, 2020).

In the light of above, this study aims at investigating the effect of the European Non-Financial Reporting Directive (NFRD) on firms' ESG scores. This study compares the regulation adopted in the EU and the US by methodology and the models used hereby are in line with the current literature (for instance Krueger et al., 2021) although only few studies of this kind have been drafted on sustainability whereas a longer literature exists with regards to accounting standards and regulation.

Overall, our findings reveal significant relationships that link regulation mandating ESG disclosure with ESG Scores. The difference-in-difference model found positive effects of mandating disclosure on the sample EU group with strong significance. This research offers a new study of these issues trying to draw a comparison between two of the most developed economies in the world. The United States and the European Union for different motives have addressed the ESG disclosure issue with two very antithetic approaches: the former letting third parties and firms free to choose, the latter mandating disclosure with structured reporting standards.

The remainder of the paper is organized as follows. In the next section, we review the relevant literature and develop our key research hypotheses. In Section 3, we present our methodology, followed by data and summary statistics in Section 4. Then, in Section 5, we show the baseline results, and in Section 6, we add some robustness tests to the main outcomes. Section 7 concludes the paper.

2. Related Literature and Testable Hypotheses

The presence of a gap between the market value of firm' shares and their book value has brought up scholars' attention to the value of non-financial information and their ability to influence a firm's market value and its variations beyond the usual (and limited) accounting information (Lourenço et al., 2014). The importance of non-financial information and their impact on investors may be seen also from an older microeconomic point of view as being part of a signal that companies offer to outsiders (Akerlof, 1978). Following signaling theory, companies engage in ESG reporting to signal to financial markets their ability to mitigate risks and generate sustainable long-term financial returns. Information on corporate sustainability helps investor resolve uncertainty and influences the share price response (Ramchander et al. 2012). Therefore, companies that do not integrate the ESG reporting into their annual reporting risk to be overlooked by investors.

This general effect of ESG information on information uncertainty, is proven by a wide literature to yield over average financial performances. The positive correlation between ESG issues awareness and financial performance is a very debated topic. Such positive relationship is the outcome appears in analyses such as that by Almeyda (2019) and appears already in former works as already shown by a solid meta-analysis (Friede, Brush et al. 2015). Moreover, it is worth noticing how this relationship looks established years before the intervention by regulators: the doubts casted are related to a very explosive expansion of the sector and regarding the quality and verifiability of the supposed policies and actions purportedly undertaken by the companies according to their reports often drawn in a very unstandardized and partial manner. Some studies worth mentioning on the impact of ESG practices and ratings on performance include Di Tommaso et al., 2020 who show how banks reduce their risk-taking propensity when adopting ESG strategies (although at a cost on value) and, also firms cope better with economic uncertainty through a long-term investment in sustainability following shareholder theory by reducing corporate risk and increasing value (Vural-Yavaş, 2020).

Other approaches to the problems underline a view that is related to information asymmetry, namely the one based on the idea that information can be meant as an intangible asset, thus a resource to the company (Surroca et al., 2010). Basically, companies are subject to allocation and intangibles can create the bases for beating the competition as these kinds of assets are of the scarcest type since it is very difficult to create, acquire or gain them. Therefore, status and respectability play an important role in building a company competitive strategy (Hussainey Salama, 2010). Thus, ESG policies affect favorably this asset class easing an otherwise complicated process to improve reputation (Karwowski et al., 2021). Also, Murè et al. (2020) study the case of Italian banks suffering from financial penalties which adopted ESG practices as a tool to improve their reputation on the market. Similar results are found with respect to stakeholder engagement, as ESG tools, though coming at a cost, benefit firms

which adopt them with their stakeholders to achieve sustainable development (Ren et al., 2022). In fact, common ESG-friendly practices (stakeholder engagement for instance) have possibly the effect to make the firm more ready to compete in the market as the engagement allows to recalibrate the strategy according to the needs, demands and aspirations of external stakeholders both up and downstream. By these means, companies inform various agents of the value chain from customers to suppliers or others on the company's ability to create wealth as well as the company's accountability regarding any previous pledge to stakeholders: this may help the company becoming more attractive or make bonds with core agents of interest (employees' trust, for instance) more solid and durable. Indeed, from the other side point of view, namely that of stakeholders, most research acknowledges how traditional financial statements miss out on clearing the business risk beyond some ratios along with overlooking intangibles despite them being so pivotal to wealth creation (Lourenço et al., 2014). Research on the SP 500 has demonstrated how these features, like size, are crucial in their relation with imperfect information (Baran and Dolly King, 2012 and 2014). A proxy of size was assumed to be the number of constituents of the famous U.S. index: the more companies are included the more decided the reduction in information asymmetry with the contrary also remaining true, as exclusions were seen to increase the asymmetry.

