Spillover Effects of Sustainability Reporting Mandate through Subsidiaries

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ABSTRACT: We investigate whether the European Union's (EU) corporate sustainability disclosure mandate has had spillover effects on U.S. firms through their EU subsidiaries. The non-financial reporting directive (NFRD) mandated large EU public interest entities to disclose their environmental and social matters starting in 2018, enhancing the EU's sustainability information environment. We find that U.S. firms with EU subsidiaries improve their CSR transparency and performance in the post-period, that is, starting from the year when the first non-financial reporting disclosures were issued by the companies under the NFRD. By focusing on the knowledge transfer channel driving this spillover effect, we find that the effect is more pronounced for U.S. firms with greater exposure to the EU market, particularly when their subsidiaries are larger and operate within the same industry, attracting headquarters' attention. Overall, this study posits that corporate sustainability reporting regulation can have far-reaching real effects through spillovers via parent-subsidiary relationships.

Keywords*:* corporate social responsibility (CSR); non-financial reporting directive (NFRD); regulation; multinational corporation (MNC); real effects; spillover effect; knowledge transfer; ESG

JEL Classifications: *G18; M48***;** *M14; M41; F23; D83*.

We appreciate comments from Linda Myers (special guest) and participants at the Helsinki Accounting & Auditing Mini Conference at Aalto University. We acknowledge financial support from the Nasdaq Nordic Foundation and the Finnish Foundation for Economic Education.
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1. Introduction

This study examines how the corporate social responsibility (CSR) reporting mandate in one jurisdiction affects voluntary behavior in another through internal corporate mechanisms, specifically subsidiary-parent knowledge flows. As CSR gains prominence among policymakers and businesses, fueled by increasing stakeholder demands for transparency and accountability, CSR disclosure regulations have emerged globally as a key policy issue of our time (e.g., Grewal & Serafeim, 2020; Fiechter et al., 2022). Among these efforts, the European Union (EU) has taken a leading role with the adoption of the Non-Financial Reporting Directive (NFRD, 2014/95)[1], which mandates large public interest entities to disclose information on environmental and social matters beginning in 2018 (or fiscal year 2017). This regulatory shift transformed the CSR reporting landscape in the EU, significantly increasing the availability and standardizing corporate sustainability information through mandatory disclosures.

Compared to the EU, the approach to CSR reporting in the U.S. is somewhat different, focusing on financial materiality and voluntary reporting driven by market demand[2]. Despite being a regulation of a different jurisdiction, the EU CSR reporting mandate may affect U.S. multinational corporations' (MNCs) CSR disclosure and activities, through knowledge transfer from EU subsidiaries to U.S. parents. Drawing on the literature on the real effects of CSR disclosure regulation, regulatory spillovers across jurisdictions, and MNCs' knowledge transfer mechanism, we examine whether the mandate has indirectly transmitted effects on U.S. firms' CSR disclosure and activities through their EU subsidiaries. Existing empirical evidence

[1] Updated with the EU Corporate Sustainability Reporting Directive (CSRD), which introduces stricter and more explicit requirements for firms starting in 2024.

[2] There is no single unified law in the U.S. mandating all firms to report on their sustainability practices, although certain specific mandatory disclosure requirements exist, such as those regarding conflict minerals under the Dodd-Frank Act.

demonstrates that CSR disclosure mandates influence firms' reporting practices and activities within their respective jurisdiction (e.g., Fiechter et al., 2022; Chen et al., 2018). However, a significant gap remains in understanding the cross-border effects of CSR mandates transmitted through subsidiary-parent relationships.

The rationale underlying our premise is that MNCs possess a unique advantage through access to extensive internal and external knowledge networks, which are widely regarded as critical for fostering competitive advantage (e.g., Foss & Pedersen, 2002; Gupta & Govindarajan, 2000; Yang et al., 2008). These networks enable MNCs to exploit existing knowledge while simultaneously exploring new opportunities[3] (Foss & Pedersen, 2002; Dyreng et al., 2012; Attig et al., 2016). Further, CSR knowledge is recognized as a vital asset[4] strategically acquired to enhance corporate reputation, meet diverse stakeholder expectations, and achieve sustainable competitive advantage (Chen et al., 2023). Consequently, the exposure of U.S. firms to the EU's regulatory environment through their subsidiaries may drive voluntary advancements in corporate sustainability practices by U.S. parent firms, even in the absence of equivalent domestic mandates.

