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Reflection of the Europeanisation of sustainable disclosure rules: The proactive adjustments of ESG reporting practices and financial returns by US companies in anticipation of the EU CSRD.[1]

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ABSTRACT

This thesis examines the proactive adjustments in ESG reporting practices and financial performance by American companies in anticipation of the European Corporate Sustainability Reporting Directive (CSRD). Focusing on the period from January 2016 to December 2023, the sample comprises a matched dataset of 1,238 publicly traded US companies. The study explores the impact of the announcement of the CSRD on US firms with significant EU activities, focusing on their Environmental, Social and Governance (ESG) scores. Grounded in a differences-in-differences analysis, the research investigates whether the announcement of the European regulation leads to anticipatory changes in ESG practices and financial strategies among US firms. The findings reveal a significant increase post-announcement in sustainability performance among targeted companies, while the effect on enterprise value is less clear due to external factors. The announcement notably influences environmental and social dimensions. US non-targeted firms experienced significant mixed variations in their ESG scores, with a decline in the environmental pillar and an increase in the social dimension post-announcement, suggesting a broader influence of the EU regulation on their sustainability performance. While the governance pillar does not exhibit any significant change, the environmental performance decline however diminishes support for potential spillover effects on non-targeted firms. The thesis provides insights into the broader implications of the CSRD on global corporate practices and highlights the need for further research to explore these dynamics more comprehensively.

ABBREVIATIONS AND ACRONYMS

CSR   Corporate Social Responsibility

CSRD   Corporate Sustainability Reporting Directive

DiD   Differences-in-Differences

EC   European Commission

EFRAG   European Financial reporting Advisory Group

EPS   Earnings Per Share

ESG   Environmental, Social and Governance

ESRS   European Sustainability Reporting Standards

EU   European Union

EV   Enterprise Value

GHG   Greenhouse Gas

GVIF   Generalised Variance Inflation Factor

IFRS   International Financial Reporting Standards

IRA   Inflation Reduction Act

NFRD   Non-Financial Reporting Directive

PSM   Propensity Score Matching

SASB   Sustainability Accounting Standards Board

SDG   Sustainable Development Goals

SEC   The Securities and Exchange Commission

SFDR   Sustainable Finance Disclosure Regulation

SOX   Sarbanes-Oxley Act

UN   United Nations

US   United States

VIF   Variance Inflation Factor

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1. INTRODUCTION

This thesis explores the proactive adjustments in ESG reporting practices and financial returns by US companies in anticipation of the European Corporate Sustainability Reporting Directive (CSRD), examining a potential Europeanisation trend of the disclosure rules. The relevance of this analysis stems from the growing global emphasis on sustainability and significant ties between European Union (EU) and United States (US). Having the largest bilateral trade and investment relationship by far, their mutual investments represent a substantial driver of the transatlantic relationship and a key feature of the global economy, accounted for more than €500 billion in 2021 (European Commission, 2023). The EU has notably been playing a leading role in this sustainable revolution, integrating ESG into the EU law and positioning its strategy for a greener world (Doyle, 2024). Indeed, by introducing the European Green Deal in December 2019, the EU has committed to minimise environmental impacts and to transition to a climate-neutral economy, while mitigating the social impact of economic change. This comprehensive package of policy initiatives aims to guide the EU on the path to achieving the climate neutrality by 2050 (European Commission, 2023).

On April 21st, 2021, the European Commission (EC) adopted a proposal for a Corporate Sustainability Reporting Directive (CSRD), replacing the current Non-Financial Reporting Directive (NFRD). One of the main change lies in the directive's expanded scope, applying to non-EU-based companies that have a subsidiary in the EU in addition to EU-based companies (Duarte & Matias, 2022). The CSRD (Directive 2022/2464) mandates that US companies report on their activities to comply with the regulation, extending beyond what many US firms currently include in sustainability reports and exceeding the reporting scope planned in the Securities and Exchange Commission (SEC) rule. A recent estimation by Refinitiv has approximated that among the 11,000 non-EU companies touched by the new regulation, a third is from the US (Holger, 2023). This makes it particularly interesting to analyse the anticipatory effects on those companies and how it affects the broader corporate behaviour within the US. As of now, 83% of US companies registered with the US SEC include some sustainability information in their fillings, responding to the demand for more Corporate Social Responsibility (CSR) information (SASB 2017). However, this disclosure is mainly voluntary, leading to eventual issues in terms of comparability and verification of the information. Indeed, the Sustainability Accounting Standards Board (SASB) points out that 50% of the SEC registered companies provide boilerplate sustainability details (SASB 2017; Christensen et al., 2021).

Current academic literature has extensively documented the increasing trend for sustainability and CSR[2] reporting over the two last decades. Despite this increased interest, the motivations behind sustainability reporting and its determinants remain topics of active debate. The findings of Arkoh et al. (2023), along with previous insights from Delmas & Toffel (2008), Ioannou & Serafeim (2017) and Reid & Toffel (2009) underline the pivotal roles of regulatory compliance and stakeholder pressure in shaping firm's CSR reporting behaviour and anticipatory actions. While most studies highlight a generally positive impact of regulations on sustainability reporting, some findings suggest negative associations or lack concrete evidence, leaving room for further investigation (Grewal et al., 2015; Leuz & Wysocki, 2015; Zhang, 2007). Additionally, although the effects of implementing regulations have been thoroughly examined, the impact of regulatory announcements, which create a time lag between the announcement and its implementation, remains less explored. This gap represents an opportunity for firms to proactively adjust their practices, either to avoid potential negative reactions from stakeholders or to capitalise on the benefits of early compliance. These adjustments can positively influence their firm value and ESG scores. Fiechter et al. (2017) is the first study to investigate anticipatory actions and find evidence of real effects before the effective date of the EU disclosure regulation 2014/95. They suggest a strategy to mitigate potential adverse stakeholders' reactions. Similar to Fiechter et al. (2017), this paper exploits the timeframe of the EU CSR Directive's announcement to isolate the anticipatory effects on US firms prior the disclosure mandate becomes effective. Precisely, this study offers a specific lens on US companies with EU engagements, focusing on how the regulatory announcement influences their Environmental, Social and Governance (ESG) performance, firm valuation, and overall US disclosure practices in anticipation of the CSRD compliance.

Gaps remain in understanding the motivation and the anticipatory reactions of US companies towards the announcement of the CSRD. This thesis aims to analyse the extent to which the new EU regulation applies to non-EU companies and how the announcement of the regulation affects these firms. Additionally, this study explores how this could reflect a Europeanisation of the disclosure regulations. Using a differences-in-differences (DiD) analysis, the

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[2] For the purpose of this paper, CSR and ESG will be considered to have the same meaning and both terms will be used interchangeably.

investigation seeks to enrich the comprehension of the intricate dynamics involved in sustainability reporting, especially the anticipatory actions and drivers in regulatory requirements. This study examines how US companies are proactively adapting their reporting and financial strategies in response to the CSRD announcement. It contributes to the broader discourse on global sustainability standards and offers insights into the transatlantic impact of EU regulations on corporate sustainability practices.

The remainder of this paper is organised as follows. Section 2 briefly reviews the historical background of sustainability reporting to date in European context and compares it with adopted US regulations. Section 3 delves into a detailed literature review of the incentives, anticipation, and market reactions to regulatory compliance, concluding with three hypotheses. Section 4 presents the research design and describes the sample. Section 5 and 6 discuss the empirical findings, additional analyses, and interpretation, highlighting some limitations. Section 7 concludes the study by suggesting further research.

2.   HISTORICAL AND REGULATORY CONTEXT

2.1.   Overview of the European Union's CSR Directive

In recent years and within the constant evolving setup, ESG factors integration into decision-making alongside sustainability risks have become central priority for policymakers, regulators, institutions, and managers. The EU has positioned itself at the forefront of the sustainable revolution by initiating the EU Green Deal. Coupled with this environmental initiative, regulatory frameworks like the Sustainable Finance Disclosure Regulation (SFDR) in 2019 and the EU Taxonomy directive in 2020 align with the green transition. The SFDR (2019/2088/EU) requires financial market participants to disclose sustainability information, enhancing transparency and aiding investors in making informed decisions (European Commission, 2023). The EU Taxonomy further allows financial and non-financial entities to share a common definition of environmentally sustainable activities, aiming to protect investors from greenwashing, help companies become more climate-conscious and support the EU's net-zero transition (European Commission, 2023).

Aligned with the United Nation (UN)'s Sustainable Development Goals (SDG) and the 2030 Agenda, the EC has developed legislation and initiatives aimed at enhancing corporate sustainability and promoting nature and human rights, incorporating ESG reporting. The NFRD

(2014/95) was introduced in 2018 as an extension to annual financial reporting requirements to include guidelines on managing environmental and social challenges. It aimed to provide information for investors and stakeholders, and influence companies to establish more effective ESG practices. This directive applied to large public-interest organisations with more than 500 employees, affecting around 11,700 EU-entities (KPMG, 2024; Duarte, 2022). Developed by the European Financial Reporting Advisory Group (EFRAG), the CSRD replaces the NFRD to address issues, such as inconsistency and limited scope, ensuring alignment with other regulations. Recognising the financial relevance of sustainability information, the CSRD extends its applicability to additional entities, broadening its international impact. The directive applies to all companies listed on regulated markets, except micro-enterprises with under €2 million in turnover or total assets, or fewer than 10 employees. It also covers all large[3] public-interest companies meeting at least two of the following criteria: (1) over 250 employees, (2) annual revenues higher than €50 million, or (3) balance sheet totals above €25 million (Branquart & Gorrin, 2024). Importantly, the scope extends to non-EU firms, notably those with EU subsidiaries. There are three ways in which non-EU firms will be affected by the CSRD: (1) if they have securities listed in the EU, (2) if they have significant activity, meaning generating €50 million in revenue, in the EU, or (3) if they are parent companies of in-scope EU subsidiaries (Branquart & Gorrin, 2024; Goodson et al., 2023).

The CSRD introduces a comprehensive and robust reporting framework aimed at protecting investors and enhancing transparency by ensuring reliable data, reporting standards and effective auditing practices. It mandates SMEs, excluding micro-enterprises, whose securities are traded on a regulated market in the EU to disclose sustainability information. EU officials estimated that the CSRD broadens the reporting scope to more than 50,000 EU and non-EU businesses (Goodson et al., 2023; Holger, 2023). This directive emphasises the integration of taxonomy-aligned data, third-party audits, electronic reporting, and detailed environmental disclosures on pollution, water, waste, and biodiversity. It also introduces the concept of double materiality, focusing on the mutual impact of ESG issues on firms and their impacts on the

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[3] According to the CSRD, the term *large* applies to company parent of a consolidated group or a group meeting two of the following criteria: (a) companies represent those with a net turnover exceeding EUR 40 million; (b) balance sheet total assets greater than EUR 20 million; (c) more than 250 employees (Pears et al., 2023).

environment and society (European Union, 2022). Figure 1 presents a clear compliance tree for non-EU companies required to report under the scope of CSRD.

Figure 1. Compliance and Disclosure Tree for non-EU companies[4]
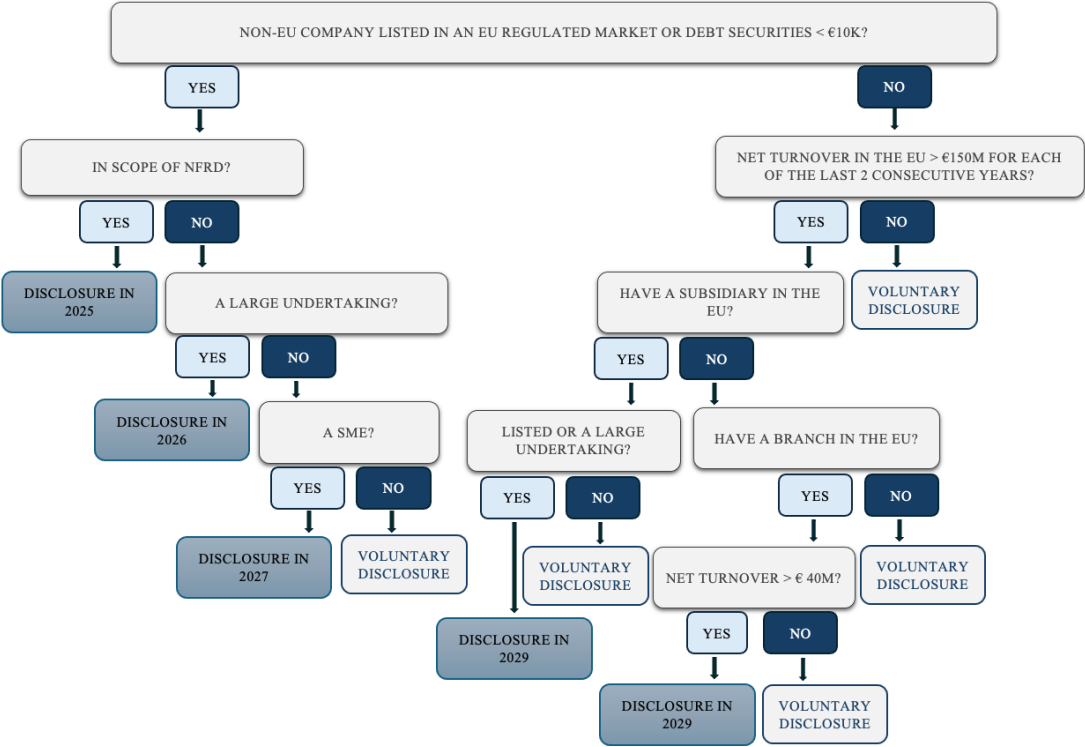
2.2. CSRD Implementation Timeline

Announced on April 21st, 2021, the CSRD and the European Sustainability Reporting Standards (ESRS) will be progressively applied from January 1st, 2024. Adopted respectively on January 5th January and July 31st, 2023, both detail the requirements applying to the companies within the scope (Pears et al., 2023). Non-EU groups with significant activity in the EU are required to provide detailed sustainability information starting in 2025. The directive's application timeline depends on the size, performance and activities of the companies. Specifically, EU-incorporated company already subject to NFRD must report for the 2024 financial year. Large EU-incorporated companies and EU-incorporated parents of large groups will have to report for the 2025 financial year. Listed small and medium-sized enterprises

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[4] Personal elaboration based on Greenomy, 2023.

(SME) on an EU-regulated market must comply for the 2026 financial year. Companies with non-EU ultimate parents but with a significant presence in the EU are asked to comply from the 2028 financial year, reporting on the entire global group, including non-EU companies (Fox et al., 2023; Pears et al., 2023). Therefore, the application of CSRD will take place with a four-phased timing, as presented in Table 1.

Table 1. Phased Timing of the EU CSR Directive[5]

Reports Due	For Full Financial Years Ending in	Non-EU Companies	EU Companies
2025	2024	Large non-EU entities with securities listed on an EU regulated market, having more than 500 employees.	Any EU-incorporated company already subject to the NFRD.
2026	2025	Large non-EU entities listed on an EU regulated market, including non-EU subsidiaries, small and non-complex institutions meeting large companies' requirements.	Large EU companies incorporated in the EU and EU-incorporated parents of large groups, meeting large companies' requirements.
2027	2026	Certain non-EU small and medium-sized enterprises listed on an EU regulated market.	Certain EU SMEs, small and non-complex credit institutions, and captive insurance undertakings.
2029	2028	Non-EU entities falling within the rules solely on account of the EU Turnover Test, also ultimate non-EU parent with EU significant presence.	N/A

2.3.   US Disclosure Regulations Relative to CSRD

The SEC has authority over the type and content of reporting required for US listed companies through Regulation S-K, which is part of the Securities Act of 1933 (Bakken et al., 2022). This regulation is mandatory for all SEC-registered companies. However, ESG disclosures remain voluntary due to the inconsistent measurements of materiality. In the US, reporting on climate change and ESG factors without clarity on material risks is not legally required, resulting in mostly voluntary and non-standardised non-financial disclosures (Lee, 2020). The US SEC Rule relies on a financial single materiality, while the CSRD requires double materiality, covering both financial and socio-environmental impacts (Goodson et al.,

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[5] Personal elaboration based on Fox et al, 2023; Pears et al., 2023.

2023). Moreover, US proposals primarily focus on climate reporting, whereas the EU Taxonomy and CSRD cover multiple environmental and social aspects. The CSRD goes beyond the SEC's proposed rules, by requiring companies to report on a broader range of topics and climate-related risks and, including water and marine resources, biodiversity and ecosystems and worker in the value chain (Bakken et al., 2022; European Union, 2022).

While both frameworks require mandatory disclosures, the EU directive marks a more significant shift towards non-financial reporting. The CSRD emphasises the importance of sustainability reporting with a principles-based approach, allowing flexibility in the manner of reporting on sustainability issues. It defines clear KPIs to enhance comparability, aligning closely with the TCFD recommendations (Goodson et al., 2023). In contrast, the SEC adopts a more prescriptive approach, focusing on detailed compliance, to ensure fair trading and prevent fraud primarily concerning financial and insider disclosures (Bakken et al., 2022). SEC regulations apply only to publicly listed companies, whereas the CSRD includes all large and listed entities, comprising SMEs. Additionally, the CSRD introduces mandatory third-party assurance requirement, which is absent in the US (Bakken et al., 2022). As part of the greener transition, the US has committed to achieving net zero greenhouse gas (GHG) emissions by 2050, aiming to reduce information asymmetry through improved ESG disclosure (Plumer & Popovich, 2021). For instance, California's Climate Corporate Data Accountability Act (SB 253) requires detailed corporate climate impact reports. At the federal level, the US SEC has proposed rules aligning with the EU, particularly concerning Scope 3 emissions, which include all indirect emissions from a company's activities. As of today, US firms are only required to report Scope 1 and 2 if deemed material, contrasting with the requirement of three emissions scopes requirement by the CSRD (Goodson et al., 2023; SEC, 2024).

3. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Understanding the relationship and motivation behind sustainable reporting and its real effects, especially around the adoption of a regulation, has become a focal point for researchers. This following literature review explores existing studies examining these dynamics and highlights the variety of results found to date.

3.1. Pre-Adoption Reporting Determinants

The number of companies issuing sustainability or CSR reports has notably increased over the past twenty years, even though factors driving sustainability reporting and the determinants are still under debate. Arkoh et al. (2023), identify and categorise the determinants under five theories. In addition to the resource-based view theory, the agency theory, and the aggregate theory, they underscore the pertinence of the real entity theory, representing the compliance with regulations, and the stakeholder theory, illustrated by the stakeholder's pressure. Interestingly, their findings suggest that compliance with regulations is a key factor associated with the real entity theory. As highlighted in their paper, regulatory compliance tends to have a positive influence on sustainability reports (Hossain et al., 2015; Fontana et al., 2015; Barakat et al., 2015; Comyns et al., 2016). While they find only three studies demonstrating no significant relationship between regulations and sustainability reporting (Amidjaya & Widagdo, 2020; Gunawan, 2007; Tauringana, 2021a, 2021b), no study reports a negative association. They conclude that regulations play a significant role in as determinants of sustainability reporting.

In addition to regulatory and legal context, stakeholders' pressure represents another common strong determinant, suggesting that a company's commitment to sustainability reporting is motivated by the social and environmental expectations of its stakeholders. Indeed, Delmas & Toffel (2008) and Reid & Toffel (2009) both find that pressure from stakeholders groups to disclose information related to environmental and social impacts from their operations increase the information disclosure. Delmas & Toffel (2008) suggest that the adoption of environmental management practices is significantly influenced by stakeholder pressures. Specifically, they identify pressures exerted by customers, suppliers or competitors as crucial business drivers. Apart from their direct influence through regulation, political considerations, and public scrutiny, governments and policymakers can indirectly affect firm's reporting and motivate CSR activities. For instance, Reid & Toffel (2009) provide evidence that the threat of future government regulation can motivate firms to initiate or further extend CSR reporting. They find that activists groups and government actors, including regulations, shape changes in organisational practices. Interestingly, their study suggests a spillover effect, consistent with

the notion of general deterrence[6] from previous theories, where a regulatory enforcement activity on specific firms often influence many other firms to improve their compliance. They conclude by finding that shareholder resolutions filed by social activists can increase the likelihood to disclose CSR information, not only for targeted firms but also for other firms within the same industry.

Furthermore, Ioannou & Serafeim (2017) examine the effect of sustainability disclosure regulations on firm's disclosure practices. Beyond the stakeholder's pression, their results from a DiD analysis suggest that even in absence of a regulation mandating specific guidelines, firms seek comparability and credibility through voluntary reporting. Their findings show on average a positive effect of the regulation on companies, being value-enhancing rather than value-destroying. By issuing a sustainability report, firms aim to inform not only their shareholders, but also a wider and diverse set of non-shareholding stakeholders about ESG objectives and issues. For instance, Deegan (2002) finds that firms are incentivised to provide CSR information to legitimise their actions towards consumers, employees, nongovernmental organisations (NGOs) and politicians to convey that they act in the broader interest of society.

Dhaliwal et al. (2012) study how CSR reports, as a form of non-financial disclosure, influence earnings forecast accuracy by financial analysts. They find that CSR reporting is linked to lower earnings forecast errors, notably in countries that are more stakeholder-oriented and among companies with less transparent financial disclosures. This finding suggests that non-financial disclosure enhances the information environment and compensates for financial opacity, improving forecast accuracy. In a similar way, Christensen et al. (2021) explore the economic effects of mandated sustainability and CSR disclosure standards in capital markets, on stakeholders and firm behaviour, analysing US firms. The study reveals a significant overlap in the drivers of voluntary CSR reporting and considerable heterogeneity in CSR disclosures, often generic and repetitive, inducing a decrease in the reporting. It suggests that monitoring could enhance the volume of companies' disclosures, especially for smaller firms and sectors with fewer regulations. Furthermore, their study reveals that real effects are more likely to

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[6] The general deterrence theory refers to the impact or effects of threat or legal punishment on public at large (William & Hawkins, 1986).

follow from a reporting mandate than from voluntary disclosures, implying that reporting mandate could represent a tool to drive social and environmental change.

3.2. Announcement: Anticipatory Strategies for Disclosure

The time lag between the passage of the EU directive and the effective date of the disclosure mandate creates a strategic option for US firms that fall under the CSRD scope. This allows them to anticipate potential reactions from the stakeholders and investors.

Prior literature shows that firms adjust their strategies in response to upcoming regulations. For instance, Fiechter et al. (2017) examine the anticipation of the passage of EU Directive 2014/95. They investigate whether firms within the scope of the directive (treated firms) anticipate the disclosure mandate, and related stakeholder reactions, by increasing the CSR activities before the first mandatory disclosures in 2018. Their results from a DiD analysis show that treated firms on average increase their CSR activities after the passage of the directive, especially those with previously lower levels of CSR disclosure. This response is more pronounced in firms facing greater potential stakeholder scrutiny due to firm-level (low CSR performance) and country-level institutional characteristics. Their findings underscore the importance of stakeholders in shaping firms' CSR decisions, consistent with the findings from Delmas & Toffel (2008) and Reid & Toffel (2009). Additionally, Fiechter et al. (2017) find that companies adopt anticipatory CSR reporting strategies only when they foresee an increase in the stakeholder's awareness and believe the strategies benefits exceed its costs. Their paper is the first to investigate and find evidence of real effects *before* the effective date of the disclosure regulation, as a strategy to mitigate potential adverse stakeholder reactions. Similarly, Christensen et al. (2008) study the impact of managerial financial reporting incentives on accounting quality changes around the adoption of International Financial Reporting Standards (IFRS) in Germany. Their analysis focuses on early voluntary IFRS adoption, before compliance became mandatory in 2005. They observe improvements in accounting quality confined to firms with incentives to adopt (voluntary adopters), due to perceived net benefits of compliance. Firms without these incentives resist to become more transparent.

In a broader European context, Grewal et al. (2015) explore the impact of mandatory non-financial disclosure by analysing market reactions to three events associated with the passage of EU Directive 2014/95 on non-financial disclosure. This directive affects firms listed on the EU exchanges or with significant operations in the EU. Using a cross-country sample and an

event study methodology for aggregated events during 2013-2014, the study reveals general negative market reactions to the adoption of the new regulation, indicating investors foresee net costs for most companies. Their analysis results in nuanced market perceptions based on firm's prior disclosure level and governance quality, with stronger negative responses from companies with lower pre-directive non-financial disclosure levels and weak governance, especially in industries exhibiting the highest level of disclosure. Conversely, companies that are excelling in non-financial performance experience positive market reactions, highlighting investor optimism for potential benefits from the adoption of the regulation.

3.3. Post-Announcement Market Reactions

3.3.1. Positive Association

Many studies identify a positive association between voluntary CSR disclosures and financial performance, which can be explained by CSR activities that build loyalty and trust, leading to higher revenues and lower costs (Cao & Rees, 2020). For instance, Li et al. (2008) and Rezaee & Jain (2004) find both significantly positive abnormal stock returns associated with legislative events increasing the likelihood of Sarbanes-Oxley Act (SOX) passage, concluding that investors perceived the Act as beneficial and enhancing investor confidence in public financial information. Overall, the Act's induced benefits significantly outweigh the imposed compliance costs, maximising shareholder value. These positive associations are consistent with prior findings from Greenstone et al. (2006). Analysing the passage of Securities Act Amendments of 1964, they find positive return around the announcement of the law for firms required to report.

Similarly, Armstrong et al. (2010) examine European stock market to 16 events associated with the adoption of the IFRS, revealing positive market reactions. This positive result to the events varies cross-sectionally, with more positive reaction for firms with lower quality pre-adoption information and higher pre-adoption information asymmetry. Thus, the results reveal a more negative reaction for firms domiciled in countries with code law. Their findings are consistent with investors expecting IFRS to improve information quality for the firms concerned. In the US context, Clarkson et al. (2008) find a positive association between environmental performance and the level of discretionary environmental disclosures, analysing 191 firms from the most polluting industries in the US. With a pure focus on environmental disclosures, their result is consistent with the predictions of the economies disclosure theory. However, their

positive association result is inconsistent with the negative association predicted by socio-political theories.

3.3.2. Negative Association

Contrastingly, Grewal et al. (2015) examine the equity market reaction to events associated with the passage of the EU Directive 2014/95, mandating firms listed on EU exchanges to disclose more non-financial information. Analysing a cross-country sample, the study demonstrates a negative market reaction, suggesting anticipated net costs from the directive. Particularly, firms with low initial non-financial disclosures, poor ESG performance and minimal institutional ownership faced even more negative impacts. Conversely, firms with stronger ESG records experience positive reactions, reflecting optimism form investors about directive's benefits. Similarly, Zhang (2007) examine the economic consequences of the SOX, studying the market reactions following the legislative adoption. His findings show significant negative cumulative abnormal returns around the SOX events for US companies, consistent with the hypotheses that restricting non-audit services requires internal control tests and imposes net private costs. Interestingly, companies with weaker shareholder rights than their industry peers experience even more negative cumulative returns around SOX events.

Nonetheless, Leuz & Wysocki (2015) analyse the effects of disclosure regulation and reporting standards on US companies based on evidence from IFRS adoption. They find limited evidence of market-wide effects and suggest that causal effects of disclosure and reporting regulation are relatively rare. Despite a strong demand for convergence in reporting practices, they argue that global convergence of reporting practices is unlikely.

3.4. Hypothesis Development

Drawing on the multifaceted dynamic of mandatory and voluntary sustainable reporting and their influence on corporate behavior, three empirical hypotheses have been formulated. These hypotheses are based on insights from the preceding literature review and directed by the central research question: *To which extent does the announcement of the EU CSRD influence US companies in their anticipatory adjustments to ESG practices and financial strategies, and what role does this play in the Europeanisation of disclosure regulations?*

The announcement of the CSRD and the time lag before the first mandatory disclosures, scheduled for the financial year 2028 for most large non-EU firms, presents a strategic

opportunity. This period allows targeted companies, especially those with lower predictive disclosure and performance levels, to take anticipatory actions and adjust their sustainability practices (Fiechter et al., 2017). By increasing their CSR activities before the disclosure becomes effective, these companies can mitigate potential adverse stakeholder reactions, such as a loss of customers with high awareness (Fiechter et al., 2017). Suggested by Arkoh et al. (2023), Delmas & Toffel (2008) and Reid & Toffel (2009), stakeholders and governments pressures represent pivotal incentives for companies to report and comply with ESG practices. Firms might increase disclosures in response to regulatory announcements by fear of non-compliance or because they perceive benefits from compliance (Ioannou & Serafeim, 2017). CSR reporting serves as a form of legitimation towards multiple actors, consequently incentivizing early disclosures measures (Deegan, 2002). Supporting the first hypothesis, Verrecchia (2001) found that through signaling theory, firms use disclosures to signal their type, activities and enhance their reputation, especially concerning topics with increasing importance such as ESG. In response to stakeholder demands and expectations, companies with room for improvement, may conform to societal norms in anticipation of the incoming regulation. Hence, hypothesis H1 posits:

H1: Mandatory disclosure regulation announcement will increase sustainability performance for US-targeted firms with historically lower levels of CSR reporting.

The expected outcome of the proposed hypothesis is that firms with pre-announcement lower CSR strategies will significantly enhance their CSR activities in response to the CSRD announcement. This expected enhancement is anticipated to be particularly evident as firms attempt to proactively adjust to meet forthcoming regulatory requirements.

CSR performance significantly shapes a firm's disclosures choices, as demonstrated by Dhaliwal et al. (2012). Firms with higher CSR performance are more likely to obtain disclosure benefits and therefore anticipate CSR reporting requirement than firms with lower CSR performance (Christensen et al., 2021; Fiechter et al., 2017; Grewal et al., 2015). However, firms are unlikely to adopt anticipatory strategies if the perceived costs exceed the benefits. As of now, it is unclear if benefits of anticipating stakeholder reactions outweigh the costs.

On the one hand, compliance with mandate disclosure can imply firm-specific costs, represented by the direct costs of data collection and preparation of CSR reports or indirect costs such as proprietary costs (Grewal et al., 2015). Grewal et al. (2015) find negative market

reactions to the passage of the CSR Directive in 2014, particularly for firms with lower CSR disclosure and performance levels. Hence, they demonstrate that the directive has material impacts, imposing indirect costs such as reputational damage on companies (Fiechter et al., 2017). In the context of financial reporting, Ioannou & Serafeim (2017) suggest that ESG disclosure regulation forces firms to adopt organisational process that generate a net cost for the company and consequently negatively affect the valuation of the firm (Eccles et al., 2014). Existing literature suggests that anticipation actions might induce costs of opportunity, uncertainty about regulatory outcome and magnitude of stakeholder reactions.

On the other hand, mandatory disclosure regulation might increase firm value by improving transparency (Lambert et al., 2007), trust (Cao & Rees, 2020), comparability and reduced information risk (Lambert et al., 2007). Existing studies found that anticipatory behaviour can yield benefits in terms of brand reputation and access to finance, inducing costs savings from reputational damage (Bénabou & Tirole, 2006; Cheng et al., 2014). While Leuz & Wysocki (2015) lack in finding evidence for market effects and causal effects of disclosure and reporting regulation, Greenstone et al. (2006), Li et al. (2008) and Rezaee & Jain (2004) find positive stock returns surrounding the announcement of the regulation. The heterogeneity in the findings deliberately leaves space for investigation. Therefore, hypothesis H2 is divided in two parts:

H2a: Mandatory disclosure regulation announcement will increase ESG performance of US-targeted firms.

H2b: Mandatory disclosure regulation announcement will increase firm valuation of US-targeted firms.

The expected result is that the CSRD announcement will lead to a noticeable improvement in the sustainability performance of US firms, reflected in their ESG scores. This enhancement driven by legitimacy in the eyes of stakeholders and benefits of being perceived as an early adopter of strong ESG practices is expected to result in improved stakeholder relationships and better overall compliance. The proactive adjustment to new ESG requirements is expected to deepen their commitment and business practices, resulting in a higher market valuation.

The EU Directive marks a significant transition from voluntary to mandatory sustainability reporting, imposing standardised framework compelling some US firms to reconsider their CSR reporting strategies. Historically, US firm's decisions to prepare CSR reports and comply with international reporting standards, such as GRI, were essentially voluntary (Lee, 2020).

Regulatory pressures often diffuse best practices, fostering a competitive environment that elevates CSR performance. Doshi et al. (2013) and Fiechter et al. (2017) suggest that mandatory sustainability reporting regulation makes it likely that other companies, peers and competitors, will increase disclosure, raising the overall level of ESG disclosure. This aligns with signalling theory, where firms signal their commitment to sustainability by aligning with new standards, seeking assurance and comparability of their ESG disclosures (Verrecchia, 2001). Cheng et al. (2014) and Cicchiello et al. (2023) argue that the signals and actions taken by firms to define sustainable practices foster a competitive environment incentivizing CSR strategies and performance. Therefore, regulatory announcements can spur voluntary improvements in ESG practices among non-targeted firms. This cascading effect suggested by the literature aligns with a broader trend of Europeanisation, where non-EU firms align with global standards to maintain competitiveness and credibility (Christensen et al., 2008). Given this context, the third hypothesis is formulated as follows:

> *H3: Mandatory disclosure regulation announcement will increase the voluntary adoption of ESG reporting for non-targeted US firms.*

The refined hypothesis anticipates that non-targeted firms will improve their CSR activities in response to regulatory signals, driven by the desire to maintain competitiveness, stakeholder trust and enhance their reputation on a broader international scale.

4. DATA SAMPLE AND METHODOLOGY

4.1. Sample Selection

The dataset is collected from a combination of FactSet and Refinitiv Eikon databases to compare and adjust the data collection. The combination of both financial databases offers detailed information for examining current state of sustainability reporting among US companies. The FactSet screener is used to select US companies based on geography and active status. Additionally, firms are filtered by *stock exchange* to include all US public and private companies listed on European exchanges and by the filter *GEOREV* to get US firms with significant portion of their revenue coming from the Europe geographic super-region. Precisely, the selection includes EU members countries, combining Euronext (Paris, Amsterdam, Brussels, and Lisbon), Frankfurt, Milan and Madrid Stock Exchanges, and Nasdaq OMX Nordic (Stockholm, Helsinki, Copenhagen), resulting in an initial treated group of 1,123 firms.

The initial control group is composed of active US firms listed on S&P1500, having 250 or more employees. The choice of S&P1500 index is based on prior literature (Cicchiello et al., 2023) and provides a relative broad initial sample. After conducting the data query and applying the pair matching method, the final sample accounts to 9,904 firm-year observations across 48 US states for the fiscal years 2016 to 2023. Table 8 provides the distribution of the sample across industries and its repartition between treated and matched control groups.