Another crucial part in this reasoning is played by information shocks that, as known, can be a driver of price volatility and simply in stock movements (Andreou et al., 2020). Hence, the reactions to ESG disclosures can play a role in discrediting firms, even more so if these are enjoying a positive reputation on the market. This negative impact of ESG poor or unexpectedly negative reports is the object of study of Wong and Zhang (2021) whose study proves on a SP500 sample how investors are susceptible to ESG information also in a negative way perceiving the shock of a lack by the company in this area as a possible risk making the cost of capital higher for said companies. It is then plausible that ESG data and reports, in a more general definition ESG-information also play a role on the improvement of imperfect information even more so given the perception of these data by market operators and institutional investors. Studies on financial intermediaries and derivatives show how ESG information can work as a tool to diminish risk in uncertain times as well as improving the returns of financial institutions adopting them (Brogi et al., 2018 and Drago et al., 2018). For these reasons size, returns and leverage will be included as controlling variables in the analysis. One of the most recent branches of literature on ESG didn't focus as much as most of the already presented literature on firms' performances linked to sustainability, but rather going in depth analysing the economic effects of ESG regulation as such. Indeed, as explained above ESG reporting offers markets and the public in general abundant new information on an until recently unexplored reality of business. The regulation however has potentially not only effects of signals and value of the company

but (as it was thought by regulators) an effect on how the business is run by firms from both an organizational and productive point of view. Indeed, most of these sorts of regulations are aimed at aligning the interests of companies including shareholders and stakeholders with the sustainable transition of the economic system. Thus, the signals and actions undertaken by firms in setting sustainable practices should lead to a competition among them to become the best sustainable one also by amplifying the amount of data disclosed. Cheng, Ioannou and Serafeim (2014) have documented already the eased access to finance of firms that were more ready to conform to these new demands by the whole society of climate social and for short ESG stronger commitments. Nonetheless, a part of firms that for some fair reasons will not disclose or will disclose an almost negligible amount of information. Indeed, the opt-out clause is present in the regulation and for companies of some kind it could be better to not disclose any ESG information apart from the very motivations of such decision. This might be even more so the case as the regulation does not imply any particular outright penalty for these actions although some literature presented above points out that the markets themselves may act as an indirect deterrent. So far, no firm has encountered some kind of ostracism from the market or important losses due to a missing ESG report. What kind of incentives the regulation itself puts up to persuade more companies to disclose remains unclear, still. Burgstahler, Hail and Leuz (2006) have also explored the role of incentives in reporting regulation, though from more of an accounting standpoint, and the relationship between regulation as such and incentives when it comes to companies reporting more tilts more in favor of incentives. This environment explains why some companies may prefer not to report or disclose only little information. However, this new regulation introduces a special trait that is quite new in the sustainability world and that makes this regulation more solid: standards. Ioannou and Serafeim (2017) pointed out how missing guidance on the metrics and ratios to use as the quantification and measurability of most of these issues may be complex and even expensive to work out (How does a firm on its own decide what measure to adopt for gas emissions? How can human rights be measured?). This lack of a formal approach represented a disincentive to disclose.

Therefore, the introduction of mandatory standards to be followed (like the GRI standards) for drafting ESG reports specifying how to measure almost anything in regard to sustainability may prove to be an important incentive in improving quantity as well as the quality of disclosure which can be put under analysis through auditing. These traits are, in fact, the centre of attention by part of accounting literature that orbits around two features of report data: accountability and homogeneity. The ability to draw comparisons from and between data is essential to decision making, let alone research itself. Wanner and Janiesch (2019) have used big data methodology in analyzing sustainability reports in a kind of meta-analysis including surveys of experts along with results from

literature. In their study on the credibility gap of ESG data disclosed beside showing how big data analytics can actually improve perceived credibility they stress the importance of ESG data (and data in general) completeness and accuracy. Hence, this novelty of standards presented by the European regulation is supposed to contribute with a reduction in bias and noise in non-financial data.