The knowledge transfer literature suggests that U.S. multinational firms may acquire and leverage subsidiary-derived insights to strengthen their global competitiveness, outperforming firms that rely solely on external market mechanisms (e.g. Yang et al., 2008; Gupta & Govindarajan, 2000). In our study, this mechanism involves localized insights on CSR disclosure and practices being conveyed from strategically significant EU subsidiaries to U.S. parent firms. Specifically, we focus on two types of knowledge that transfer reversely (e.g., Yang et al., 2008;

[3] Prior research highlights the critical role of subsidiary institutional environments in influencing U.S. multinationals, with Dyreng et al. (2012) linking earnings management to local laws and institutions, and Attig et al. (2016) associating strong legal frameworks with higher CSR ratings.

[4] Chen et al. (2023) show how firms acquire CSR knowledge through cross-border mergers and acquisitions to achieve sustainable competitive advantage.

Mudambi et al., 2014) from EU subsidiaries to U.S. multinational firms following the EU disclosure mandate: 1) knowledge about CSR measurement, disclosure, and performance, and 2) knowledge about the external demand for CSR.

The first type of knowledge about CSR measurement, disclosure, and performance refers to structured reporting practices, metrics, and activities encouraged by the NFRD and referenced frameworks such as the Global Reporting Initiative (GRI). Through subsidiaries' exposure to the NFRD[5], U.S. parent firms may learn about how to measure and effectively communicate their CSR performance. By enhancing the quality and comparability of disclosed information (Fiechter et al., 2022), the NFRD facilitates benchmarking against competitors and industry leaders, providing U.S. firms with a valuable roadmap for improving their practices. Moreover, the directive's link to the double materiality approach may enable firms to address both financial impacts and broader societal and environmental effects (drawing on Christensen et al., 2021).

The second type of knowledge concerns the external demand for CSR from various stakeholders such as industry peers, supply chain partners, analysts, and the media. The NFRD's enhancement of CSR transparency in the EU likely increased public scrutiny and stakeholder pressure on firms, prompting improvements in their practices (Fiechter et al., 2022; Christensen et al., 2017; Christensen et al., 2021; She, 2022). This is attributed to feedback loops, where stakeholder reactions to disclosures lead firms to anticipate or respond to these reactions, likely fostering greater accountability and tangible effects on their practices (Christensen et al., 2021). By leveraging insights gained from their EU subsidiaries, U.S. multinational parent companies can

[5] Not all EU subsidiaries are subject to the NFRD, as they may not meet the eligibility criteria. We use the term "exposure" to encompass both subsidiaries directly subject to the regulation and those indirectly influenced through networks, including e.g. peers and competitors.

better understand evolving stakeholder priorities, monitor market conditions and competition, and align their CSR activities and strategies with global market demands.

Building on the insights from the above literature, we investigate whether U.S. multinational firms with EU subsidiaries were indirectly influenced by the NFRD mandate. To examine the potential spillover effect of the EU CSR disclosure mandate on U.S. firms through their EU subsidiaries, we adopt a difference-in-differences approach. Using Compustat data from publicly listed U.S. firms, the treatment group consists of firms with one or more subsidiaries in EU countries, while the control group includes firms with subsidiaries only in the U.S. or in non-EU countries. We define the pre- and post-periods based on the implementation of the NFRD mandate and the first NFRD-compliant disclosures by firms. Specifically, the post-period includes the three firm-years starting from 2018, while the pre-period comprises the three firm-years preceding 2018.

Our findings reveal that U.S. firms with subsidiaries in the EU significantly improved their corporate social reporting transparency and performance following the implementation of the NFRD mandate in 2018. The EU subsidiary indicator variable is statistically significant across various model specifications and robustness checks, highlighting its association with the aggregated CSR transparency score. Similarly, both environmental and social performance dimensions exhibit significant improvements, indicating that firms not only increase transparency, the expressed goal of NFRD, but they also invest more in CSR activities. Importantly, firms with greater exposure to the EU market, proxied by above-median number of EU subsidiaries, demonstrate stronger responsiveness to the NFRD mandate. This heightened effect is evident in CSR transparency and environmental performance, reflecting that increased exposure prompts parent firms to more actively monitor the external information environment in the EU, where the NFRD has introduced stricter CSR information requirements. Finally, our results reveal that the

spillover effect is more pronounced for firms with lower prior CSR engagement, suggesting that the regulation prompted firms with greater room for improvement to enhance their sustainability practices.