4.2. Research Design

The research's objective is to evaluate the anticipatory effects of mandatory disclosures required by the EU CSRD with a comprehensive methodology, incorporating empirical strategies to assess the impact on firm's CSR activities. The research question aims to analyse whether and how the US firms anticipate the disclosure mandate by increasing their CSR activities before the first mandatory disclosures. The core empirical strategy includes a DiD analysis evaluating the effects on two key outcomes: ESG scores and Enterprise Value (EV), before and after the announcement of the CSRD implementation in 2021. The DiD is commonly applied in financial literature to assess the impacts of regulatory policies; here the method will be adapted to anticipatory effects of the regulation (Christensen et al., 2021; Cicchiello et al., 2023; Doshi et al., 2013; Fiechter et al., 2017). The DiD estimator addresses omitted variables that affect both the treated and the control groups, allowing to analyse time differences across two groups. Incorporating control variables into the regression allows to isolate the average impact of the announcement on the treated group. The DiD method inherently controls for time-invariant unobserved heterogeneity. To avoid multicollinearity issues, I choose not to include year fixed effects, since the time dummy already captures the overall time trend, and additional year dummies would introduce redundancy. Instead, I control specifically for the year 2020, which has been particularly affected by the COVID-19. Subsequently, the analysis permits to determine if the CSRD announcement incentivises firms to enhance their ESG practices.

4.2.1. Identification of the Announcement Date

To proceed with the research design, the event is identified on April 21st, 2021, when the EU Commission first announced the CSRD's applicability to non-EU companies. This announcement date refers to when the EC published the proposal for the CSRD, revising and strengthening rules introduced by the NFRD (European Union, 2022). The sample period spans

the last 8 financial years, from 2016 to 2023 included, considering the fiscal years 2016-2020 as pre-announcement and 2021-2023 as post-announcement period.

4.2.2. Definition of Treated and Control Firms

To perform the analysis, the two groups need to be clearly defined and matched. The treated group comprises US companies directly affected by the CSRD regulation. These firms are identified based on the scope of the directive, comprising US subsidiaries that meet the CSRD's criteria or have significant revenue from the EU market.[7] As the complete dataset contains values in USD, the financial criteria from the regulation are converted using the European Central Bank exchange rate of €1=$1.2007, effective on the day of the announcement (April 21st, 2021) (European Central Bank, 2024). Consequently, treated firms meet at least two of the following criteria: having 250 or more employees, a net turnover of at least $60,035,000, or total assets amounting to at least $30,017,500.

Based on academic literature, propensity score matching (PSM) is applied to reduce selection bias in the analysis. Using the *Matchit* package in R, a one-to-one nearest neighbour matching, also known as pair matching, was performed to pair each treated unit with one control unit having a similar propensity score. Each pair consists in one treated and one control unit, helping balance covariates between the groups. This procedure uses a PSM as a technique to estimate the effect of a treatment by accounting for covariates that predict receiving the treatment (Wooldridge, 2020). Therefore, the control group comprises firms listed on the S&P1500 that, while not directly subjected to the CSRD, are comparable to the treated group in other respects. Following previous studies, the control companies are matched based on two covariates: the Industry Classification Benchmark (ICB) sector name and the earnings per share (EPS) for the years 2016-2020 (Bentivogli & Mirenda, 2017; Yi, 2001). EPS represents the value of normalised net income divided by the number of basic weighted average shares (Refinitiv, 2021). This matching ensures comparability between the groups, with the primary difference

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[7] Based on the EU Directive (2022/2464, L322/20), treated companies are non-SME listed companies or large companies satisfying at least two of the following criteria: 250 workers or more, at least €50m net turnover, at least €25m assets; or listed non-EU companies with €150m net turnover in EU (in each of last 2 years), and cumulatively one of these: listed or large subsidiary or have significant branch in the EU, meaning generating at least €50m in revenue. These criteria are exposed in Figure 1.

being their exposure to the regulation (Cicchiello et al., 2023; Fiechter et al., 2017). Matching on pre-treatment covariates helps to isolate the effect of the treatment and avoid post treatment bias. To check the reliability of the matching procedure and ensure that both observed groups comparable in terms of their baseline characteristics, the covariate balance[8] is constructed. The small differences in covariate values post-matching indicate that the two groups are well-matched, validating the matching process used in the analysis. The effective sample size accounts for a total of 1,238 companies.

4.3. Variables Definition

4.3.1. ESG Scores and Enterprise Value

The first dependent variable *ESG it* is the indicator of ESG rating for firm *i* at time *t* provided by Refinitiv Eikon database. The *ESG scores* from equations (1) and (2) measure a company's sustainability performance, commitment, and effectiveness in environmental (E), social (S) and governance (G) aspects based on verifiable publicly reported information. The ESG score represents a sum of weighted category scores, with weights varying by industry for environmental and social pillars. Governance weights are consistent across all industries. These scores range from 0 to 100, with 100 indicating the best ESG performance (Refinitiv, 2021). Following prior literature, it is assumed that the ESG rating is directly related to sustainability performance, because of the positive association with the company's investment in sustainability activities (Cicchiello et al., 2023; Fiechter et al., 2017). Therefore, these scores are used to test the sustainability performance of the US-targeted companies (H1 and H2a) and as a proxy for the extent and quality of voluntary ESG reporting (H3). They serve as a reflection of ESG reporting practices, since firms that voluntarily adopt and enhance ESG reporting practices are likely to exhibit improvements in their ESG scores. This approach leverages the fact that ESG scores are widely available, regularly updated and standardized across firms. This facilitates comparative analysis, captures changes in ESG practices and ensures consistency in measurement, unlike other reporting metrics.

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[8] The matching covariate balance is detailed in Table 9, while Table 10 summarises statistics of the paired matching balance.

The second variable of interest is the enterprise value, also retrieved from Refinitiv Eikon database. It represents the market valuation of all outstanding shares of a company, being the total shares of stock that are currently owned by shareholders. Equation (3) assesses the impact of the announcement on firm valuation based on changes in *EV it*, the enterprise value for firm *i* at time *t* to test H2b.

4.3.2. Control Variables

Following prior literature and to mitigate potential omitted bias, my regression model includes a set of control variables that can influence the outcomes but are not directly affected by the disclosure regulation. Specifically, the analysis controls for the following variables. Net asset value (*Assetvalue*) can influence a firm's ability to invest in ESG and affects the EV. Return on total assets (*ROA*), reflects the company's profitability relative to its total assets and serves as a good indicator of overall firm performance. Higher profitability might enable more substantial ESG investments (Cicchiello et al., 2023). Stakeholder engagement (*Stkhldr*) is crucial for understanding ESG scores and can impact the company's reputation and value. Due to its near perfect collinearity with *EV*, Market capitalization (*Mrktcap*) is only used to control for ESG scores since it is not typically a criterion for CSRD applicability but might influence the capacity to invest in ESG activities. Net cash flow from operating activities (*CFoperating*) measures the total cash generated from a company's core business operations, which is critical for assessing a company's liquidity and financial stability, directly impacting its market valuation. CSR strategy scores (*Stratcsr*) may influence the reputation and the relationship with investors, potentially affecting the EV. CSR Reporting Score (*Rprtscore*) reflects the company's engagement in reporting CSR activities, potentially increasing the ESG performance and the EV. Finally, the year dummy (*Year 2020*) controls for the unique effects of the pandemic and related economic shocks, which significantly impacted corporate operations and performance[9].

These control variables are important because larger firms tend to disclose more ESG-related information, and more profitable firms might invest more in ESG activities, positively impacting ESG rating scores (Cicchiello et al., 2023). To ensure robustness, these control

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[9] Each variable used in the analysis is defined in Table 12.

variables are first tested in a correlation matrix (Table 14) to examine their relationships, and the generalised variance inflation factor (GVIF) is then used in each regression to check for multicollinearity. As an extension of variance inflation factor (VIF), GVIF adjusts for the degrees of freedom associated with each predictor, especially useful for categorical variables with multiple levels, such as my interaction terms.

4.3.3. Correlation Analysis

Table 14 presents the Pearson's correlation matrix for the variables used in the analysis, measuring the strength and direction of the linear relationship between variables. All variable, except *ROA* with *ESG* ($p<0.1$), show a highly significant correlation ($p<0.01$) with the dependant variables, *ESG* and *EV*, indicating strong relationships between these financial and ESG metrics. Any pair with a correlation above 0.8 has been removed due to perfect collinearity. For instance, the near-perfect correlation between *EV* and *Mrktcap* (0.98) indicates that market capitalisation represents a major component of enterprise value, therefore not used in the EV-model. Similarly, *Stratcsr* highly linear with *ESG* and *Rprtscore*, is excluded from the ESG-model.

The correlation analysis reveals a high positive correlation between ESG scores and the variables CSR strategy score (0.775, $p<0.01$) and CSR reporting score (0.7, $p<0.01$). These correlations suggest that better strategic CSR and higher reporting scores are strongly associated with higher ESG scores. The close link between strategic CSR and reporting scores (0.862, $p<0.01$), emphasising their interconnectedness. Additionally, the correlation matrix highlights a relative strong influence of environmental (0.854, $p<0.01$) and social (0.885, $p<0.01$) factors on ESG scores, while governance (0.667, $p<0.01$) has a relatively weaker impact. Governance practices tend to be more standardised and uniform across industries compared to environmental and social, which are closely tied to changes in the overall ESG performance. For *EV*, relative high correlations with *Assetvalue* (0.619, $p<0.01$) and *CFoperating* (0.58, $p<0.01$) indicate a positive association with improved enterprise values. Furthermore, the table exhibits a moderate positive correlation between my two dependant variables (0.266, $p<0.01$). This suggests that companies with higher ESG scores tend to have higher enterprise values, indicating the market values sustainable and ethical practices of companies.

4.4. Regression Models

The focus of my analysis is the relationship between the CSRD announcement and the impact on two outcome variables, the ESG performance and the enterprise value. After having matched my sample, I follow previous research studies within the field of policies to implement a DiD analysis to compare changes over time in relevant outcomes between affected US companies and their matched control group (Cicchiello et al., 2023; Doshi et al., 2013; Fiechter et al., 2017; Ioannou & Serafeim, 2017). This method helps in attributing observed changes to the CSRD's impact, controlling for pre-existing trends.

My analysis employs a DiD model using pooled OLS regressions with an interaction term for time and treatment. An essential requirement for a reliable pooled OLS model is the absence of heteroskedasticity, which refers to the inconstant variance of the error term, given the explanatory variables (Wooldridge, 2020). To assess this issue, the equations (1), (2) and (3) are estimated by using OLS regression with heteroskedasticity-robust standard errors clustered at a firm level (Cicchiello et al., 2023; Fiechter et al., 2017). This method adjusts the standard errors to account for within-cluster correlation, particularly important when using panel data that are not independent within clusters, like my dataset (Wooldridge, 2020). Furthermore, the parallel trends assumption is a crucial condition for the validity of the DiD methodology and to ensure the significance of the results. It posits that, in absence of the treatment, the average outcomes for both of my groups would have followed the same trajectory over time. Therefore, the differences between the treated and the control groups before the treatment occurred should remain constant (Wooldridge, 2020). This assumption is tested in the robustness checks and is presented in Table 13. To test the aforementioned hypotheses, three regression models are constructed.

$$(1) \quad ESG\ score_{it} = \beta_0 + \beta_1\ Treated_i + \beta_2\ Time_t + \beta_3\ (Treated_i * Time_t) + \beta_4\ (Treated_i * LowRprt_{it} * Time_t) + \beta_5\ (Treated_i * HighRprt_{it} * Time_t) + \beta_6\ Year\ 2020_t + \varepsilon_{it}$$

Where:

- o *Treated* is a dummy variable equal to 1 for affected firms.
- o *Time*, a dummy variable equal to 1 for all year post-announcement (2021-2023).
- o *Treated x Time* captures the DiD effect.
- o *LowRprt*, a dummy equal to 1 for firms with low CSR reporting practices pre-announcement.

o *HighRprt*, a dummy equal to 1 for firms with high CSR reporting practices pre-announcement.

o *Year 2020* corrects for unobserved, time-invariant characteristics of firms in the year 2020.

o ε_{it}, the error term.

Equation (1) aims to test if the level of CSR reporting prior the announcement leads to variation in the response of ESG scores with the mandatory disclosure regulation announcement. By running a DiD analysis, the first model examines how the reporting level variable, classified as *None*, *Low* or *High*, influences the ESG performance after the announcement. By including interaction terms between the treatment indicator, the time indicator and the reporting level, it allows to evaluate the heterogeneity in the treatment effect. Representing the CSR sustainability reporting score, *Rprtinglevel* assesses whether a company publishes a separate CSR or sustainability report or includes a substantial section about sustainability or CSR in its annual report, ranking from 0 to 100 (Refinitiv, 2021). The firms are categorised based on their pre-announcement reporting scores: *None* for scores of 0, *Low* for scores of 80 and below and *High* for scores between 81 and 100. The cut-off of 80 is based on the median of the non-zero scores which equals to 81.826[10]. Both interaction terms allow to observe how the regulation's announcement's impact differs among firms with different reporting levels, relative to firms with no CSR reporting. By assessing how the treatment's impact on ESG scores varies based on sustainability reporting levels pre-announcement, this approach provides a nuanced understanding of the treatment effect (H1).

(2) $$ESG\ score_{it} = \beta_0 + \beta_1\ Treated_i + \beta_2\ Time_t + \beta_3\ (Treated_i * Time_t) + \\ \beta_4\ Stkhldr_{it} + \beta_5\ Log(Assetvalue_{it}) + \beta_6\ Log(Mrktcap_{it}) + \beta_7\ Rprtscore_{it} + \\ + \beta_8\ Year\ 2020_t + \varepsilon_{it}$$

Where:

o Stkhldr, Assetvalue, *Mrktcap*, *Rprtscore* and *Year 2020* are control variables for *ESG score*, the sustainability performance.

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[10] A density plot of the reporting level scores pre-announcement is displayed in Figure 3, while Figure 4 shows the post-announcement density plot.

Equation (2) is designed to assess whether US-targeted firms improve their sustainability performance in anticipation of the CSRD following the announcement (H2a). Unlike equation (1), this DiD regression model includes control variables and examines the impact of the disclosure regulation announcement on ESG scores post-announcement, comparing treated firms to control firms. The model aims to isolate the effect of the announcement on sustainability performance. The result will offer robust evidence regarding the influence of the regulation announcement on the sustainability activities among US-targeted firms.

$$
\begin{aligned}
(3) \quad \text{Log}(EV_{it}) = {} & \beta_0 + \beta_1\, Treated_i + \beta_2\, Time_t + \beta_3\, (Treated_i * Time_t) + \\
& \beta_4\, \text{Log}(Assetvalue_{it}) + \beta_5\, ROA_{it} + \beta_6\, Stratcsr_{it} + \beta_7\, \text{Log}(CFoperating_{it}) + \\
& \beta_8\, Rprting_{it} + \beta_9\, Year\ 2020_t + \varepsilon_{it}
\end{aligned}
$$

Where:

- *Assetvalue, ROA*, *Stratcsr, CFoperating*, *Rprting* and *Year 2020* are control variables for *EV*, the enterprise value.

In a similar way, equation (3) aims to evaluate the impact of the announcement on the firm value (H2b). The natural logarithm of financial variables, including *EV*, is used to linearise the relationship and manage heteroskedasticity. It allows to transform *EV, Assetvalue* and *CFoperating* into a comparable scale and stabilise the variance of these financial data. The transformation is executed using *log1p* function. This function handles value close to zero and avoids issues with taking the logarithm of negative numbers, allowing to interpret the coefficients as approximate percentage change. This approach is common and beneficial in financial analysis to normalise the distribution of variables and improve the reliability of the regression model.

The key coefficient β_3 captures the causal effect of the treatment over time and represents the DiD term in each equation. It identifies the average treatment on the treated firms, indicating how the announcement influences the ESG performance and the enterprise value relative to control firms. When statistically significant and positive (or negative) in both equations (2) and (3), it suggests that the directive announcement has led to an increase (or decrease) in both sustainability performance and enterprise valuation. A positive impact on the treated firms compared to the control group implies an incentive for firms to improve their CSR practices. Both regressions include various control variables, presented in Section 4.3.2. to ensure that the

estimated effect of the regulation is not confounded by other factors that also affect the sustainability performance or the firm value.

5. EMPIRICAL FINDINGS

5.1. Influence of Initial CSR Reporting Levels

The first regression results (Table 15) assess the impact of the CSRD announcement on ESG scores, focusing on firms with varying levels of reporting prior the announcement. By segmenting firms based on their pre-announcement CSR characteristics, the analysis examines whether prior CSR reporting levels amplify or mitigate the response to the announcement. The regression from equation (1) evaluates the heterogeneity in the treatment effect, using robust standard errors (column 2) and robust standard errors clustered at a firm level (column 3) to ensure the validity of the coefficients.[11] All coefficients considered are based on the clustered robust standard errors, which are highly relevant for ensuring validity when dealing with panel data and correcting for heteroskedasticity. Table 2 presents a summary of the regression analysis, specifically related to firms with low reporting levels.

Regarding the targeted firms, the only significant coefficient is the interaction term between *Treated* and *Time*. It indicates that treated firms with no initial CSR reporting benefit from an increase in their ESG scores from 3.029 in the post-announcement period. This finding suggests a highly significant ($p<0.01$) and positive impact of the CSRD announcement on treated firms' sustainability performance, only for firms with no prior CSR reporting practices. Conversely, other coefficients for treated firms are not statistically different from zero, indicating no additional impact on the ESG scores of the targeted firms due to the announcement. Precisely, there is no evidence that a pre-existing low reporting level differentially influences sustainability performance of targeted companies. Therefore, H1 is not supported by the results.