Assurance plays a big role as well diminishing the risk of incurring mistakes and wrong calculations while addressing the risk of misreporting by firms or managers. Indeed, assurance has a beneficial effect on firms receiving it as they manage to obtain better terms on capital markets since also the data provided will be of a better level (Serafeim, 2011). This process, indeed, allows analysts to perform better and more truthful analyses improving comparability too. Financial reporting presents a very structured process with international accounting standards (IFRS), compliance and audit, on the other hand sustainability offers a field where firms in some countries are subject to regulation (E.U., e.g.) whereas in others (like the U.S.) are still unregulated environments. Provided that accountability and metrics in regular financial disclosure are proven to be somewhat important there is some likelihood for them to be significant also for ESG reported information. This stems from signaling as well since assurance and standards works as a signal to investors and this is even more true in an unregulated context especially as the greenwashing effect is more likely to be present in those contexts. In regulated markets this may be even more true given that the need for these signals to be positive as disclosure is mandated (or almost so).

Although previous literature on financial disclosure has pointed out that regulation in the field tend to affect positively the firms involved, there are still exceptions as sometimes data represent a mean to comparative advantage hence making firms less willing to disclose. Obliging companies to disclose adds companies' valuation and encourages the implementation of virtuous practices by management: a tool to improve the owner-agent alignment with positive effects involving dividends (La Porta et al., 2000). Koo, Ramalingegowda, and Yu (2017) use a difference-in-difference to analyze a sample of SP firms over a period of 23 years (1950-1973) separating firms according to the increase in disclosure after the introduction of disclosure regulation. They try to understand changes in dividends according to the SEC mandated disclosure finding that regulation had an effect on reporting quality consistent with causality in the increase of dividends. Nevertheless, another side of literature depicts a different story: firms sustained extra costs due to compliance to new laws. Indeed, the literature review on the issue presented by Roychowdhury, Shroff and Verdi (2019), gives a deeper view of the many cases reported in literature underlining the presence of exceptions to the positive relationship between reporting and investments. In their review the authors manage to discern two categories in which financial reporting has a role on investment decisions: imperfect information and moral hazard environments implying adverse selection risk; uncertainty regarding future growth. Especially in the

second scenario the effect of financial reporting is not always clear. They stress the fact that literature should address more the cases where firms do not manage to overcome extra costs (costs meant as lower investment) represented by having a poor financial reporting quality. A good example of this situation is reported by Bushee and Leuz (2005) who analyzed the almost unregulated Over the Counter Bulletin Board market where listed firms usually do not meet the requirements to be listed in major exchanges. In their study on the year 1999 they found how for such firms SEC reporting provisions created a considerable cost.

In light of the review above it is not sure to what degree the sustainability environment can be assumed to behave in a similar way to traditional financial reporting. This is made even more unclear by the fact that ESG reporting does not address only shareholders but stakeholders as a whole. Indeed, previous works on the issue concentrate also on the relationship between sustainability reporting and performance in sustainable sectors. On the other side this cultural shift is posed also to the financial sector even though more by investors' demand rather than by statutory requirements. ESG has been integrated into portfolio and investment strategies but with different effects from the companies' case. Moreover, literature depicts a different kind of relationship with ESG integration as shown by already mentioned Kaiser (2020). In the study the researcher has evaluated the effect of ESG integration in different forms of strategies: value, growth and momentum. The paper takes into analysis a sample of European and American firms from the STOXXEUROPE600 and the SP500 respectively. The analysis finds ESG ratings not to be necessarily a performance limitation. Beside that once ESG ratings have been adjusted for controls such as size country and industry they show a positive risk-adjusted performance. This contributed to showing how sustainability ratings were consistent with the author's risk mitigation assumption. In fact, it would be reasonable to explain this divergence in the two main markets for ESG investments (OECD, 2021) in an already different culture in the two continents when coming to sustainability. However, it must be noted that at the time Kaiser was writing the Non-Financial Reporting Directive (European ESG disclosure regulation) had already entered into force. A recent, peculiar and interesting study on the possible effects of this differences in current ESG disclosure regulations in the international landscape. Krueger, Sautner, Tang, and Zhong, (2021) have published a very innovative dataset that they created for their very study. Their results highlight a significant positive effect of ESG regulations mandating disclosure on both the willingness of firms to publish ESG reports, as well as on the information quality. In general, the answers support the idea that obliging companies to publish ESG reports actually improve the information quality in the market while having also positive spillovers in real business situations.