To better understand the knowledge transfer mechanism, we run cross-sectional analyses using the headquarter attention variable informed by the knowledge transfer literature[6] (e.g. Ambos et al., 2006; Bouquet & Birkinshaw, 2008; Gupta & Govindarajan, 2000; Foss & Pedersen, 2002). The variable, built using ORBIS data, incorporates three factors that are relevant to the significance of a subsidiary to the parent: subsidiary size, the subsidiary-to-parent asset ratio, and industry similarity. Our findings show that higher headquarter attention significantly amplifies the post-period effects on CSR transparency and performance. This suggests that parent firms learn about CSR more effectively from subsidiaries that attract their attention due to these key factors.

We conduct several robustness tests to validate our results. First, we exclude U.S. firms cross-listed in the EU, which reinforces our main conclusions. The continued improvement in CSR practices among U.S. firms with EU subsidiaries, even after removing those affected by EU cross-listing, reinforces our main conclusion that these enhancements are primarily driven by the NFRD's spillover effects. Second, we conduct a placebo test showing insignificant effects for multinational U.S. firms with non-EU subsidiaries, reinforcing that the CSR performance improvements are specifically driven by exposure to the EU's regulatory environment under the NFRD, rather than broader global CSR trends. Third, we employ alternative CSR data, which further confirms our findings. The positive results in the post-period for environmental activities verify that U.S. firms with EU subsidiaries have significantly intensified their CSR efforts.

[6] Larger subsidiaries are particularly effective at attracting attention and transferring valuable knowledge to the parent firm (Ambos & Birkinshaw, 2010; Gupta & Govindarajan, 2000; Foss & Pedersen, 2002)

Our paper makes several contributions to existing literature. First, it offers new insights into the real effects of CSR reporting mandates (Christensen et al., 2021). Prior studies have focused on the direct impacts of CSR mandates on regulated firms, such as improvements in reporting and practices (Ioannou & Serafeim, 2017; Christensen et al., 2017; Chen et al., 2018; Fiechter et al., 2022), stock liquidity, and investment outcomes (Krueger et al., 2021; Gibbons, 2023) and enhanced supply chain due diligence (She, 2022). While Cascino et al. (2024) show how multinational groups shift irresponsible ESG practices to subsidiaries in weaker enforcement jurisdictions, our study finds positive spillover in parent-subsidiary relationships. We show how knowledge and practices from a more regulated EU environment are transferred to multinational parent firms through their subsidiaries. This knowledge flows within MNC networks, enabling unregulated U.S. parent firms to enhance CSR transparency and performance.

Second, our study contributes to the literature on knowledge transfer within MNCs. Prior research highlights that knowledge transfer is central to the competitive advantage of MNCs (e.g. Yang et al., 2008), enabling them to leverage and disseminate innovations, capabilities, and best practices across geographically dispersed subsidiaries (e.g., Gupta & Govindarajan, 2000; Foss & Pedersen, 2002). We show that EU subsidiaries, whether directly subject to the mandate or simply operating in a regulated environment, act as conduits of CSR knowledge. This underscores the critical role of strategically significant foreign subsidiaries as enablers of knowledge transfer within multinational corporations, facilitating the diffusion of sustainability practices and regulatory-driven activities across organizational boundaries.

Third, we contribute to the literature on regulatory spillovers by providing evidence that a CSR reporting mandate in one jurisdiction can influence voluntary CSR behavior in another. While prior studies emphasize how ESG disclosure regulations for banks generate transmission effects

through lending relationships (Wang, 2023) and how directors' exposure to sustainability regulations abroad enhances the sustainability performance of U.S. firms through the importation of expertise (Iliev & Roth, 2023), we demonstrate how the EU's sustainability disclosure requirements spill over to unregulated U.S. multinational parent firms through foreign subsidiaries exposed to the mandate. This finding is particularly important for U.S. firms and investors as they navigate through turbulence and uncertainty in domestic CSR regulations. As evidenced by the recent pause in the SEC's climate-related disclosure rule, U.S. firms and investors face uncertainty about CSR regulation with changes in administrations, which potentially can lead to greater regulatory divergence from the EU and other global requirements. Our findings suggest that U.S. MNCs respond to the EU's regulation, suggesting that foreign regulation and "global standards" play a role in mitigating uncertainty from domestic regulatory shifts for U.S. firms and their stakeholders.