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[11] The robust standard errors adjust for heteroskedasticity, correcting the standard error when its variance is not constant. The clustered standard errors accounts for correlation within clusters, which is important when observations are not independent within clusters (Wooldridge, 2020).

Interestingly, the non-targeted firms experienced a significant increase in their ESG scores post announcement and for each initial CSR reporting level. The coefficient *Time* indicates that in the post-announcement period, ESG scores for the non-targeted firms with no initial CSR reporting have significantly ($p<0.01$) increased by about 9.036 points, compared to the pre-announcement period. Additionally, both coefficients *LowRprt* and *HighRprt* are significant, respectively at the 5% and 1% level. They indicate that non-treated firms with historically low and high CSR reporting levels have an ESG score that is respectively about 9.808 and 22.453 points higher than non-treated firms with no prior CSR reporting. The interaction term *Time x LowRprt* is highly significant across all three models ($p<0.01$), demonstrating that in the post-announcement period, non-treated firms with historically low CSR reporting see a significant increase in ESG scores from about 9.579 points compared to those with no prior CSR reporting. The additional increase in ESG scores suggests that the time trend had a stronger positive effect on non-treated firms with low CSR reporting levels, a trend not observed in the treated firms.

Consequently, Table 15 provides no evidence supporting the hypothesis H1. While targeted firms with no prior CSR reporting experience an increase post-announcement, the three-way interaction term (*Treated x Time x Reporting Level*) is not statistically significant. This indicates that the combined effect of treatment, time, and existing reporting level does not significantly influence ESG scores. Moreover, the interaction term *Treated x LowRprt* is not significant, confirming no evidence of a significant increase in ESG scores for targeted firms with historically lower levels of CSR reporting.

Table 2. Results Summary for Low Reporting Level

	ESG Scores	
	(Robust SE)	(Clustered SE)
LowRprt	9.808***	9.808**
	(2.280)[12]	(3.919)
Treated x Time	3.029***	3.029***
	(0.801)	(0.753)
Treated x LowRprt	3.873	3.873
	(2.621)	(4.511)

[12] Note: The standard error of each coefficient is reported in parentheses beneath the corresponding coefficient.

Time x LowRprt	9.579***	9.579***
	(3.241)	(2.827)
Treated x Time x LowRprt	-3.371	-3.371
	(3.667)	(3.388)

<div align="right">

*p<0.1; **p<0.05; ***p<0.01

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5.2.   Impact on ESG Performance of Targeted Companies

Table 16 presents the regression results from equation (2) aiming to test whether the announcement of the mandatory disclosure regulation leads to improved ESG performance among US-targeted firms (H2a). In other words, the equation is constructed to assess how the sustainability performance of treated firms is adjusted following the announcement of the mandate regulation. All control variables have positive and highly significant coefficient ($p<0.01$), suggesting a good explanatory power on ESG scores. Moreover, the key coefficient *Treated x Time* is positive (1.369) and significant at the 1% level of significance. This means that the hypothesised increase in ESG performance for US-targeted firms following the announcement is supported by the data, as the interaction term does significantly differ from zero ($p=0.001027$). To further the analysis of the impact of the regulation on ESG performance, each pillar of the ESG is examined individually.

5.2.1.   Environmental Performance Insights

As ESG encompasses three distinct dimensions, separating them allows for a more in-depth understanding of the effect. Tables 17 to 19 report the results for each individual pillar constituting ESG scores. Specifically, Table 17, summarised in Table 3, presents the regression results on the environmental pillar scores, allowing insights into how disclosure mandates affect environmental practices individually. Aligned with the impact on ESG scores, the interaction term *Treated x Time* is positive (4.723) and significant at the 1% level ($p<0.01$), indicating post-announcement, the targeted firms show an improvement in environmental scores, compared to the non-treated firms. Specifically, having stakeholder engagement increase the environmental score from 16.902 points, ceteris paribus. Interestingly, the coefficient *Time* has a negative and highly significant coefficient, at the 1% level. This indicates that the environmental pillar scores for non-treated firms are, on average, 3.218 points lower in the post-announcement period compared to the pre-announcement period.

As a result, the environmental pillar provides nuanced insights into how the announcement might influence the environmental performance of both groups differently. While the insignificant *Treated* (p>0.1) coefficient implies no statistically significant difference in the ESG scores between treated firms and non-treated firms in the pre-announcement period, the interaction term demonstrates a significant positive impact of the announcement on the environmental scores (+4.723) for the targeted firms. This result suggests that the announcement could be driving improvements in environmental performance for the treated firms but implies a general negative trend (-3.218) in environmental scores for the non-targeted firms following the announcement.

Table 3. Results Summary on Environmental Pillar

	Environmental Pillar Score
	(Clustered SE)
Treated	0.842
	(0.870)
Time	-3.218***
	(0.601)
Treated x Time	4.723***
	(0.789)
	*p<0.1; **p<0.05; ***p<0.01

5.2.2. Social Performance Insights

The regression analysis on the social pillar score is presented in Table 18 and summarised in Table 4. Interestingly, the coefficient *Treated*, statistically significant at the level 1% across all three models, indicates that before the announcement, firms subject to the CSRD had social scores that were 3.955 points higher on average compared to the reference group. The significant coefficient *Time* (p<0.01) amounts 1.958, suggesting a positive trend of the social pillar for the non-treated group post-announcement, compared to pre-announcement period. Finally, the interaction term of 1.649, significant at the 5% level, indicates a positive effect on the social pillar score of the treatment over time. Targeted firms benefited from an improvement in social scores, compared to the pre-announcement period. The positive impact of the CSRD announcement on the social pillar is relatively modest when compared to the environmental pillar, yet still significant.

Table 4. Results Summary on Social Pillar

	Social Pillar Score
	(Clustered SE)
Treated	3.955***
	(0.804)
Time	1.958***
	(0.536)
Treated x Time	1.649**
	(0.677)
	*p<0.1; **p<0.05; ***p<0.01

5.2.3. Corporate Governance Performance Insights

Table 19 presents the results of the regression on the corporate governance pillar score. Unlike the environmental and the social pillars, the interaction term *Treated x Time* is not statistically significant (p=0.711). This suggests that there is no significant difference in the governance pillar scores between the two groups after the announcement compared to prior. Therefore, it implies no evidence of a differential impact of the disclosure regulation announcement on the corporate governance practices. Interestingly, the negative and significant (p<0.01) coefficient *Treated* indicates that, on average, treated firms had lower governance scores, about 3.084 points lower, compared to non-treated firms before the announcement.

Table 5. Results Summary on Corporate Governance Pillar

	Corporate Governance Pillar Score
	(Clustered SE)
Treated	-3.084***
	(1.050)
Time	0.082
	(0.689)
Treated x Time	0.310
	(0.838)
	*p<0.1; **p<0.05; ***p<0.01

5.3. Impact on Enterprise Value of Targeted Companies

Table 20 presents the results of the third regression on the log-transformed enterprise value Log (EV_{it}) dependant variable. The natural logarithm transformation on variables ensures the interpretation of the coefficients, because some financial variables can vary widely in their scale with different magnitudes. The interaction term between time and treatment,

measuring the effect of the mandatory disclosure announcement on treated firms, is highly significant (0.096, p<0.01), suggesting a positive effect of the announcement on the valuation of targeted US firms. The treated firms experienced an additional 9.6% increase in enterprise value post-announcement compared to non-treated firms. The significant *Treated* coefficient indicates that on average, treated firms had an enterprise value pre-announcement approximately 16.5% higher than their control group. Interestingly, the variable *Time*, highly significant (p<0.01), has a negative coefficient (-0.156), suggesting that following the announcement, enterprise value of non-targeted companies follows a general downward trend. Their enterprise value post-treatment decreased from about 15.6% compared to prior the announcement, holding other factors constant. Consequently, the regression results support the hypothesis that mandatory disclosure regulation announcement increases firm valuation of US-targeted firms over the post-announcement period (H2b).

Table 6. Results Summary on Log (EV)

	Log (EV)
	(Clustered SE)
Treated	0.165***
	(0.036)
Time	-0.156***
	(0.025)
Treated x Time	0.096***
	(0.030)
	*p<0.1; **p<0.05; ***p<0.01

5.4. Incentives for Voluntary ESG Reporting

The hypothesis H3 suggests that the announcement of mandatory disclosures will have a spillover effect, encouraging non-targeted firms to voluntarily adopt ESG reporting. This hypothesis is based on the idea that regulatory pressures can create competitive environments that drive firms towards higher transparency and comparability in their reporting practices. To assess these potential incentives, ESG scores of non-targeted firms are compared before and after the announcement, under the assumption that firms adopting and enhancing ESG reporting practices are likely to show improvements in their ESG scores (Dhaliwal et al., 2012).

Using the equations (1) and (2), the coefficient *Time* assesses the change in ESG scores for non-targeted companies from the pre-announcement to the post-announcement period. In the first equation (Table 15), this significant coefficient (p<0.01) indicates that the announcement

period had a measurable impact, suggesting a significant increase of 9.036 points in the ESG scores of non-targeted firms. Additionally, the significant *Time x LowRprt* coefficient ($p<0.01$) suggests that ESG scores for non-targeted firms with low prior CSR reporting levels increased by 9.579 points after the announcement compared to those with no prior CSR reporting. Non-treated firms with initial high CSR reporting level increased by 1.526 points ($p<0.1$) post-announcement compared to those with no initial CSR reporting. While controlling for other variables, the impact is smaller, but remains statistically and economically significant. The second regression (Table 16) confirms the finding, with a significant *Time* coefficient ($p<0.05$), indicating that the non-targeted firms experienced a significant increase of 1.051 units in ESG scores post-announcement, ceteris paribus.

However, when looking at the pillars individually, the results reveal varied insights. Regarding the environmental pillar score, the significant and negative *Time* coefficient (-3.218, $p<0.01$) suggests that non-targeted firms did not improve their environmental scores after the announcement. In fact, their scores decreased by 3.218 points, indicating a lack of incentives or effectiveness in improving environmental performance post-announcement. Even though this decline is observed for the environmental dimension, they experienced a significant increase in their social pillar scores in the post-announcement period, about 1.958 points higher ($p<0.01$) than before the announcement. Unlike the environmental and social pillars, the governance scores for non-targeted firms did not show a significant change post-announcement. Given the pronounced enhancement in environmental dimension for treated companies (+4.723, $p<0.01$), one might argue that non-treated firms could feel pressure to improve as well due to competitive dynamics and market expectations. However, the significant decline in environmental scores for non-targeted firms (-3.218, $p<0.01$) does not support the spillover effect in this specific context.

Therefore, while the results show an overall increase in ESG scores for non-targeted firms post-announcement compared to pre-announcement period, especially for those with initial low reporting levels, the significant decrease in environmental pillar scores for non-targeted firms introduces ambiguity. Despite the significant increase in social pillar scores post-announcement indicating an improvement in social practices, the results do not provide sufficient support for the spillover effect hypothesis (H3).

5.5. Robustness Checks

One critical underpinning of the DiD approach is the parallel-trends assumption, asserting that control firms represent valid counterfactuals to treated companies. This assumption requires that the outcome variables, ESG scores and EV, remain parallel and constant across both groups prior the 2021 announcement. This implies there should be no discernible treatment effect on treated firms before the treatment. Figure 2 shows graphical visualisations of the parallel-trends assumption, with both groups exhibiting increasing trends and relatively close slopes (2.04; 1.67 for *ESG scores* and 0.14; 0.08 for *Log (EV))*. Although the ESG scores graph seems to satisfy the assumption with a slightly faster increase for the treated group, the *Log (EV)* graph shows a cross point that complicates the interpretation, indicating potential violations of the assumption. Therefore, formal statistical tests verify this assumption. The pre-treatment trends test, presented in Table 13, is a method to formally test for differences in trends between the two groups in the pre-treatment period. This approach involves adding an interaction term between the treatment indicator and the time variable, and testing the coefficient of this interaction (Wooldridge, 2020). The results indicate that both p-values for *ESG scores* (0.368) and E*V* (0.061) are not significantly different from zero respectively at the 10% and 5% level. This supports the parallel trends assumption for ESG scores, implying that observed changes in the post-treatment period can be more confidently attributed to the treatment effect rather than pre-existing differences in trends. For EV, the close p-value suggests a complex influence of multiple factors, making it harder to assess the impacts accurately. For instance, market conditions, political events or concurrent regulations are likely to affect EV. Therefore, the parallel trends assumption is confidently validated for ESG scores, supporting the validity and robustness of the DiD approach.

Figure 2. Parallel Trends Assumptions Pre-Treatment[13]

Pre-Treatment Trends in ESG Scores

Pre-Treatment Trends in Log(EV)
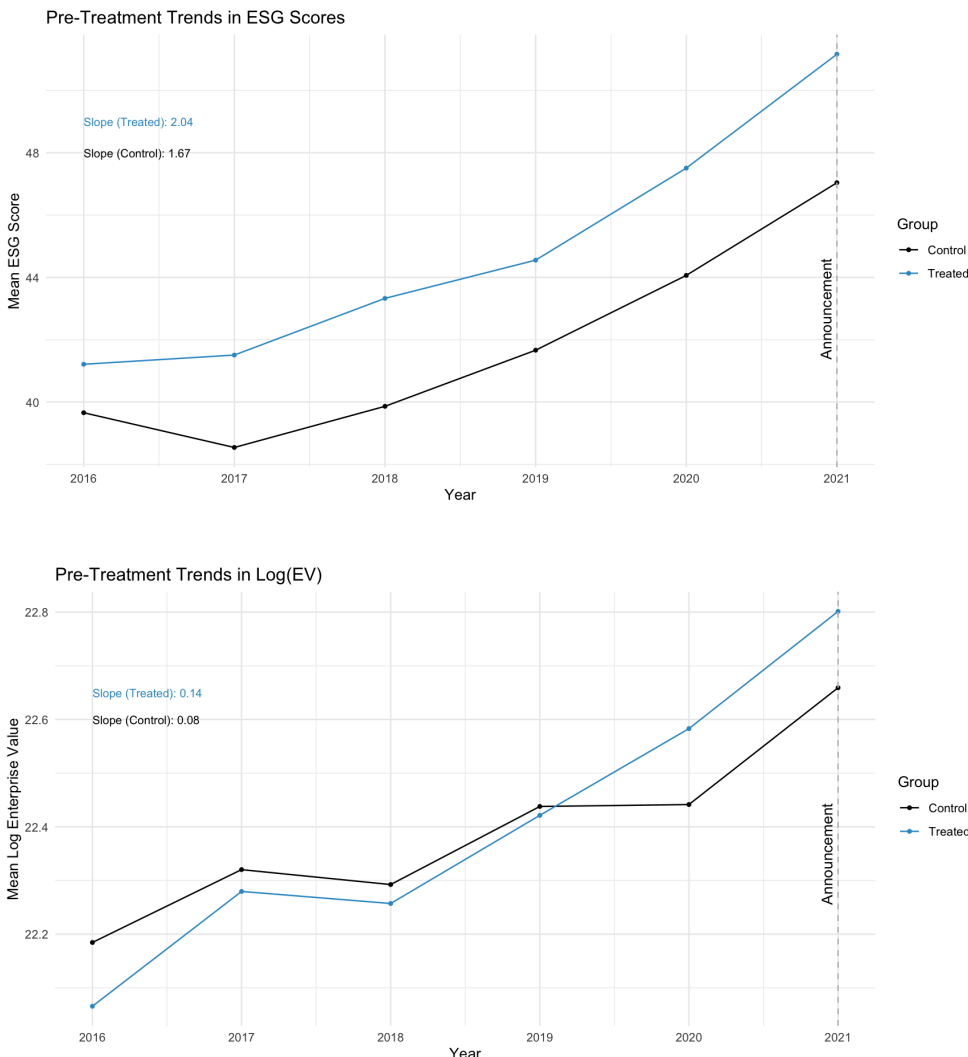
[13] A noticeable dip in 2017 in the trends of both groups, followed by a sharp increase from 2018 onwards, is observed in both graphs. This 2017 dip could represent an external market event or economic condition that temporarily affected the overall performance of the firms. A possible explanation could be that the US geopolitical landscape saw increased nationalism and the implementation of protectionist trade policies under the Trump administration. This likely contributed to market uncertainties and fluctuations in corporate performance metrics (Yandle et al., 2017). Further investigation into specific events or conditions during that period would be necessary to provide a detailed explanation for this dip. Additionally, treated firms were improving at a faster rate before the announcement, which might suggest proactivity from these firms even before the CSRD announcement.

Additionally, I replicated the analysis using a one-to-many matching process instead of pair matching. This approach involves assigning weights to the control group firms to better match the treated group. Table 11 presents the matching balance resulting in a weighted dataset of 925 treated firms and 138 control firms, while the main regression results from this weighted matching method are displayed in the Appendices with further details. Most results support the findings from the paired matching analysis: treated firms showed a significant post-announcement increase in ESG scores, particularly for firms with no prior CSR reporting (2.218, p<0.05). Non-treated firms also show significant increase in ESG scores, particularly for firms with low prior CSR reporting (9.108, p<0.01). The environmental scores of targeted firms increase post-announcement (3.307, p<0.01), while non-targeted firms show a significant decrease (-1.723, p<0.05), confirming my results. The positive impact on enterprise value for targeted firms increasing by 11.1% (p<0.05) are also consistent with the results from the pair matching. Consequently, these tests confirm the validity and robustness of the observed effects.