The literature presented so far has dealt with numerous aspects of ESG disclosures and practices. However, there are still gaps to be possibly filled by more research. Indeed, as it stands now, the

literature on ESG regulation and effects on markets as well as on ESG ratings themselves appears to be still incomplete. Clearly the novelty of the issue leaves many open questions waiting for an answer with regards to the exact nature of the relationship between regulation and disclosed information quality. Thus, the study presented hereby tries to answer a little part of this doubts following hypothesis that will be explored empirically.

Hypothesis on the effects of regulation on ESG ratings: the mandatory disclosure regulation improves the ESG reporting and the available information quality, thus, improving ESG Scores (rating). The hypothesis is of a more peculiar kind as the analyses on regulation effects are quite few both because only a minority of countries has actually passed legislation in such a direction and because of the recent history of this economic issue.

3. Econometric Methodology

The econometric approach chosen is the difference-in-difference (DiD) methodology used to capture changes in firms' ratings after the implementation of the NFRD. The DiD methodology is commonly used in the financial literature (Rajan & Zingales 1998, Dell'Ariccia et al. 2008) to compare a treatment group to a control group before and after treatment. Such methodology has been used by others in the literature to gauge regulation effects (Ioannou and Serafeim, 2017). We use the DID technique to measure the impact of the ESG disclosure regulation in the EU using the United States as a control group. The DID design helps to analyse time differences across the two groups and the DID estimator considers possible effects on both groups by omitted variables. The model also includes fixed effects for firms and time to reach a clear identification of the treatment effects accounting for confounding effects of time and firms characteristics. This analysis tries to answer the question "Does mandatory ESG reporting yields better ESG Score?", estimating the following equation over the period 2015-2020:

$$ESG_{jt} = \beta_0+\beta_1 Post*Treatment+\beta_2 Treatment_{jt}+\beta_3 Post_{jt}+\beta_i\sum Controls+ \beta_4 Time+ \beta_5 Firms+\epsilon_{jt}$$

Where ESG_{jt} is the indicator of ESG rating for firm j at time t. Treatment is a dummy variable equal to 1 for the European firms and 0 otherwise. Post is a dummy variable equal to 1 for all the year following the NFRD (2018-2020). Post*Treatment is the DID term that captures the effect of the treatment (normative) on ESG rating. The key coefficient is $\beta 1$. If $\beta 1$ is positive (negative) on ESG rating, then we assume that the NFRD have contributed positively to the ESG rating. Controls are firm-level control variables. Time and Firms represent the fixed effects included in the regression. ϵjt is the error term.

4. Data

4.1 Data

The dataset was collected from Thomson Reuters' DataStream, which has a reputation regarding sustainability data, and it has been extensively used in the literature. The original sample comprised the firms in the EUROPESTOXX600 (600 firms) and SP500 (505 firms) indexes. The initial sample consist of 1105 companies in Europe (17 countries) and the United States of America (USA). The sample period covered in the analysis is 2015 – 2020 with a quarterly granularity. The choice to evaluate firms in the European countries and USA based on statutory reasons. The main difference between these two groups lies on the adoption of a legislation on ESG disclosure in the EU, the NFRD. It is worth mentioning the fact that the UK despite exiting the Union had already adopted in line with the other European countries. Therefore, all the European countries that were not placed under EU law or did not ratify the directive were removed from the initial sample. This was due to the fact, that the index includes also countries that are European as to the continent but do not make part of the Union, and do not adopt her regulation (namely, Switzerland and Russia).

Furthermore, a missing values analysis was carried out in order to clean the dataset from missing entries. Moreover, all variables are winsorized at the 1% level to reduce the influence of outliers. The final sample consisted of 866 companies, of which 429 companies belong to EUROSTOXX600 (treatment) and 437 to the SP500 (control), yielding a panel dataset balanced between the two groups.

4.2 Variables

Following the literature on sustainability and ESG issues (Friede et al., 2015), the variables were selected so as to gauge the effects of the NFRD, while considering a number of controls. The variables used in the analysis ad dependent is ESG Scores. These Scores are a transparent and objective measure of firms' ESG performance, commitment and effectiveness through a data-driven analysis of 10 variables (emissions, materiality etc.) based on publicly available information (Refinitiv ESG methodology). The Scores are used as such with no need for transformations of sort.