Finally, from a practical perspective, our findings provide intriguing insights into the far-reaching effects of EU sustainability reporting regulations. With the stricter Corporate Sustainability Reporting Directive (CSRD) being implemented in the EU beginning in 2025, these results offer an understanding of how such mandates can influence U.S. firms and other global firms, even in the absence of equivalent domestic regulations or amid divided political perspectives on sustainability.

The remainder of the paper is organized as follows: Section 2 outlines the hypothesis development. Section 3 describes the data and methodology. Section 4 presents the main results on spillover effects, while Section 5 focuses on the cross-sectional analyses, highlighting how subsidiary characteristics drive more prominent results. Finally, Section 6 concludes the study.

2. Background and hypothesis development

2.1 Institutional background: CSR reporting regulation in the EU and the U.S.

In the EU, the non-financial reporting directive (NFRD, 2014/95) was the first major step towards mandatory CSR reporting. The directive contributes to achieving the United Nations' Sustainable Development Goals and staying within the framework of the Paris Agreement. The NFRD was passed in 2014, and the member states had time until the end of 2016 to transpose the directive into their national legislation with enforcement mechanisms similar to those for financial reporting. The NFRD mandated that public interest entities with more than 500 employees and with either more than EUR 20 million in total assets or more than EUR 40 million in sales must prepare non-financial disclosures annually starting with fiscal year 2017. The first mandatory NFRD reports were therefore published in 2018.

The NFRD requires companies to publish annual governance-approved CSR reports[7] that address policies, key risks, and outcomes related to environmental issues, social and employee matters, human rights, anti-corruption efforts, and board diversity. To facilitate compliance, the directive and the EU Commission's non-binding guidelines recommend using existing reporting frameworks, such as the Global Reporting Initiative (GRI) standards. Despite the implementation guidelines[8] incorporating general and sector-specific key performance indicators, there was no unified EU-level guidance on enforcing these requirements, leaving implementation to individual countries[9].

[7] The NFRD increased executives' responsibility for corporate sustainability reporting by requiring disclosures to be included in the Board of Directors' report or a separate statement signed by the board and CEO.
[8] In June 2016, the European Commission issued implementation guidelines aimed at ensuring that disclosures are relevant, useful, and comparable.
[9] The directive allowed flexibility in how to apply it in national laws, and hence, some EU countries went beyond the minimum requirements in their implementation of the directive.

In the U.S., CSR reporting has been largely voluntary and based on market demand[10], with an emphasis on the investor perspective and financial materiality (Christensen et al. 2021). Regulation is limited to specific disclosures, such as those mandated under the Dodd-Frank Wall Street Reform and Consumer Protection Act (2010), which requires reporting on mine safety and conflict minerals (Sections 1502 and 1503), and the U.S. Environmental Protection Agency (2009) mandate for greenhouse gas emissions disclosure for certain industries.

During the sample period of this study, a divergence between U.S. and EU approaches to CSR policy frameworks became evident after June 1, 2017, when U.S. President Donald Trump announced the United States' decision to withdraw from the 2015 Paris Agreement[11] on climate change mitigation. Trump argued that the agreement would undermine the U.S. economy and create a permanent disadvantage. The Paris Agreement, however, is a cornerstone of the EU's actions for sustainable economies, referenced in both the EU Guidelines on non-financial reporting and the NFRD review documents[12], highlighting a substantial difference in transatlantic CSR policies and political objectives during the Trump administration and the overlapping sample period (2017-2020).