6. DISCUSSION

6.1. Independence from Initial CSR Reporting Levels

The time lag between the announcement of the CSRD and the first mandatory disclosures presents strategic opportunity for firms to proactively enhance their sustainability practices, as highlighted by Fiechter et al. (2017). Existing literature suggests that such periods might allow firms, particularly those with lower initial CSR disclosures, to adjust their practices in anticipation of new regulations, aiming to mitigate adverse stakeholder reactions and fear of non-compliance (Arkoh et al., 2023; Delmas & Toffel, 2008; Reid & Toffel, 2009). Hypothesis H1 posited that US targeted firms might increase their ESG performance in anticipation of the mandate regulation, especially those with lower initial CSR reporting level. However, the regression results (Table 15) show no evidence in favour of this hypothesis. The interaction term *Treated x Time x LowRprt* does not significantly differ from zero, indicating no significant influence of the combined effect of the treatment, time and initial low reporting level on ESG scores. Thus, the hypothesis H1 is rejected.

While the significant *Time x Treated* term suggest that targeted firms with no initial CSR reporting experienced a significant increase in ESG scores post-announcement, this effect is not amplified by initial CSR reporting levels. In fact, the results demonstrate a significant

impact on the non-targeted firms, especially those with no prior CSR reporting and an even stronger effect on those with low prior CSR reporting level. This result reflects a broader market response to the regulatory environment, aligning with previous findings from Dhaliwal et al. (2012) and Ioannou & Serafeim (2017). These broader market reactions underscore the influence of regulatory announcements on corporate behaviour, beyond the directly targeted firms, and the initial CSR reporting level. The rejection of hypothesis H1 indicates that while the CSRD announcement positively impacts targeted firm's ESG scores, this effect is not significantly influenced by having an initial positive CSR reporting level. However, the initial CSR reporting level seems to have a significant impact on the non-targeted firms, possibly representing a bigger incentive to improve their ESG performance and reputation when they have no or low prior CSR disclosures. This result particularly aligns with the existing literature, suggesting that companies with lower baseline CSR activities might take proactive steps to enhance their reporting and sustainability performance to meet stakeholder's expectations (Fiechter et al., 2017), align with social norms or benefit from enhanced reputation (Delmas & Toffel, 2008; Reid & Toffel, 2009). The announcement could represent a threat for increased scrutiny and stakeholder's expectations. Therefore, the significant improvements among non-targeted firms suggest a pervasive market response, emphasising the importance of regulatory signals in driving widespread adoption of enhanced ESG practices.

6.2. Increased ESG Performance and Firm Valuation

The analysis of ESG performance post-CSRD announcement (Table 16) indicates a significant increase in ESG scores for US targeted firms, supporting the hypothesis H2a. This finding aligns with the literature suggesting that regulatory announcement can drive firms to enhance their sustainability practices to meet forthcoming requirements, such as mandate sustainability disclosures (Dhaliwal et al., 2012; Ioannou & Serafeim, 2017). The analysis of individual ESG pillars further substantiates these findings. Targeted firms experienced a significant and positive increase in both their environmental pillar and social pillar scores post-announcement. While the impact is stronger in the environmental dimension, increasing about 4.723 points post-announcement, the lack of significance in the governance pillar shows no evidence of improvement post-announcement for the corporate governance practices. The differential impact across ESG pillars suggests that the mandatory disclosure regulation has immediate and noticeable effects on environmental primarily and social aspects of ESG performance. This finding aligns with the literature suggesting that environmental initiatives

often receive more attention and resources following regulatory changes (Dhaliwal et al., 2012; Fiechter et al., 2017). The increase in social scores is also consistent with previous studies, emphasizing the importance of social responsibility in building stakeholder trust and legitimacy (Cao & Rees, 2020; Cheng et al., 2014). Additionally, governance practices are less responsive to the regulatory signal, potentially due to existing high standardisation or more likely to slower adaptability in governance structures, as already observed (Leuz & Wysocki, 2015).

Similarly, the regression results on enterprise value (Table 20) support hypothesis H2b, indicating that the CSRD announcement positively influences the market valuation of targeted firms, compared to non-targeted firms. The increase of 9.6% in enterprise value post-announcement suggests that anticipated improved transparency and regulatory compliance enhance firm valuation by reducing information asymmetry while increasing investor confidence (Cao & Rees, 2020; Lambert et al., 2007). However, these results should be taken with careful attention to potential bias because complex external factors influencing enterprise value might obscure a clear assessment of the real impacts.

Overall, the results indicate a substantial positive impact on both ESG performance and enterprise value due to the directive announcement, particularly for targeted firms. While the impact on governance is not significant, the overall improvement in sustainability practices, particularly in environmental pillar, underscores the proactive adjustments of targeted firms to align with future regulatory requirements. The increase in market valuation for targeted companies further suggests that the market perceives the regulation as beneficial, enhancing transparency, anticipated long-term benefits associated with sustainable reporting and stakeholder trust. This result aligns with Grewal et al. (2015), suggesting that enhanced CSR activities and reporting bolster firm's public image and credibility, leading to significant benefits. Therefore, these findings contribute to the understanding of how regulatory signals can influence firm behaviour and market outcomes, emphasising the importance of proactive compliance and sustainability practices in achieving long-term business success.

6.3. Ambiguity Around Potential Spillover Effect

This hypothesis H3 is grounded in the idea that regulatory pressures can create a competitive environment, driving firms towards higher transparency and comparability in their reporting (Dhaliwal et al., 2012; Doshi et al., 2013). Using ESG scores as a proxy to evaluate the change in ESG reporting practices, the empirical findings for H3, which posits a spillover

effect encouraging non-targeted firms to adopt ESG reporting practices following the announcement, show mixed results.

The significant increase post-announcement in ESG scores for non-targeted firms in first regressions support the hypothesis that regulatory signals can incentivise voluntary adoption of ESG practices. Although the effect diminishes slightly when controlling for other variables, this finding is consistent with Fiechter et al. (2017), suggesting that regulations can spur improvements in sustainable activities among non-targeted firms. However, the detailed analysis of individual ESG pillars reveals a more nuanced picture. The environmental pillar scores for non-targeted firms decreased significantly post-announcement. This decline suggests potential challenges in improving environmental performance, possibly due to scrutiny, regulatory and societal pressures, or evolving sustainability standards (Grewal et al., 2015). The literature indicates that environmental initiatives often require substantial investment and structural changes, which might not be immediately feasible for all firms (Dhaliwal et al., 2012). These challenges could explain the significant decrease among non-targeted firms.

The overall increase in ESG scores post-announcement for non-targeted firms, combined with the significant decrease in environmental scores, therefore introduces ambiguity. This strong decline might indicate that those firms prioritise social aspects of ESG over environmental ones, or that environmental improvements are more challenging to implement without direct regulatory compulsion. These mixed results indicate that while there is a general trend towards improved ESG reporting among non-targeted firms, suggesting a spur of voluntary improvements, the extent and focus of these improvements vary significantly across ESG dimensions. Notably, the decline in environmental performance among non-targeted firms, occurring simultaneously with the greatest improvement among targeted firms, weakens the support for the spillover effect or the sharing of best practices. Consequently, the results provide partial support for H3, underscoring the complexity of the CSRD announcements on different aspects of ESG practices. The lack of sufficient causality between the announcement and the incentives to improve among non-targeted firms leads to the rejection of H3. Further research should explore the underlying reasons for these differences across pillars and consider additional factors influencing firm's responses.

6.4. Europeanisation Trend in Corporate Disclosures

According to economies disclosure theory, improved environmental disclosures reflect economic incentives and impact positively firm performance (Clarkson et al., 2008). However, the results of my research align more closely with the socio-political theories, where firms' response to regulatory signals are influenced by broader social political pressures, leading to complex and potential contradictory results. These findings could indicate a broader trend towards the Europeanisation of disclosure regulations, where US firms voluntarily align their practices with emerging global standards to maintain competitiveness and credibility in international markets (Ioannou & Serafeim, 2017). However, since there is an existing delay in the mandatory reporting requirements, Europeanisation may not yet be fully observed. The research results highlight the complexity around a potential broader alignment of disclosures practices. The findings are consistent with Leuz & Wysocki (2015), who suggest that while there is a strong demand for convergence in reporting practices, global convergence is more complex due to varying competitive dynamics. The significant decrease in environmental scores among US non-targeted further weakens the support for the potential Europeanisation trend.

Additionally, the Inflation Reduction Act (IRA), signed in 2022, represents a notable shift in US policy. The development of its own regulations incentivises compliance and reporting. This move towards greater transparency and accountability in environmental disclosures aligns US reporting rules more closely with EU disclosure rules (Guedel & Eichenberger, 2023). However, this complicates the landscape global convergence in reporting practices as both continents elaborate their legislation. These evolving regulations underscore the complexity of a potential Europeanisation trend in reporting disclosures. While the CSRD does impact US firms, particularly and positively those that must comply with its requirements, the broader Europeanisation process is more intricate and multifaceted. Despite this, the CSRD demonstrates an influential impact on the broader scope of US firms, highlighting the interplay between different regulatory frameworks. Further research is needed to determine the influence of external regulations or national incentives on this dynamic.

6.5. Limitations

The main limitation of this study lies in the methodology approach of using yearly ESG data and therefore identifying the year 2021 as the announcement of the CRSD. This limitation

stems from ESG scores only being reported on a yearly basis and thus restricting the analysis to annual data sources rather than more granular intra-annual variations. Consequently, short-term adjustments made by firms in response to the announcement may be overlooked, and the full spectrum of firm behaviour changes might not be captured. This further connects to the limitation of the sample size of my analysis. Despite Refinitiv's prominence as an industry leader in providing ESG metrics and scores, significant gaps are still persistent in my variables. While the DiD methodology controls for certain biases, external factors, such as other regulatory changes, economic conditions, or industry-specific trends might not be fully accounted for. Highlighted by Leuz & Wysocki (2015), countries and jurisdictions may compete on aspects such as implementation guidance, additional reporting requirements or monitoring. This raises the question of whether such competition enhances or hinders financial and sustainability performance of firms, adding potential transaction costs. These factors could independently cofound the results.

Moreover, the distinction between the timeline for reporting depending on the firm has not been applied. Firms with different deadlines and stages of compliance may exhibit varied responses, influencing and limiting the overall findings. Another limitation is the assumption of parallel trends in the DiD analysis, concerning the enterprise value. While robustness checks validate this assumption for ESG scores, any violation of the parallel-trends assumption for enterprise value could bias the results. The study does not fully account for all external factors that might influence enterprise value, such as market conditions, political events, or other concurrent regulations, which could independently affect the enterprise value of firms. Therefore, the results for the enterprise value should need careful interpretation and future research should incorporate additional controls for these potential biases. Furthermore, the paper focuses on short-term anticipatory reactions of the 2021 announcement, examining immediate responses rather than long-term impacts over multiple years. Firms may require more time to fully adjust their practices, therefore the complexity of ESG reporting and the varying degrees of firm responsiveness to regulatory signals introduce variability that is challenging to fully control.

Acknowledging these limitations highlights the need for further research to address these gaps, investigate long-term effects and consider a broader range of factors influencing firm behaviour over an extended period and explore the broader implications of regulatory incentives on sustainability practices.

7. CONCLUSION

This paper explores the influence of the EU CSRD announcement on US companies' anticipatory adjustments to ESG practices and financial performance, focusing on three main hypotheses. Employing a differences-in-differences regression approach, the study finds a significant post-announcement increase in both sustainability performance and enterprise value among US targeted firms having significant activities in the EU, supporting existing literature that suggests that regulatory pressures spur proactive sustainability enhancements. The empirical findings align with signalling theory and legitimation strategies (Deegan, 2002; Verrecchia, 2001), indicating that companies use CSR reporting to signal their commitment to sustainability and legitimise their operations. This behaviour is supported with the observed increases in ESG scores, among environmental and social dimensions.

However, the analysis shows no differential impact from positive initial CSR reporting levels, suggesting that the CSRD announcement affects targeted firms regardless of their potential prior CSR disclosures. This is supported by the fact that only targeted firms with no prior CSR reporting demonstrate significant results. The environmental and social pillars show substantial improvements, while corporate governance remains unchanged. These results highlight the importance of regulatory frameworks in promoting corporate sustainability, showing immediate effects primarily on environmental and social aspects. This aligns with existing literature suggesting a more pronounced attention to environmental and social aspects, and less flexibility among governance which is already highly regulated.

Additionally, the observed mixed reactions post-announcement among non-targeted firms indicates a broader influence of the EU regulation, not only affecting targeted firms but having a potential spillover. Although non-targeted firms exhibit increased overall ESG scores, the decline in their environmental performance introduces ambiguity for spillover effect. While the environmental scores have the largest increase for the targeted firms, the results demonstrate a significant post-announcement decline for the non-targeted firms, weakening the support for these incentives. This aligns with existing findings suggesting that environmental initiatives require substantial investment and structural changes, not immediately feasible for all firms.

Overall, the findings emphasise the complex interplay between regulatory frameworks, stakeholder reactions and ESG practices. Despite methodological limitations, the study provides valuable insights into the transatlantic impact of the EU regulations on corporate

sustainability strategies, contributing to the understanding of how regulatory announcements can prompt proactive compliance and strategic adjustments among firms, enhancing overall transparency and sustainability performance. Further research should continue to explore the nuanced effects across distinct ESG dimensions considering multiple dimensions and better investigate a potential Europeanisation of sustainability disclosures regulations over a longer period to capture more comprehensive and long-term impacts.

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9. TABLES AND FIGURES

Table 7. Descriptive Statistics

	Year-Observations	Mean	Sd	Median	Min.	Max.	Kurtosis	Se
Company Name*	9904	-	-	-	1.00	1,238	-	-
ICB Sector Name*	9904	-	-	-	-	43.00	-	-
State of Headquarters*	9896	-	-	-	-	48.00	-	-
Year	9904	-	-	-	2016	2023	-	-
ESG scores	9200	45.91	19.04	43.98	0.95	93.24	-0.82	0.20
EV	9703	24,629,135,409.62	9,456,8440,400.29	5,085,843,003.48	15,460,691.70	2,727,293,860,720.00	313.55	960,048,583.39
Stratcsr	9200	31.10	34.33	18.24	0.00	99.98	-1.18	0.36
Soc	9200	47.76	21.25	45.70	0.63	98.26	-0.81	0.22
Gov	9200	53.75	21.69	55.76	0.41	99.45	-0.73	0.23
Env	9200	32.36	27.37	27.05	0.00	98.24	-1.03	0.29
Mrktcap	9697	21597989470.09	97246309768.38	3973039959.80	1023346.28	3010058686960.00	399.91	987539401.06
EPS	9901	10.71	454.92	2.33	-12453.84	27665.37	2024.11	4.57
Assetvalue	8624	6260245506.46	21311905291.47	1522744000.00	873920.00	567509000000.00	209.57	229492186.43
ROA	8141	0.07	0.07	0.05	0.00	1.47	31.42	0.00
CFoperating	8976	1829465309.02	8974798010.72	374450000.00	0.00	522855000000.00	1611.27	94729067.25
Rprtscore	9206	39.53	41.27	0.00	0.00	92.86	-1.96	0.43
Rprtscore 2020	9904	39.28	42.29	0.00	0.00	90.81	-1.97	0.42
Log (EV)	9703	22.46	1.61	22.35	16.55	28.63	0.27	0.02
Log (Assetvalue)	8624	21.28	1.49	21.14	13.68	27.06	0.76	0.02
Log (ROA)	8141	0.07	0.06	0.05	0.00	0.91	12.04	0.00
Log (CFoperating)	8976	19.78	1.71	19.74	0.00	26.98	2.57	0.02
Log (Mrktcap)	9697	22.25	1.62	22.10	13.84	28.73	0.71	0.02

Table 8. Summary Table for Sector Distribution

	ICB Sector Name	Total Firms	Control	(%)	Treated	(%)
1	**Aerospace and Defense**	192	48	25.00	144	75.00
2	Alternative Energy	80	24	30.00	56	70.00
3	**Automobiles and Parts**	160	16	10.00	144	90.00
4	Banks	712	712	100.00	0	0.00
5	Beverages	48	48	100.00	0	0.00
6	**Chemicals**	264	32	12.12	232	87.88
7	Construction and Materials	168	168	100.00	0	0.00
8	Consumer Services	104	104	100.00	0	0.00
9	Electricity	176	176	100.00	0	0.00
10	**Electronic and Electrical Equipment**	344	48	13.95	296	86.05
11	Finance and Credit Services	96	96	100.00	0	0.00
12	**Food Producers**	216	120	55.56	96	44.44
13	Gas, Water and Multi-utilities	136	136	100.00	0	0.00
14	**General Industrials**	320	32	10.00	288	90.00
15	Health Care Providers	200	200	100.00	0	0.00
16	Household Goods and Home Construction	136	136	100.00	0	0.00
17	**Industrial Engineering**	304	16	5.26	288	94.74
18	Industrial Materials	96	16	16.67	80	83.33
19	**Industrial Metals and Mining**	192	32	16.67	160	83.33
20	**Industrial Support Services**	504	168	33.33	336	66.67
21	Industrial Transportation	136	136	100.00	0	0.00
22	**Investment Banking and Brokerage Services**	384	96	25.00	288	75.00
23	**Leisure Goods**	200	16	8.00	184	92.00
24	Life Insurance	56	56	100.00	0	0.00
25	**Media**	232	64	27.59	168	72.41
26	**Medical Equipment and Services**	512	112	21.88	400	78.12
27	Mortgage Real Estate Investment Trusts	64	64	100.00	0	0.00
28	Non-life Insurance	192	184	95.83	8	4.17
29	Oil, Gas and Coal	304	304	100.00	0	0.00
30	Personal Care, Drug and Grocery Stores	96	96	100.00	0	0.00
31	**Personal Goods**	184	48	26.09	136	73.91
32	**Pharmaceuticals and Biotechnology**	384	136	35.42	248	64.58
33	Precious Metals and Mining	16	0	0.00	16	100.00
34	Real Estate Investment Trusts	352	352	100.00	0	0.00
35	Real Estate Investment and Services Development	32	32	100.00	0	0.00
36	Retailers	288	288	100.00	0	0.00
37	**Software & Computer Services**	824	152	18.45	672	81.55
38	**Technology Hardware & Equipment**	640	112	17.50	528	82.50
39	**Telecommunications Equipment**	176	16	9.09	160	90.91
40	Telecommunications Service Providers	80	80	100.00	0	0.00
41	Tobacco	32	8	25.00	24	75.00
42	Travel and Leisure	256	256	100.00	0	0.00
43	Waste and Disposal Services	16	16	100.00	0	0.00