A set of controls was included in each regression to compensate the bias of omitted factors. Specifically, to eliminate bias deriving from profitability Return on Assets (RoA) was included as it is a proxy of profitability (net income to total assets) and in line with previous studies, a positive relation is expected between the RoA and ESG Scores (Kaiser, 2020; Kreuger et al., 2021).

Size: previous studies have highlighted the positive relationship between firm size and ESG rating, especially in environments characterized by asymmetric information (Baran and Dolly King 2012 and 2014). Indeed, bigger firms' have already a tendence to disclose more ESG related information. The analysis uses the natural logarithm of total assets referring to it as Size.

Leverage (measured as the ratio between total debt and common equity): highly leveraged companies deal with more risks and more financial distress along with higher capital costs (Fama and French, 2002). This may hinder the companies' willingness to disclose and to even address the ESG issue possibly due to its more long-term aspect, while highly leveraged firms will be focused on short-term (Krueger et al., 2021). By means of these controls the study aims at limiting the bias effect in the analysis.

Dummies Post and Treatment indicate respectively the time when the NFRD takes effect and the group of firms being treated.

4.3 Descriptive Statistics

Table I shows the descriptive statistics of the variables over the period 2015-2020. The average ESG Score, the dependent variable, is 62.5. The fact is in line with the features of listed firms (Hussainey et al. 2010). The means of other main variables are in line with the features expected from sample like this. The ratios have been transformed and we can see the average RoA to be around 0.07 and the average Leverage to be 1.1, the Size variable has an average of 16.9 as natural logarithm of total assets. The descriptive statistics depicts clearly the sample as composed by top companies with important size, debts levels and balance sheets in general.

Table I:

Summary Statistics:

Variables	**Obs**	**Mean**	**Std. dev.**	**Min**	**Max**
ESG	20,784	62.488	17.408	3.190	94.470
Size	20,784	16.857	1.616	13.270	21.451
ROA	20,784	0.067	0.065	-0.106	0.304
Leverage	20,784	1.115	1.273	0.000	7.482

Table B.I: Summary of some descriptive statistics (Observations; Mean; Standard Deviation; Minimum; Maximum) of the overall sample from 2015 to 2020. The variables taken into analysis are the following: the ESG Score is the rating assigned to each company as found on Data-Stream; the Size assesses the natural logarithm of total assets of firms considered; the ROA gives a grasp of a firm's profitability (equal to Net Income and after-tax interests to assets); Leverage as total debt to common equity.

4.4 Identification

As the NFRD was enforced since 2017, with the data and information contained in the reports available starting from the beginning of 2018 the time horizon considered was 2015-2020. By these means, a comparison between the pre and post enforcement of the regulation can be made. According to the parallel trend's assumption, the dependent variable should behave similarly in both treatment and control groups over the period preceding the introduction of the regulation.

In Figure 1 it is possible to see the parallel trends of the ESG Scores in the two groups (US in blue and EU in red) in the sample period 2015-2020. The gap shown by the graph between the means of the two groups is the inherent presence of what could be defined as a cultural difference between the United States and European Union (Kaiser, 2020). Despite depicting an upward parallel trend in both groups a different pace is achieved by the European group after the introduction of the NFRD with the consequent new information made available in 2018, while the US reaches a plateau. This proves the "parallel trends" assumption.

Figure 1:

Parallel trends graph:

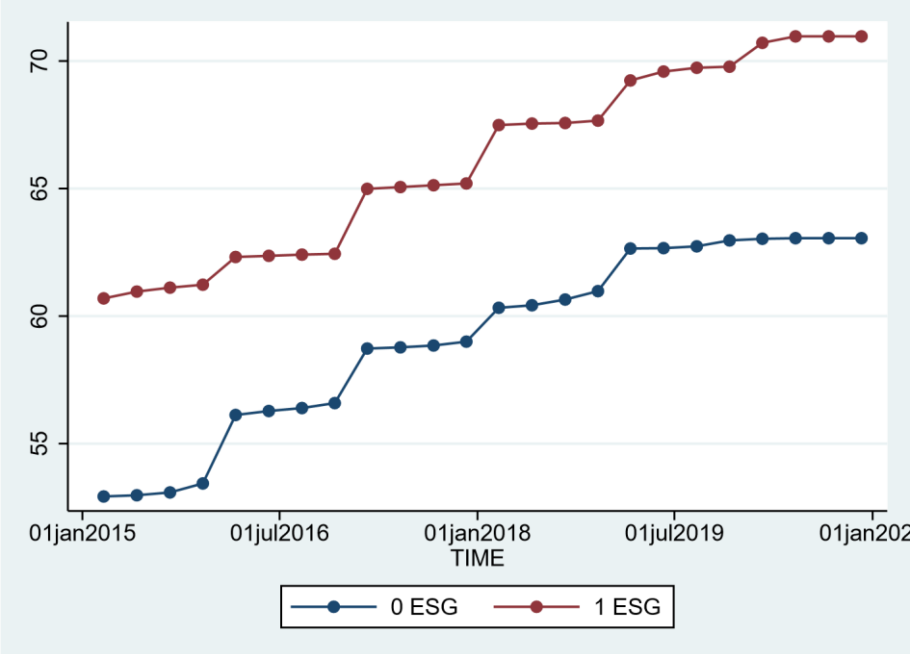

Figure A.1: Parallel Trends. ESG 1 is the European (treated) group and ESG 0 is the US (control) indicate the average ESG Score of each group. The post-treatment (cutoff in January 2018) part of the graph depicts a different behavior of the two groups.

5. Results

The results of the analyses are shown in Table II. The results to the question "Does mandatory ESG reporting yields better ESG Score?" can be seen on the columns referring to "ESG" as the dependent variable (which refers to ESG Scores). The variable capturing the regulation effects is "Post*Treatment". Indeed, in column (1) the coefficients of variables "Post" and "Post*Treatment" show positive impacts on the value of the ESG Scores. This column depicts the analysis with fixed effects (FE) only on firms. The variable capturing the regulation effect, "Post*Treatment" has a very significant positive effect (p-value < 0.01) and R-squared of variance explained around 25.2%. The controls used were Size RoA and Leverage whose impacts on the dependent appear consistent with expectations: positive effect for Size and RoA while Leverage has a negative effect. The impact of the controls is again highly significant with p-values less than 0.01. This result, already important for our hypothesis, is proven consistent in the second column (2) of Table II where the analysis include fixed effects on firms and time as well. Here, the treatment effect appears again positive and highly significant although with a lesser coefficient than in the first case (around 0.63). Such an analysis provides a higher explanation to the variance of the dependent with R-squared equal to 30.1% compared to the first model. These values show how the NFRD has had a positive effect on the ESG ratings for the treated, European group, thus reinforcing the trend in ESG relevance (and activities) in the firms' environment. Such a positive effect translates into a higher ESG rating of around 0.6 point on average. Thus, it is clear how listed firms have answered positively to the call for more ESG awareness and accountability on their side. These results are in line with literature results both in terms of asymmetric information (Ioannou and Serafeim, 2017) and ESG awareness in companies (Lourenço et al., 2014). Nevertheless, causality is difficult to be inferred as, despite the control group, a few other relations could be affecting these results. Indeed, other trends and firms' characteristics may come in the way of causality identification.

Table II:

Results:

VARIABLES	(1) ESG	(2) ESG	(3) ESG	(4) ESG
Post*Treatment	0.7373***	0.6302***	0.7064***	0.6585***
	(4.4933)	(3.9577)	(4.2913)	(4.1099)
Post	4.4432***		4.6200***	
	(35.4658)		(36.8899)	
Size	5.6088***			
	(28.4171)			
ROA	3.8782***			
	(3.3490)			
Leverage	-0.6341***			
	(-7.6655)			
Constant	-33.8288***	-9.3543***	-37.0126***	-3.0784
	(-10.1993)	(-2.7773)	(-11.2129)	(-0.9082)
Observations	19,918	20,784	20,391	20,391
R-squared	0.252	0.301	0.262	0.302
Number of ID	866	866	860	860
PSM	NO	NO	YES	YES
Firm FE	YES	YES	YES	YES
Quarter FE	NO	YES	NO	YES

Table B.II: General results are shown in column (1) and (2). Robustness checks in (3) and (4) with PSM. The variables heading each column indicate the dependent variable, ESG Score. Note that t-statistics are presented in parentheses and significance levels are *** p<0.01, ** p<0.05, * p<0.1.