2.2 Hypothesis development

The EU's CSR information environment began to evolve with the introduction of the CSR Directive in 2014, enacted in 2018. According to Fiechter et al. (2022), EU firms subject to NFRD

[10] The ongoing policy discussion in the U.S. mainly centers on whether to introduce a mandate that would specifically require companies to disclose CSR reporting (Christensen et al., 2021). In this context, one of the most well-known U.S.-originated voluntary, industry-specific standards for the disclosure of financially material environmental, social, and governance (ESG) topics is the Sustainability Accounting Standards Board (SASB).
[11] The Paris Agreement is an international treaty focused on climate change mitigation, adaptation, and finance, negotiated by 196 parties at the 2015 UN Climate Change Conference near Paris. Under the agreement, each country must determine, plan, and regularly report on its contributions.
[12] Consultation document review of the non-financial reporting directive (2020) states that non-financial matter "environment" in Article 19a of the Accounting Directive could possibly be further disaggregated to include "Alignment with Paris Agreement".

started adapting to its requirements even before the enforcement, resulting in gradual improvements in CSR reporting and activities, with the strongest impacts observed in 2017 and 2018. MNCs, by their nature, are influenced by the institutional and regulatory environments of their foreign subsidiaries[13] (Attig et al., 2016; Dyreng et al., 2012), as their global operations often require adapting to diverse stakeholder expectations and regulatory standards. Moreover, MNCs utilize their international networks to foster learning and innovation, strengthening their competitive advantage (e.g. Ambos et al., 2006; Frost, 2001). This includes acquiring CSR knowledge, increasingly recognized as a vital strategic asset for achieving sustainable competitive success (e.g., Chen et al., 2023). This strategic importance of CSR knowledge, combined with the NFRD's role in reshaping external CRS demands within the EU, underscores the need to examine whether the mandate generates spillover effects on U.S. multinational firms through their EU subsidiaries. Thus, we investigate the impact of the EU's NFRD on the CSR practices of U.S. multinational firms, with a specific focus on knowledge transfer channels facilitated by their subsidiaries.

Operating across diverse institutional environments, MNCs learn from varied contexts while leveraging their unique ability to transfer and exploit knowledge efficiently within intra-corporate networks, surpassing external market mechanisms (Gupta & Govindarajan, 2000). By integrating dispersed knowledge through robust internal flows, MNCs enhance their competitive advantage, with knowledge moving from headquarters to subsidiaries, laterally between subsidiaries, and back to the parent firm (Yang et al., 2008; Mudambi et al., 2014; Ambos et al., 2006). The reverse knowledge transfers, wherein internationally dispersed subsidiaries contribute valuable insights

[13] Firms with subsidiaries in countries with strong legal and political institutions tend to exhibit higher CSR ratings (Attig et al., 2016) and demonstrate less earnings management compared to those operating in weaker institutional environments (Dyreng et al., 2012).

and innovations to the parent firm (e.g., Ambos et al., 2006; Frost 2001), enable the refinement of global strategy and the enhancement of practices across the network. Knowledge transfer is supported by incentive systems promoting sharing and committees integrating subsidiaries into the corporate network (Gupta & Govindarajan, 2000). In this study, we consider two sets of knowledge that U.S. firms may have acquired through reverse knowledge transfer from EU subsidiaries following the EU disclosure mandate: 1) knowledge about CSR measurement, disclosure, and performance, and 2) knowledge about the external demand for CSR.

Firstly, the NFRD has led EU firms subject to its requirements to significantly enhance CSR transparency and engagement by providing more detailed disclosures on environmental, social, and governance factors (Fiechter et al., 2022). This has likely enabled EU subsidiaries of U.S firms to gain valuable insights into CSR measurement, disclosure, and performance through their exposure to the mandated disclosures, which in turn have provided U.S. parent companies with an opportunity to learn and adopt these practices. Firms operating in jurisdictions with voluntary CSR reporting, such as the U.S., likely face challenges related to the diversity of CSR topics, the absence of universally accepted metrics, and the difficulty of quantifying CSR outcomes in financial terms (drawing on Christensen, 2021). These challenges complicate comparability across firms and industries. The NFRD addresses some of these issues by guiding firms to adopt more standardized and comprehensive CSR reporting practices, recommending structured frameworks like the Global Reporting Initiative (GRI) and OECD guidelines to enhance the quality and comparability of disclosed information. The practices adopted in the EU provide guidelines on reporting processes, topics and key activities, potentially enabling firms to comply with expectations and adopt commonly used language without exposing themselves to mitigation and reputational risks (drawing on Christensen, 2021). By aligning with the NFRD guidelines, U.S. firms can learn to

enhance their performance and processes by benchmarking against the improved quality demonstrated by their EU counterparts, including industry leaders and competitors. Furthermore, the directive adopts a double materiality approach, addressing both the financial effects on firms and their impacts on society and the environment (Christensen, 2021). This enables firms to broaden their approaches for measuring externalities and intangibles that have often been underemphasized in other jurisdictions.