Table 9. Matching Covariate Balance

Balance Measures	One-to-Many Balance		One-to-One Balance	
	Type	Diff.Adj	Type	Diff.Adj
Distance	Distance	0.0023	Distance	1.7245
Sector Aerospace And Defense	Binary	0.0011	Binary	0.0194
Sector Alternative Energy	Binary	-0.0065	Binary	0.0065
Sector Automobiles And Parts	Binary	0.0119	Binary	0.0258
Sector Banks	Binary	0.0016	Binary	-0.1438
Sector Beverages	Binary	-0.0006	Binary	-0.0097
Sector Chemicals	Binary	0.0011	Binary	0.0404
Sector Construction And Materials	Binary	0.0007	Binary	-0.0339
Sector Consumer Services	Binary	-0.0035	Binary	-0.021
Sector Electricity	Binary	-0.0018	Binary	-0.0355
Sector Electronic And Electrical Equipment	Binary	-0.0076	Binary	0.0501
Sector Finance And Credit Services	Binary	0.0031	Binary	-0.0194
Sector Food Producers	Binary	0.0049	Binary	-0.0048
Sector Gas, Water And Multi-Utilities	Binary	-0.0045	Binary	-0.0275
Sector General Industrials	Binary	-0.0086	Binary	0.0517
Sector Health Care Providers	Binary	0.0028	Binary	-0.0404
Sector Household Goods And Home Construction	Binary	0.0026	Binary	-0.0275
Sector Industrial Engineering	Binary	-0.0043	Binary	0.0549
Sector Industrial Materials	Binary	-0.0108	Binary	0.0129
Sector Industrial Metals And Mining	Binary	0.0151	Binary	0.0258
Sector Industrial Support Services	Binary	-0.0032	Binary	0.0339
Sector Industrial Transportation	Binary	0.0068	Binary	-0.0275
Sector Investment Banking And Brokerage Services	Binary	-0.0077	Binary	0.0388
Sector Leisure Goods	Binary	0.0108	Binary	0.0339
Sector Life Insurance	Binary	0.0018	Binary	-0.0113
Sector Media	Binary	0.0032	Binary	0.021
Sector Medical Equipment And Services	Binary	0.0108	Binary	0.0582
Sector Mortgage Real Estate Investment Trusts	Binary	0.0004	Binary	-0.0129
Sector Non-Life Insurance	Binary	-0.0004	Binary	-0.0355
Sector Oil, Gas And Coal	Binary	-0.0079	Binary	-0.0614
Sector Personal Care, Drug And Grocery Stores	Binary	-0.0023	Binary	-0.0194
Sector Personal Goods	Binary	-0.0011	Binary	0.0178
Sector Pharmaceuticals And Biotechnology	Binary	0.0005	Binary	0.0226
Sector Precious Metals And Mining	Binary	0.0022	Binary	0.0032
Sector Real Estate Investment And Services Development	Binary	-0.0005	Binary	-0.0065
Sector Real Estate Investment Trusts	Binary	0.0006	Binary	-0.0711
Sector Retailers	Binary	0.0001	Binary	-0.0582
Sector Software & Computer Services	Binary	0.0043	Binary	0.105
Sector Technology Hardware & Equipment	Binary	-0.0076	Binary	0.084
Sector Telecommunications Equipment	Binary	-0.0097	Binary	0.0291
Sector Telecommunications Service Providers	Binary	0.0007	Binary	-0.0162
Sector Tobacco	Binary	0	Binary	0.0032
Sector Travel And Leisure	Binary	0.0001	Binary	-0.0517
Sector Waste And Disposal Services	Binary	0.0011	Binary	-0.0032
Eps2016	Contin.	-0.042	Contin.	-0.2148
Eps2017	Contin.	0.0077	Contin.	-0.3571
Eps2018	Contin.	-0.0426	Contin.	-0.2008
Eps2019	Contin.	-0.0355	Contin.	-0.0998
Eps2020	Contin.	-0.033	Contin.	-0.0458

Sample Sizes

	Control	Treated	Control	Treated
All	619	925	619	925
Matched (ESS)	**138**	**925**	**619**	**619**
Matched (Unweighted)	619	925	0	306

Notes: The covariate balance allows to check the matching procedure reliability and quality. The distance represents the difference in the distance measure (propensity score) used for matching the groups. The term ESS (Effective Sample Size) refers to the effective number of observations that are used in the analysis after accounting for the weights assigned during the matching process, especially in the one-to-many matching. The small difference in covariate means (*Diff.Adj*) indicates good balance, which helps in isolating the effect of the treatment on the outcome variable. The matching process has successfully balanced the propensity scores between the treated and control groups. Both for binary and continuous covariates, the values close to 0 indicate good balance.

Table 10. Summary of Balance for Paired Matched Data (one-to-one)

	Means Treated	Means Control	Std. Mean Diff.	Ecdf Mean	Ecdf Max	Std. Pair Dist.
Distance	0.8101	0.4661	1.7245	0.4299	0.7512	1.7245
Sector Aerospace And Defense	0.0291	0.0097	0.1403	0.0194	0.0194	0.2807
Sector Alternative Energy	0.0113	0.0048	0.0746	0.0065	0.0065	0.1864
Sector Automobiles And Parts	0.0291	0.0032	0.1871	0.0258	0.0258	0.2339
Sector Banks	0	0.1438	-0.9044	0.1438	0.1438	0.9044
Sector Beverages	0	0.0097	-0.1207	0.0097	0.0097	0.1207
Sector Chemicals	0.0468	0.0065	0.2318	0.0404	0.0404	0.3059
Sector Construction And Materials	0	0.0339	-0.2134	0.0339	0.0339	0.2134
Sector Consumer Services	0	0.021	-0.1937	0.021	0.021	0.1937
Sector Electricity	0	0.0355	-0.4101	0.0355	0.0355	0.4101
Sector Electronic And Electrical Equipment	0.0598	0.0097	0.2556	0.0501	0.0501	0.3545
Sector Finance And Credit Services	0	0.0194	-0.2415	0.0194	0.0194	0.2415
Sector Food Producers	0.0194	0.0242	-0.0305	0.0048	0.0048	0.2744
Sector Gas, Water And Multi-Utilities	0	0.0275	-0.3421	0.0275	0.0275	0.3421
Sector General Industrials	0.0582	0.0065	0.2673	0.0517	0.0517	0.3341
Sector Health Care Providers	0	0.0404	-0.4115	0.0404	0.0404	0.4115
Sector Household Goods And Home Construction	0	0.0275	-0.2427	0.0275	0.0275	0.2427
Sector Industrial Engineering	0.0582	0.0032	0.284	0.0549	0.0549	0.3174
Sector Industrial Materials	0.0162	0.0032	0.125	0.0129	0.0129	0.1875
Sector Industrial Metals And Mining	0.0323	0.0065	0.1777	0.0258	0.0258	0.2666
Sector Industrial Support Services	0.0679	0.0339	0.163	0.0339	0.0339	0.4889
Sector Industrial Transportation	0	0.0275	-0.1936	0.0275	0.0275	0.1936
Sector Investment Banking And Brokerage Services	0.0582	0.0194	0.2005	0.0388	0.0388	0.4009
Sector Leisure Goods	0.0372	0.0032	0.2179	0.0339	0.0339	0.2594
Sector Life Insurance	0	0.0113	-0.1305	0.0113	0.0113	0.1305
Sector Media	0.0339	0.0129	0.141	0.021	0.021	0.2928
Sector Medical Equipment And Services	0.0808	0.0226	0.2572	0.0582	0.0582	0.4572
Sector Mortgage Real Estate Investment Trusts	0	0.0129	-0.2782	0.0129	0.0129	0.2782
Sector Non-Life Insurance	0.0016	0.0372	-0.3141	0.0355	0.0355	0.3426
Sector Oil, Gas And Coal	0	0.0614	-0.2983	0.0614	0.0614	0.2983
Sector Personal Care, Drug And Grocery Stores	0	0.0194	-0.1713	0.0194	0.0194	0.1713
Sector Personal Goods	0.0275	0.0097	0.1323	0.0178	0.0178	0.2766
Sector Pharmaceuticals And Biotechnology	0.0501	0.0275	0.1238	0.0226	0.0226	0.4243
Sector Precious Metals And Mining	0.0032	0	0.0696	0.0032	0.0032	0.0696
Sector Real Estate Investment And Services Development	0	0.0065	-0.0881	0.0065	0.0065	0.0881
Sector Real Estate Investment Trusts	0	0.0711	-0.5146	0.0711	0.0711	0.5146
Sector Retailers	0	0.0582	-0.3136	0.0582	0.0582	0.3136
Sector Software & Computer Services	0.1357	0.0307	0.3654	0.105	0.105	0.5791
Sector Technology Hardware & Equipment	0.1066	0.0226	0.3264	0.084	0.084	0.5021
Sector Telecommunications Equipment	0.0323	0.0032	0.1999	0.0291	0.0291	0.2444
Sector Telecommunications Service Providers	0	0.0162	-0.1745	0.0162	0.0162	0.1745
Sector Tobacco	0.0048	0.0016	0.0568	0.0032	0.0032	0.1137
Sector Travel And Leisure	0	0.0517	-0.2967	0.0517	0.0517	0.2967
Sector Waste And Disposal Services	0	0.0032	-0.0568	0.0032	0.0032	0.0568
Eps 2016	-4.2335	24.5762	-0.2148	0.0387	0.1002	0.2538
Eps 2017	4.5284	18.6702	-0.3571	0.035	0.1212	0.5533
Eps 2018	-6.1689	29.8147	-0.2008	0.047	0.1276	0.2203
Eps 2019	-7.0666	13.9137	-0.0998	0.0532	0.1422	0.1211
Eps 2020	-16.977	1.776	-0.0458	0.0369	0.0792	0.0675

Sample Sizes:

	Control	Treated
All	619	925
Matched	**619**	**619**
Unmatched	0	306
Discarded	0	0

Table 11. Summary of Balance for One-to-Many Data

	Means Treated	Means Control	Std. Mean Diff.	eCDF Mean	eCDF Max	Std. Pair Dist.
Distance	0.6881	0.6876	0.0023	0.0023	0.0346	0.0094
Sector Aerospace And Defense	0.0195	0.0184	0.0078	0.0011	0.0011	0.0827
Sector Alternative Energy	0.0076	0.0141	-0.0748	0.0065	0.0065	0.1217
Sector Automobiles And Parts	0.0195	0.0076	0.0861	0.0119	0.0119	0.1463
Sector Banks	0.0259	0.0244	0.01	0.0016	0.0016	0.0332
Sector Beverages	0.0065	0.0071	-0.0072	0.0006	0.0006	0.1532
Sector Chemicals	0.0314	0.0303	0.0062	0.0011	0.0011	0.0555
Sector Construction And Materials	0.0259	0.0252	0.0045	0.0007	0.0007	0.1824
Sector Consumer Services	0.0119	0.0154	-0.0319	0.0035	0.0035	0.2027
Sector Electricity	0.0076	0.0093	-0.0203	0.0018	0.0018	0.1014
Sector Electronic And Electrical Equipment	0.04	0.0476	-0.0386	0.0076	0.0076	0.0583
Sector Finance And Credit Services	0.0065	0.0034	0.0388	0.0031	0.0031	0.1532
Sector Food Producers	0.0259	0.0211	0.0306	0.0049	0.0049	0.0608
Sector Gas, Water And Multi-Utilities	0.0065	0.011	-0.0558	0.0045	0.0045	0.1423
Sector General Industrials	0.0389	0.0476	-0.0447	0.0086	0.0086	0.1181
Sector Health Care Providers	0.0097	0.0069	0.0289	0.0028	0.0028	0.2238
Sector Household Goods And Home Construction	0.013	0.0104	0.0231	0.0026	0.0026	0.101
Sector Industrial Engineering	0.0389	0.0432	-0.0224	0.0043	0.0043	0.0182
Sector Industrial Materials	0.0108	0.0216	-0.1045	0.0108	0.0108	0.2209
Sector Industrial Metals And Mining	0.0216	0.0065	0.1041	0.0151	0.0151	0.1329
Sector Industrial Support Services	0.0454	0.0486	-0.0156	0.0032	0.0032	0.1224
Sector Industrial Transportation	0.0205	0.0137	0.0483	0.0068	0.0068	0.1921
Sector Investment Banking And Brokerage Services	0.0389	0.0466	-0.0396	0.0077	0.0077	0.1181
Sector Leisure Goods	0.0249	0.0141	0.0694	0.0108	0.0108	0.0564
Sector Life Insurance	0.0076	0.0058	0.0208	0.0018	0.0018	0.1521
Sector Media	0.0227	0.0195	0.0218	0.0032	0.0032	0.0767
Sector Medical Equipment And Services	0.0541	0.0432	0.0478	0.0108	0.0108	0.0855
Sector Mortgage Real Estate Investment Trusts	0.0022	0.0017	0.0095	0.0004	0.0004	0.1324
Sector Non-Life Insurance	0.013	0.0133	-0.0031	0.0004	0.0004	0.1553
Sector Oil, Gas And Coal	0.0443	0.0523	-0.0385	0.0079	0.0079	0.3074
Sector Personal Care, Drug And Grocery Stores	0.013	0.0152	-0.0201	0.0023	0.0023	0.1553
Sector Personal Goods	0.0184	0.0195	-0.008	0.0011	0.0011	0.0981
Sector Pharmaceuticals And Biotechnology	0.0346	0.0341	0.003	0.0005	0.0005	0.1298
Sector Precious Metals And Mining	0.0022	0	0.0465	0.0022	0.0022	0.0378
Sector Real Estate Investment And Services Development	0.0054	0.0059	-0.0074	0.0005	0.0005	0.1079
Sector Real Estate Investment Trusts	0.0195	0.0189	0.0042	0.0006	0.0006	0.1018
Sector Retailers	0.0357	0.0356	0.0004	0.0001	0.0001	0.1848
Sector Software & Computer Services	0.0908	0.0865	0.015	0.0043	0.0043	0.0856
Sector Technology Hardware & Equipment	0.0714	0.0789	-0.0294	0.0076	0.0076	0.1741
Sector Telecommunications Equipment	0.0216	0.0314	-0.0669	0.0097	0.0097	0.1027
Sector Telecommunications Service Providers	0.0086	0.0079	0.0078	0.0007	0.0007	0.1329
Sector Tobacco	0.0032	0.0032	0	0	0	0.0053
Sector Travel And Leisure	0.0314	0.0312	0.0006	0.0001	0.0001	0.2219
Sector Waste And Disposal Services	0.0032	0.0022	0.019	0.0011	0.0011	0.0464
Eps2016	-2.0391	3.5926	-0.042	0.0223	0.0738	0.1468
Eps2017	4.0321	3.7272	0.0077	0.024	0.0851	0.3345
Eps2018	-2.9609	4.6688	-0.0426	0.0263	0.0728	0.1269
Eps2019	-3.6184	3.8503	-0.0355	0.0347	0.0922	0.0731
Eps2020	-10.5357	2.9762	-0.03301	0.0366	0.0814	0.0409

Sample Sizes:

	Control	Treated
All	619	925
Matched (ESS)	**138**	**925**
Matched	619	925
Unmatched	0	0
Discarded	0	0

Notes: Using the matchit *(formula = matching_formula, method = "full")*, the table displays the Effective Sample Size (ESS) of the matched data. ESS is an estimate of the size of the sample after accounting for the weights assigned to control units. The one-to-many matching approach proceeds with control units matched multiple times, and their contributions are weighted accordingly.

Figure 3. Density Plot of CSR Reporting Scores Pre-Announcement (2016-2020)

Density Plot of Reporting Scores prior the announcement
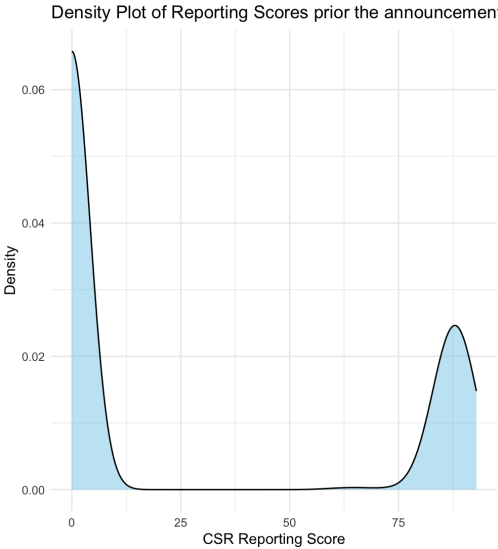
Notes: The distribution of the reporting scores provides insights into how the scores are spread across the dataset for the years prior the announcement (2016-2020). The density plot indicates a bimodal distribution, with two prominent peaks (0-10 and 80-90). This suggests that the reporting scores are not evenly distributed but instead tend to cluster around these two distinct ranges. This also suggests a gap between companies with low/no scores and those with high scores. Possible reasons for this bimodal distribution could be company's proactivity or industry standards.