6. Robustness check

These first two analyses had to deal with two different groups and to make the results more robust, a check on the features of the two groups was performed. As the decision of firms to abide by the ESG disclosure regulation (Treatment) may have correlation with the controls such as Size making the results in the Difference-in-Difference model inconsistent, the model is re-estimated on a matched sample following other works in the literature (e.g., Ioannou and Serafeim 2017). In the first step, replacement was based on pre-treatment size and leverage with neighbor matching. Size was included as smaller firms may have little experience on ESG disclosure and thus decide not to follow the regulation, while leveraged firms may risk to signal negatively the market, hence infringing the decision on ESG disclosure.

$$Treatment_{it} = \beta_0 + \beta_1 Size_{it} + \beta_2 Leverage_{it} + \epsilon_{it}$$

The probit model (shown above) estimates are used to forecast predictions to form the Propensity Scores. The variables considered are the Treatment dummy as dependent and Size (natural log of Total Assets) and Leverage (debt-to-equity ratio). Indeed, the probabilities of the probit model have been used to estimate through propensity score matching (PSM) technique a new sample of observations. This sample increases the comparability of the two groups. The method adopted has been that of 1:1 matching. In this way the procedure creates a homogeneous sample by matching any observation from the treated group to one from the control group with similar characteristics with respect to Size and Leverage. The second step of this robustness check consists in including only the matched sample obtained before and re-perform the analyses with the dependent, the differences term (Post*Treatment) and the other controls as in the previous models. The findings in all cases (also regarding the next section) reinforce the estimates found on the unmatched samples.

Hence, once obtained this new sample, the analyses that were performed initially, were repeated on it as shown by Table II (note PSM row says "YES"). In this way a robust check on the initial result has been performed. As above, the table shows two analyses one with firm fixed effect and one with both firm and time fixed effects. The results to be considered are those of column (3) and (4). Both the analyses confirm out previous results with positive coefficients and similar in value (slightly reduced) to those of the first attempt: treatment effects impact ESG Score by 0.71 and 0.66 for each respective analysis in terms of effects. Moreover, the significance of these results is again very high with p-values below the 0.01 level. The R-squared values are also interesting as the results shown in column (3) explain 26.2% of the variance, and the value increases to 30.2% in the case of the two fixed effects analysis in column (4).

Given these robustness checks and the various approaches on fixed effects we can, thus, say that the overall effect of the European Union ESG disclosure regulation is positive on the rating ESG Score. This confirms the first hypothesis formulated in this study and, indeed, the answer to the question proposed in the hypothesis is affirmative. Thus, the difference yielded by a form of mandating ESG disclosure has produced positive effects on the companies ESG valuations. This result is interesting as it opposes one of the doubts presented in the literature on mandating disclosure was linked to the fact that mandating disclosure to all companies may induce lower ESG ratings as less virtuous companies would have been forced to publish reports.

7. Conclusions

This analysis has tried to fill a gap in present literature on ESG regulation with another empirical work. In this research an attempt was made to compare two approaches to ESG information and

ratings: the regulation mandating information disclosure and on the other side no regulation, trying to answer the doubts on this policy. This comparison between to very important markets both for the size and for the ESG market has taken into account 866 firms in a panel dataset over a horizon of 6 years with data collected with a quarterly granularity.

The study tried to answer the question "Does mandatory ESG reporting yields better ESG Score?" the analyses that were undertaken here allow to answer "Yes", although with some caveats. The findings of this little study are various and significant. The empirical test has indicated a positive and very significant impact of the mandate to disclose ESG data on the ESG Scores. This result has proven robust to the checks that were run, and appears consistent with the literature results (e.g., Krueger, 2021).

In conclusion, the findings of the present study indicate interesting and significant results regarding the effects of regulation mandating ESG disclosure in the EU on ESG Scores (positive). The research leaves, of course, some open questions especially regarding the hypothesis that may require more research as well as different methodologies in order to perform comparisons among results. For instance, a better use of controls such as industry could be of use. The authors feel to advise, despite the limits of this research but following the example set by Krueger et al. (2021), a larger adoption internationally of common ESG reporting standards. Thus, hoping to achieve better awareness and measurability of firms' ESG strategies and policies.

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