The second type of knowledge that can transfer from EU subsidiaries to their U.S. multinational parent companies refers to the external demand for CSR arising from stakeholders such as industry peers, supply chain partners, analysts, and the media. Prior research (e.g., She, 2022) underscores the role of external stakeholder pressure in amplifying the real effects of CSR mandates[14]. The increased CSR transparency in the EU has likely intensified public scrutiny, compelling firms to enhance their sustainability practices (Fiechter et al., 2022; Christensen et al., 2017). This, in turn, creates feedback loops (Christensen, 2021), where stakeholder reactions influence corporate CSR performance and reputation, fostering greater accountability[15]. Through their subsidiaries, U.S. parent firms gain insights into evolving stakeholder priorities, enabling them to monitor industry trends, anticipate reputational risks, and align with societal expectations. This knowledge transfer can ultimately drive refinement in CSR strategies, ensuring firms remain competitive and responsive to shifting global sustainability standards, and aligned with a broader stakeholder audience (Attig et al., 2016; Chen et al., 2023).

[14] According to She (2022), the real effects of the CSR mandate are more pronounced when firms face greater pressure from NGOs and socially conscious shareholders, when customers have stronger incentives to use the disclosed information, and when the regulation enhances information comparability.
[15] According to Christensen et al. (2021), firms are expected to adjust their CSR activities when stakeholders leverage newly disclosed information to apply pressure, such as through reduced consumption, divestment, or activism.

The integration of knowledge about CSR practices and external demands can enhance the US MNC's capacity and motivation to strengthen CSR transparency, particularly after 2018 in response to the NFRD. Based on this, we propose the following hypothesis:

H1: Following the NFRD mandate, U.S. firms with EU subsidiaries increase CSR transparency relative to U.S. firms without EU subsidiaries.

The aim of the NFRD was to enhance transparency without explicitly mandating additional investments in activities or performance. As a result, U.S. firms with EU subsidiaries might prioritize enhancing CSR disclosures over improving CSR activities, as the former is less costly (Wickert et al. 2016). However, stakeholder reactions to disclosed information can drive greater engagement and a shift of resources toward CSR investments (Christensen et al., 2021; She, 2022). Evidence from EU firms supports this, with the NFRD shown to drive meaningful improvements in CSR activities (Fiechter et al., 2022). Hence, we predict:

H2: Following the NFRD mandate, U.S. firms with EU subsidiaries invest more in sustainability activities enhancing CSR performance relative to U.S. firms without EU subsidiaries.

Greater exposure to the EU market can also drive closer monitoring of subsidiaries and the use of transparent external information[16], drawing on Shroff, Verdi, & Yu (2014). Thus, we propose:

H3: Following the NFRD mandate, U.S. firms with greater exposure to the EU market, measured by number of subsidiaries, will increase their investments in corporate sustainability transparency and performance compared to U.S. firms with lower exposure or no EU subsidiaries.

[16] MNCs monitor the external information environment, which refers to using publicly available data, such as competitor information and media coverage, to assess subsidiary performance and investment decisions, thereby reducing information asymmetry (Shroff, Verdi, & Yu, 2014).

The impact of the NFRD mandate may vary based on firms' prior CSR engagement. Specifically, U.S. firms with EU subsidiaries that historically exhibited lower CSR reporting and performance may experience stronger NFRD-driven pressure to improve. Additionally, these firms have greater potential for improvement compared to those that have already made substantial CSR investments. Therefore, we predict:

H4: U.S. firms with EU subsidiaries and lower pre-NFRD CSR performance experience greater increase of CSR transparency and performance improvements after the NFRD implementation.