Figure 4. Density Plot of CSR Reporting Scores Post-Announcement (2021-2023)

Density Plot of Reporting Scores Post-Announcement
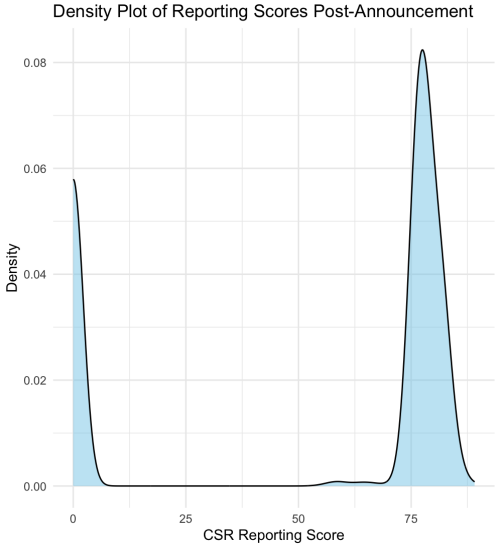
Notes: This distribution shifts to a more pronounced peak at the higher end (75-100), suggesting that more companies have higher CSR reporting scores post-announcement. The shift in the distribution of reporting from pre- to post-announcement suggests that the CSRD announcement could have a significant impact on the reporting practices of companies.

Table 12. Definition of Variables

Variables	Description	Data source
ESG scores	Refinitiv® ESG Scores is an overall company score based on the self-reported information in the commitment and effectiveness across environmental, social and corporate governance pillars.	*Refinitiv Eikon*[14]
ENV	Environmental pillar score is the company's impact on living and non-living natural systems, including the air, land and water, as well as complete ecosystems. It reflects how well a company uses best management practices to avoid environmental risks and capitalise on environmental opportunities to generate long term shareholder value.	*Refinitiv Eikon*
SOC	Social pillar score is the company's capacity to generate trust and loyalty with its workforce, customers and society through its use of best management practices. It reflects the company's reputation and the health of its license to operate, which are key factors in determining its ability to generate long term shareholder value.	*Refinitiv Eikon*
GOV	Corporate governance pillar score is the company's systems and processes, which ensure that its board members and executives act in the best interests of its long-term shareholders. It reflects a company's capacity, through its use of best management practices, to direct and control its rights and responsibilities through the creation of incentives, as well as checks and balances to generate long term shareholder value.	*Refinitiv Eikon*
EV	Enterprise Value (Outstanding Shares) represents Market Capitalization (O/S) + Debt including Preferred Equity & Minority Interest - Total (-) Cash & Short-Term Investments - Total. The data item is calculated for all periodicities.	*Refinitiv Eikon*
Stratcsr	CSR strategy category score reflects a company's practices to communicate that it integrates the financial, social and environmental dimensions into its day-to-day decision-making processes.	*Refinitiv Eikon*
Mrktcap	The Company Market Capitalisation represents the sum of market value for all relevant issue-level share types. The issue-level market value is calculated by multiplying the requested shares type by the latest close price.	*Refinitiv Eikon*
Rprting	CSR Sustainability Reporting measures whether a company publishes a dedicated CSR, H&S, or Sustainability report, or includes a comprehensive section on environmental and social impacts in its annual report. *Rprting* is a binary variable equal to 1 for firms having CSR sustainability reporting.	*Refinitiv Eikon*
Rprtingscore	CSR sustainability reporting score assesses whether a company publishes a separate CSR, H&S, or Sustainability report, or includes a substantial section about sustainability or CSR in its annual report.	*Refinitiv Eikon*
Stkhldr	Stakeholder Engagement represents the information on how the company is engaging with its stakeholders in its decision-making process; what procedures are in place for engagement. *Stkhldr* is a binary variable equal to 1 for firms engaged with stakeholders.	*Refinitiv Eikon*

[14] Refinitiv. (2021). Environmental, Social and Governance (ESG) Scores. Methodology.

EPS	Earnings Per Share (excluding Extraordinary Items – Normalized) represents the value of Normalized Net Income divided by the Number of basic weighted average shares used to calculate earnings and other per share item on company level.	*Refinitiv Eikon*
Assetvalue	Net Asset Value is the total book value of a company's securities, calculated in general form by taking the total assets of a company and subtracting the value of the company's intangible assets (goodwill, patents, etc.) minus current and long-term liabilities.	*Refinitiv Eikon*
ROA	Return On Total Assets (%) is a profitability ratio and as such gauges the return on investment of a company. Specifically, ROA measures a company's operating efficiency regardless of its financial structure and is calculated by dividing company's net income prior to financing costs by total assets.	*Refinitiv Eikon*
CFoperating	Net Cash Flow from Operating Activities represents the total of all operating cash flows after tax and finance servicing outflows. The value is adjusted by all rounding adjustments. Applicable to all industries.	*Refinitiv Eikon*

Table 13. Pre-Treatment Parallel Trends Test Results

	Dependent variable:	
	ESG Scores	**Log (EV)**
	(1)	(2)
Year	1.282***	0.063***
	(0.258)	(0.021)
Treated	-661.922	-110.409*
	(739.116)	(58.907)
Year x Treated	0.329	0.055*
	(0.366)	(0.029)
Constant	-2,545.905***	-104.886**
	(520.503)	(41.497)
Observations	5,494	6,010
R²	0.018	0.007
Adjusted R²	0.017	0.006
P-value Interaction Term	0.368	0.061*
		*p<0.1; **p<0.05; ***p<0.01

Notes: This statistical test compares the trends in the treatment and control groups. By creating the interaction terms between the treatment indicator and time, the model test if the trends are parallel pre-treatment. In both cases, I am looking for evidence that the pre-treatment coefficients (the time trend interaction) are not significantly different from zero. Both p-value are above 0.05, indicating that the ESG scores and the EV in the pre-treatment period did not differ significantly between the treated and control groups over time, supporting the parallel trends assumption. The parallel-trends assumption is confidently satisfied for *ESG scores* but requires additional attention for *EV*. The non-significant interaction terms imply that any observed changes in the post-treatment period can be more confidently attributed to the treatment effect rather than pre-existing differences in trends.

Table 14. Correlation Matrix

	ESG	EV	ENV	SOC	GOV	Assetvalue	ROA	CFoperating	Stratcsr	Mrktcap	Rprtscore
ESG	1.000										
EV	0.266***	1.000									
ENV	0.854***	0.262***	1.000								
SOC	0.885***	0.262***	0.74***	1.000							
GOV	0.677***	0.125***	0.408***	0.354***	1.000						
Assetvalue	0.233***	0.619***	0.248***	0.231***	0.092***	1.000					
ROA	0.025*	0.137***	0.035**	0.057***	-0.016	-0.01	1.000				
CFoperating	0.201***	0.58***	0.191***	0.193***	0.105***	0.639***	0.033**	1.000			
Stratcsr	0.775***	0.251***	0.789***	0.707***	0.434***	0.222***	0.026*	0.184***	1.000		
Mrktcap	0.237***	0.98***	0.229***	0.234***	0.115***	0.569***	0.157***	0.554***	0.221***	1.000	
Rprtscore	0.7***	0.191***	0.718***	0.638***	0.39***	0.171***	0.01	0.14***	0.862***	0.167***	1.000

*p<0.1; **p<0.05; ***p<0.01

Notes: The correlation matrix allows to find pairs of predictors with high correlation. Values near 0 indicate little to no linear relationship between the variables, whereas values near 1 indicate a strong linear relationship. If any pair has a correlation above 0.8 (or below -0.8), they should be removed because of perfect collinearity. For instance, *EV* and *Mrktcap* are almost perfectly colinear, therefore I removed Mrktcap from my regression. Stratcsr is also highly linear with ESG and Rprtscore, therefore this variable is removed from the model. These correlations highlight the relationships between key financial metrics and ESG performance, providing insight into the factors that influence both sustainability and enterprise value. As observed, especially environmental and social pillars have similar correlation to other variables than ESG scores.

Table 15. Regression Results based on Reporting Level (H1)

	Dependent variable:		
	ESG Scores		
	OLS	Robust SE	Clustered SE
	(1)	(2)	(3)
Treated	0.860	0.860*	0.860
	(0.558)	(0.464)	(0.898)
Time	9.036***	9.036***	9.036***
	(0.592)	(0.506)	(0.530)
LowRprt	9.808***	9.808***	9.808**
	(1.960)	(2.280)	(3.919)
HighRprt	22.453***	22.453***	22.453***
	(0.565)	(0.589)	(1.190)
Year 2020	5.590***	5.590***	5.590***
	(0.473)	(0.455)	(0.272)
Treated x Time	3.029***	3.029***	3.029***
	(0.866)	(0.801)	(0.753)
Treated x LowRprt	3.873	3.873	3.873
	(2.364)	(2.621)	(4.511)
Time x LowRprt	9.579***	9.579***	9.579***
	(2.760)	(3.241)	(2.827)
Treated x HighRprt	0.089	0.089	0.089
	(0.810)	(0.856)	(1.721)
Time x HighRprt	1.526*	1.526*	1.526*
	(0.900)	(0.868)	(0.818)
Treated x Time x LowRprt	-3.371	-3.371	-3.371
	(3.358)	(3.667)	(3.388)
Treated x Time x HighRprt	-1.687	-1.687	-1.687
	(1.283)	(1.275)	(1.190)
Constant	29.702***	29.702***	29.702***
	(0.387)	(0.307)	(0.564)
VIF	1.01	1.01	1.15
Observations	9,051	9,051	9,051
R^2	0.418	0.418	0.418
Adjusted R^2	0.418	0.418	0.418
Residual Std. Error (df = 9038)	14.523	14.523	14.523
F Statistic (df = 12; 9038)	541.604***	541.604***	541.604***

*p<0.1; **p<0.05; ***p<0.01

Notes: The diagnostic statistics and goodness-of-fit measures include the Generalized Variance Inflation Factor (GVIF), R-squared and adjusted R-squared, residual standard error, and the F-statistic. GVIF calculates the multicollinearity among the predictors, adjusting for the

degrees of freedom in the model. GVIF values below 5 indicate moderate correlation that may not be problematic. Values above 10 indicate severe multicollinearity, which can affect the stability and interpretation of the regression coefficients. The process of mean-centering has been applied to these variables. This process adjusts the scale of the variable so that it has a mean of zero, which can help reduce multicollinearity, especially in models with interaction terms. It does not affect the relationships between variables; instead, it re-scales the data to improve numerical stability and to reduce GVIF (Wooldridge, 2020). The close alignment between R-squared and adjusted R-squared suggests a well-fitted model without overfitting. The relative low residual standard error indicates a good fit of the model to the data. The F-statistic has a highly significant p-value ($p<0.01$), indicating a significant overall regression model and that the independent variable jointly explain a significant portion of the variance in ESG scores.

Table 16. Regression Results on ESG Scores (H2a)

	Dependent variable:		
	ESG Scores		
	OLS	Robust SE	Clustered SE
	(1)	(2)	(3)
Treated	0.976***	0.976***	0.976
	(0.343)	(0.341)	(0.640)
Time	1.051***	1.051***	1.051**
	(0.392)	(0.382)	(0.419)
Stakeholder Engagement	11.674***	11.674***	11.674***
	(0.362)	(0.380)	(0.672)
Log Asset Value	0.972***	0.972***	0.972***
	(0.146)	(0.155)	(0.318)
Log Market Cap	2.564***	2.564***	2.564***
	(0.139)	(0.144)	(0.300)
CSR Reporting Score	0.180***	0.180***	0.180***
	(0.004)	(0.004)	(0.007)
Year 2020	0.822**	0.822**	0.822***
	(0.407)	(0.407)	(0.293)
Treated x Time	1.369***	1.369**	1.369***
	(0.529)	(0.532)	(0.529)
Constant	34.000***	34.000***	34.000***
	(0.271)	(0.263)	(0.459)
VIF	1.04	1.04	1.27
Observations	8,155	8,155	8,155
R^2	0.618	0.618	0.618
Adjusted R^2	0.618	0.618	0.618
Residual Std. Error (df = 8146)	11.734	11.734	11.734
F Statistic (df = 8; 8146)	1,646.625***	1,646.625***	1,646.625***

*p<0.1; **p<0.05; ***p<0.01

Figure 5. Difference in ESG scores across Groups Pre- and Post-Announcement
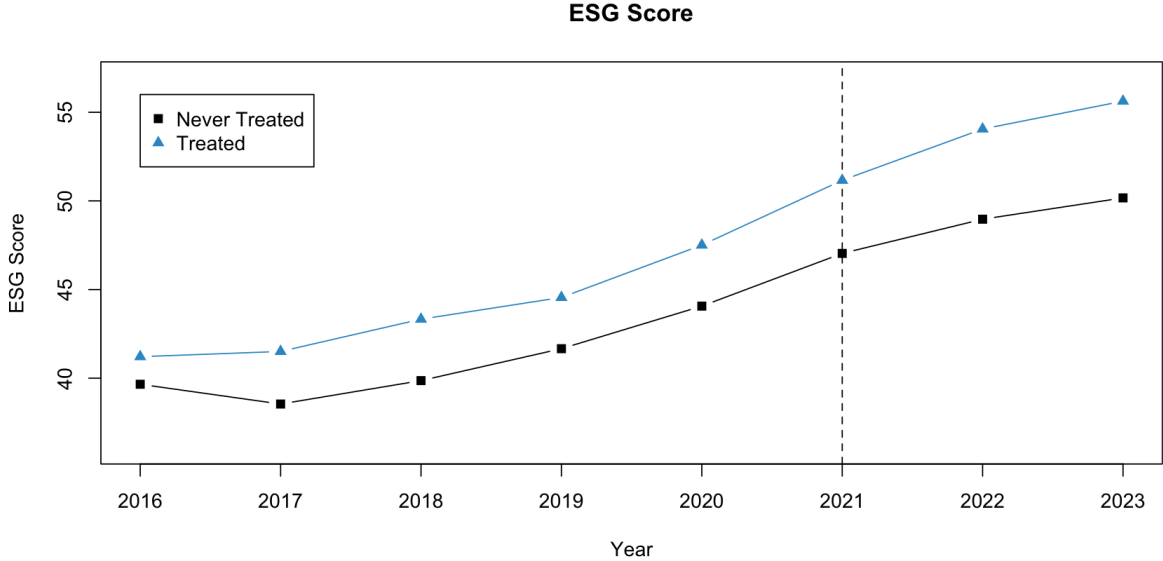
ESG Score

Notes: The visual representation aligns with the regression results, suggesting that the CSRD announcement positively influenced the ESG practices of treated firms. These companies exhibit a relative higher baseline in terms of ESG scores. However, it is essential to interpret these results considering potential biases and the multifaceted nature of ESG reporting, as discussed in the analysis.

Table 17. Regression Results on Environmental Pillar

	Dependent variable:		
	Environmental Pillar Score		
	OLS	Robust SE	Clustered SE
	(1)	(2)	(3)
Treated	0.842[*]	0.842[*]	0.842
	(0.480)	(0.472)	(0.870)
Time	-3.218[***]	-3.218[***]	-3.218[***]
	(0.549)	(0.538)	(0.601)
Stakeholder Engagement	16.902[***]	16.902[***]	16.902[***]
	(0.507)	(0.579)	(1.039)
Log Asset Value	1.786[***]	1.786[***]	1.786[***]
	(0.205)	(0.209)	(0.407)
Log Market Cap	3.146[***]	3.146[***]	3.146[***]
	(0.194)	(0.199)	(0.396)
CSR Reporting Score	0.292[***]	0.292[***]	0.292[***]
	(0.006)	(0.007)	(0.011)
Year 2020	-1.533[***]	-1.533[***]	-1.533[***]
	(0.570)	(0.564)	(0.433)
Treated x Time	4.723[***]	4.723[***]	4.723[***]
	(0.741)	(0.752)	(0.789)
Constant	15.854[***]	15.854[***]	15.854[***]
	(0.380)	(0.352)	(0.580)
VIF	1.04	1.04	1.27
Observations	8,155	8,155	8,155
R^2	0.645	0.645	0.645
Adjusted R^2	0.645	0.645	0.645
Residual Std. Error (df = 8146)	16.443	16.443	16.443
F Statistic (df = 8; 8146)	1,850.797[***]	1,850.797[***]	1,850.797[***]

*p<0.1; **p<0.05; ***p<0.01

Table 18. Regression Results on Social Pillar

	Dependent variable:		
	Social Pillar Score		
	OLS	Robust SE	Clustered SE
	(1)	(2)	(3)
Treated	3.955***	3.955***	3.955***
	(0.421)	(0.424)	(0.804)
Time	1.958***	1.958***	1.958***
	(0.481)	(0.464)	(0.536)
Stakeholder Engagement	10.950***	10.950***	10.950***
	(0.445)	(0.473)	(0.836)
Log Asset Value	0.174	0.174	0.174
	(0.180)	(0.183)	(0.365)
Log Market Cap	4.096***	4.096***	4.096***
	(0.170)	(0.171)	(0.351)
CSR Reporting Score	0.171***	0.171***	0.171***
	(0.005)	(0.005)	(0.009)
Year 2020	1.241**	1.241**	1.241***
	(0.499)	(0.512)	(0.358)
Treated x Time	1.649**	1.649**	1.649**
	(0.649)	(0.648)	(0.677)
Constant	34.238***	34.238***	34.238***
	(0.333)	(0.319)	(0.562)
VIF	1.04	1.04	1.27
Observations	8,155	8,155	8,155
R^2	0.542	0.542	0.542
Adjusted R^2	0.542	0.542	0.542
Residual Std. Error (df = 8146)	14.408	14.408	14.408
F Statistic (df = 8; 8146)	1,206.760***	1,206.760***	1,206.760***

*p<0.1; **p<0.05; ***p<0.01

Table 19. Regression Results on Corporate Governance Pillar

	Dependent variable:		
	Corporate Governance Pillar Score		
	OLS	Robust SE	Clustered SE
	(1)	(2)	(3)
Treated	-3.084***	-3.084***	-3.084***
	(0.560)	(0.564)	(1.050)
Time	0.082	0.082	0.082
	(0.641)	(0.624)	(0.689)
Stakeholder Engagement	8.277***	8.277***	8.277***
	(0.592)	(0.581)	(1.012)
Log Asset Value	1.835***	1.835***	1.835***
	(0.239)	(0.257)	(0.521)
Log Market Cap	-0.604***	-0.604**	-0.604
	(0.227)	(0.243)	(0.507)
CSR Reporting Score	0.133***	0.133***	0.133***
	(0.007)	(0.007)	(0.011)
Year 2020	0.041	0.041	0.041
	(0.665)	(0.664)	(0.473)
Treated x Time	0.310	0.310	0.310
	(0.865)	(0.866)	(0.838)
Constant	47.849***	47.849***	47.849***
	(0.444)	(0.439)	(0.760)
VIF	1.04	1.04	1.27
Observations	8,155	8,155	8,155
R^2	0.193	0.193	0.193
Adjusted R^2	0.192	0.192	0.192
Residual Std. Error (df = 8146)	19.193	19.193	19.193
F Statistic (df = 8; 8146)	242.921***	242.921***	242.921***

*p<0.1; **p<0.05; ***p<0.01

Notes: The constant indicates the baseline level of each pillar when all independent variables equal zero. While the constant equals 47.849 for the corporate governance pillar, it amounts 34.238 for the social pillar and only 15.854 for the environmental pillar score, all highly significant (p<0.01).

Figure 6. Impact on Each Individual ESG Pillar
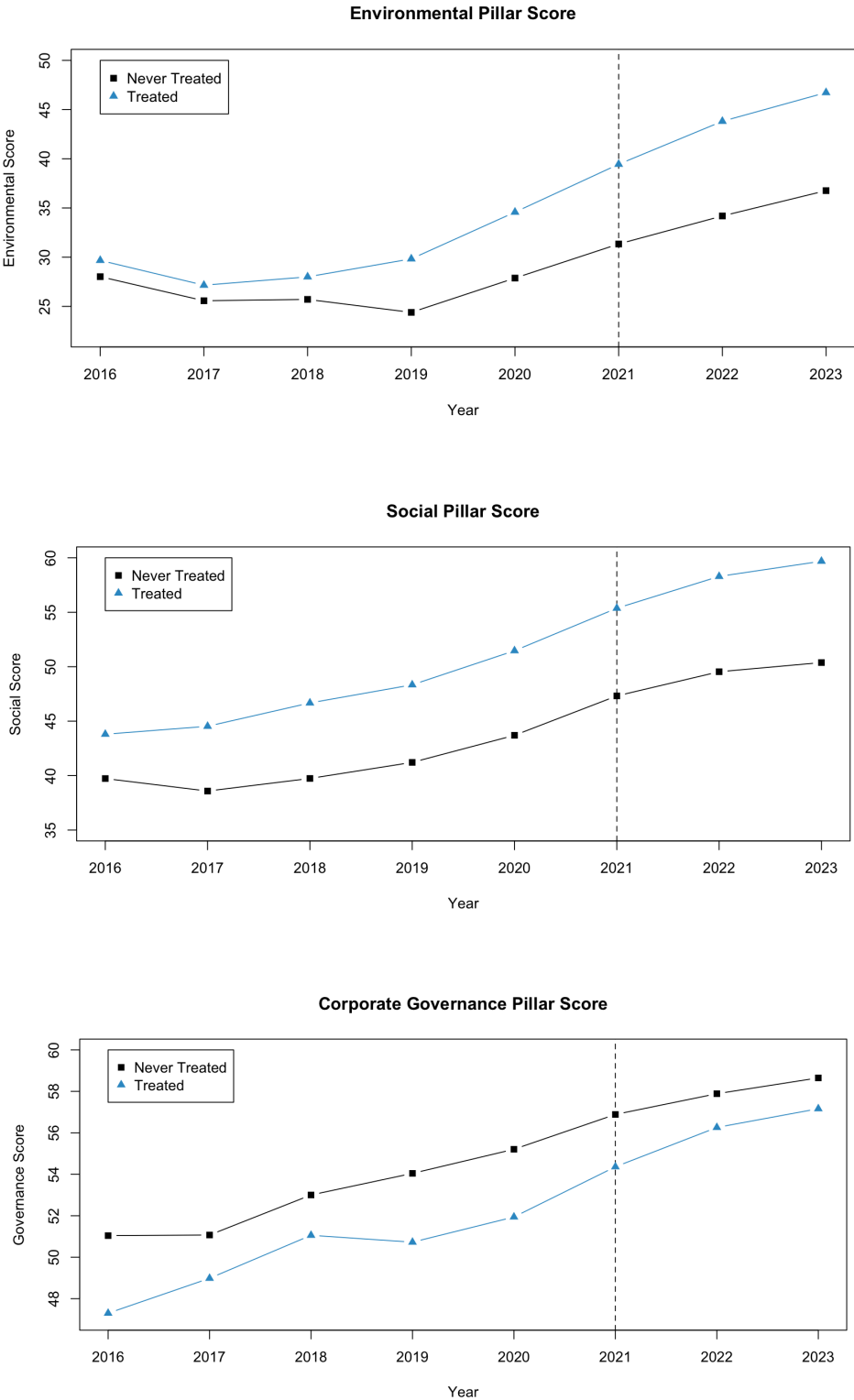
Notes: Thes graphs illustrate the trends in Environmental, Social and Corporate Governance Pillar over the studied period (2016-2023). Based on the results, the treated firms (dark blue) show increase in both environmental and social pillar compared to the control group. The graph allows for a visual representation demonstrating a higher increasing trend for the targeted firms. These trends support the hypothesis that the CSRD regulation significantly enhances environmental and social ESG performance among targeted firms.

Table 20. Regression Results on Log (EV) (H2b)

	OLS	Robust SE	Clustered SE
	Dependent variable:		
	Log (Enterprise Value)		
	(1)	(2)	(3)
Treated	0.165***	0.165***	0.165***
	(0.022)	(0.021)	(0.036)
Time	-0.156***	-0.156***	-0.156***
	(0.026)	(0.027)	(0.025)
Log Asset Value	0.475***	0.475***	0.475***
	(0.011)	(0.019)	(0.032)
ROA	3.090***	3.090***	3.090***
	(0.132)	(0.196)	(0.306)
Stratcsr	0.005***	0.005***	0.005***
	(0.001)	(0.001)	(0.001)
Log CFoperating	0.391***	0.391***	0.391***
	(0.010)	(0.017)	(0.027)
CSR Reporting	0.010	0.010	0.010
	(0.034)	(0.035)	(0.052)
Year 2020	-0.067**	-0.067**	-0.067***
	(0.027)	(0.032)	(0.024)
Treated x Time	0.096***	0.096***	0.096***
	(0.035)	(0.035)	(0.030)
Constant	4.309***	4.309***	4.309***
	(0.151)	(0.185)	(0.340)
VIF	1.05	1.05	1.84
Observations	6,654	6,654	6,654
R²	0.789	0.789	0.789
Adjusted R²	0.788	0.788	0.788
Residual Std. Error (df = 6644)	0.693	0.693	0.693
F Statistic (df = 9; 6644)	2,752.345***	2,752.345***	2,752.345***

*p<0.1; **p<0.05; ***p<0.01

Notes: The control variables *Asset value*, *ROA*, *Stratcsr* and *CFoperating* are all highly significant at the 1% level, suggesting a positive association with the enterprise value. The significant positive coefficient for *Treated* further indicates that treated firms had a higher enterprise value even before the announcement, suggesting that these firms may have been better positioned to benefit from the upcoming regulations.

Figure 7. Differences in Log (EV) across Groups Pre- and Post-treatment

Log (Enterprise Value)
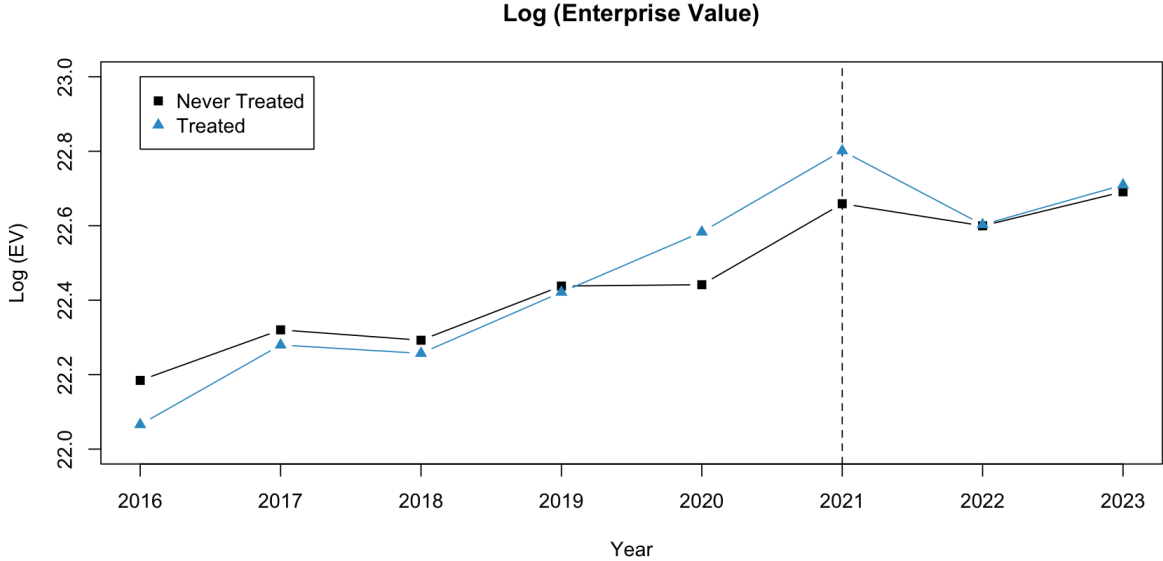
Notes: The visual trend suggests a temporary slower growth immediately following the announcement for both groups. Despite this initial dip, the treated group eventually benefit more over time relative to the control group, as demonstrated by the positive and significant interaction coefficient. Nevertheless, the difference among the two observed groups is relatively small, indicating that the influence of the announcement is slight. Figure 7 demonstrates the minor differences on a very small scale, with the lines gradually converging towards each other. The interpretation of this graph requires additional attention to potential bias, as multiple external factors are influencing EV.

10. APPENDICES

Appendix 1. One-to-Many Matching: Regression Results based on Reporting Level

	Dependent variable:		
	ESG scores		
	OLS	Robust SE	Clustered SE
	(1)	(2)	(3)
Treated	-1.096**	-1.096*	-1.096
	(0.528)	(0.591)	(1.110)
Time	8.871***	8.871***	8.871***
	(0.621)	(0.878)	(0.809)
LowRprt	7.282***	7.282**	7.282
	(1.358)	(3.467)	(7.145)
HighRprt	23.705***	23.705***	23.705***
	(0.586)	(1.381)	(2.875)
Year 2020	5.465***	5.465***	5.465***
	(0.434)	(0.657)	(0.320)
Treated x Time	2.218***	2.218**	2.218**
	(0.821)	(1.014)	(0.913)
Treated x LowRprt	8.082***	8.082**	8.082
	(1.759)	(3.687)	(7.468)
Time x LowRprt	9.108***	9.108*	9.108***
	(2.051)	(5.243)	(2.612)
Treated x HighRprt	-0.651	-0.651	-0.651
	(0.760)	(1.470)	(3.046)
Time x HighRprt	0.728	0.728	0.728
	(0.929)	(2.016)	(1.269)
Treated x Time x LowRprt	-1.589	-1.589	-1.589
	(2.608)	(5.477)	(3.127)
Treated x Time x HighRprt	0.039	0.039	0.039
	(1.203)	(2.155)	(1.449)
Constant	31.267***	31.267***	31.267***
	(0.404)	(0.528)	(0.951)
Observations	11,305	11,305	11,305
R²	0.415	0.415	0.415
Adjusted R²	0.414	0.414	0.414
Residual Std. Error (df = 11292)	14.886	14.886	14.886
F Statistic (df = 12; 11292)	666.227***	666.227***	666.227***

*p<0.1; **p<0.05; ***p<0.01

Appendix 2. One-to-Many Matching: Regression Results on Environmental Pillar

	Dependent variable:		
	Environmental Pillar Score		
	OLS	Robust SE	Clustered SE
	(1)	(2)	(3)
Treated	-0.932**	-0.932	-0.932
	(0.445)	(0.799)	(1.510)
Time	-1.723***	-1.723	-1.723**
	(0.555)	(1.274)	(0.879)
Stakeholder Engagement	14.508***	14.508***	14.508***
	(0.447)	(0.953)	(2.143)
Log Asset Value	1.853***	1.853***	1.853***
	(0.183)	(0.245)	(0.497)
Log Market Cap	3.531***	3.531***	3.531***
	(0.171)	(0.258)	(0.556)
CSR Reporting Score	0.312***	0.312***	0.312***
	(0.005)	(0.009)	(0.017)
Year 2020	-0.475	-0.475	-0.475
	(0.521)	(0.869)	(0.492)
Treated x Time	3.307***	3.307**	3.307***
	(0.691)	(1.327)	(0.930)
Constant	17.941***	17.941***	17.941***
	(0.398)	(0.746)	(1.257)
Observations	10,087	10,087	10,087
R^2	0.653	0.653	0.653
Adjusted R^2	0.652	0.652	0.652
Residual Std. Error (df = 10078)	16.586	16.586	16.586
F Statistic (df = 8; 10078)	2,367.058***	2,367.058***	2,367.058***

*p<0.1; **p<0.05; ***p<0.01

Appendix 3. One-to-Many Matching: Regression Results on Social Pillar

	Dependent variable:		
	Social Pillar		
	OLS (1)	Robust SE (2)	Clustered SE (3)
Treated	0.433	0.433	0.433
	(0.384)	(0.618)	(1.176)
Time	2.288***	2.288**	2.288***
	(0.479)	(0.934)	(0.885)
Stakeholder Engagement	10.391***	10.391***	10.391***
	(0.386)	(0.613)	(1.326)
Log Asset Value	-0.110	-0.110	-0.110
	(0.158)	(0.188)	(0.350)
Log Market Cap	4.946***	4.946***	4.946***
	(0.147)	(0.196)	(0.421)
CSR Reporting Score	0.172***	0.172***	0.172***
	(0.005)	(0.007)	(0.011)
Year 2020	1.355***	1.355**	1.355***
	(0.450)	(0.672)	(0.466)
Treated x Time	1.137*	1.137	1.137
	(0.596)	(0.990)	(0.913)
Constant	36.969***	36.969***	36.969***
	(0.343)	(0.555)	(1.002)
Observations	10,087	10,087	10,087
R²	0.564	0.564	0.564
Adjusted R²	0.563	0.563	0.563
Residual Std. Error (df = 10078)	14.309	14.309	14.309
F Statistic (df = 8; 10078)	1,627.087***	1,627.087***	1,627.087***

*p<0.1; **p<0.05; ***p<0.01

Appendix 4. One-to-Many Matching: Regression Results on Log (EV)

	Dependent variable:		
	Log (EV)		
	OLS	Robust SE	Clustered SE
	(1)	(2)	(3)
Treated	0.015	0.015	0.015
	(0.020)	(0.033)	(0.063)
Time	-0.150***	-0.150***	-0.150***
	(0.025)	(0.053)	(0.046)
Log Asset Value	0.422***	0.422***	0.422***
	(0.010)	(0.029)	(0.039)
ROA	2.275***	2.275***	2.275***
	(0.115)	(0.295)	(0.374)
Stratcsr	0.004***	0.004***	0.004***
	(0.0004)	(0.001)	(0.001)
Log CFoperating	0.484***	0.484***	0.484***
	(0.009)	(0.031)	(0.037)
CSR Reporting	0.013	0.013	0.013
	(0.030)	(0.054)	(0.072)
Year 2020	-0.037	-0.037	-0.037
	(0.025)	(0.037)	(0.027)
Treated x Time	0.111***	0.111**	0.111**
	(0.031)	(0.055)	(0.044)
Constant	3.799***	3.799***	3.799***
	(0.127)	(0.234)	(0.446)
Observations	8,190	8,190	8,190
R^2	0.823	0.823	0.823
Adjusted R^2	0.823	0.823	0.823
Residual Std. Error (df = 8180)	0.682	0.682	0.682
F Statistic (df = 9; 8180)	4,219.225***	4,219.225***	4,219.225***

*p<0.1; **p<0.05; ***p<0.01