Multinational headquarters orchestrate corporate assets and knowledge while sourcing strategic insights from key subsidiaries leveraging location-based competencies[17]. Larger subsidiaries, with extensive resources, local expertise, and significant contributions, are particularly effective at attracting attention and transferring valuable, unique knowledge (Ambos & Birkinshaw, 2010 Bouquet & Birkinshaw, 2008; Gupta & Govindarajan, 2000; Foss & Pedersen, 2002). Assumingly also, subsidiaries operating within the same industry as the parent further benefit from shared industrial knowledge, facilitating the transfer of tacit, product- or process-specific insights. Thereby, we predict that subsidiaries attracting headquarters' attention through size, asset ratio, and industry alignment enhance reverse knowledge transfer, improving MNC's CSR transparency and performance.

H5: Following the NFRD mandate, U.S. firms with a greater parent firm attention, determined by factors of subsidiary size, asset ratio, and industrial similarity, exhibit a stronger positive impact on CSR transparency and performance improvements compared to U.S. firms with lower attention to their EU subsidiaries or no EU subsidiaries.

[17] Attention from headquarters, a critical organizational resource, enhances subsidiary performance (Bouquet & Birkinshaw, 2008)

3. Data and methodology

3.1 Data and sample

We obtain CSR performance and reporting data from LSEG ESG. The database provides comprehensive and granular metrics of firms' CSR reporting and performance that are used broadly in prior research (e.g., Fiechter et al., 2021; Iliev & Roth, 2023; Wang, 2023). The financial and subsidiary data used in the main analyses of this study are from Compustat and I/B/E/S, while complementary ESG data to enhance robustness are obtained from MSCI. In addition to the main tests, we perform cross-sectional analyses using data on EU subsidiaries from the Orbis database[18].

Our initial sample consists of all publicly listed U.S. firms from 2015 to 2020. Panel A of Table 1 outlines the sample selection process. Subsequently, upon incorporating the EU subsidiaries indicator, we discard observations that do not align with the available subsidiary data. Following this, we further refine the dataset by excluding observations where the EU subsidiary indicator displays inconsistency within the sampled period. Finally, we exclude firm-years that are missing necessary data for the variables used in our analysis. After these exclusions, we are left with a sample of 9,040 firm-years. From this sample, we identify 5,525 treatment firm-years and 3,515 benchmark firm-years.

We use a difference-in-differences research design to compare changes in CSR reporting transparency and CSR performance between treatment and control firms during our sample period. This period begins in 2015, three years prior to the enforcement of the NFRD, and concludes in 2020, three years after the mandated firms began reporting. The post-period starting from 2018

[18] Through the Orbis database, we identified subsidiaries of parent firms based on the parent ISIN codes. The subsidiary IDs were then used to collect financial and organizational data on the subsidiaries for the years 2015–2020. We acknowledge that the data may slightly differ from SEC data on subsidiaries, as the SEC classification relies on a parent firm's identification of significant subsidiaries, which is filed in the 10-K and 10-Q reports, primarily through Exhibit 21.

marks a significant development in the EU's sustainability reporting landscape, as it encompasses the introduction of mandated sustainability disclosures and the increased availability of sustainability information in the EU market.

To test the impact of NFRD on U.S. firm reporting and performance through our hypothesized spillover mechanism, we define treated firms as U.S. entities with at least one subsidiary in the EU[19]. To ensure accurate effect measurement, we exclusively select firms with constant EU subsidiaries by removing those with inconsistency within the sampled period. As our benchmark group, we consider U.S. firms without EU subsidiaries, offering a diverse group, potentially with global and domestic subsidiaries. We employ entropy balancing to harmonize the samples between the treatment and control groups, with a more detailed explanation provided in Section 3.2.

Table 1 presents the distribution of treatment and benchmark firms by year and industry sector. Panel B shows that in our sample, the number of treatment firm-years ranges from 702 in 2015 to 945 in 2020, reflecting an increase in the number of firms receiving environmental and social scores and reporting performance over time. The corresponding firm-year observations for the control group range from 329 in 2015 to 659 in 2020, indicating even greater growth. Panel C provides the distribution of treatment and benchmark firms by industry sector (Fama–French 12 industry groups). Treated firms have a significant representation in the computers, software, and electronic equipment industry (25%), while the control group is predominantly represented by the finance industry (34%).

[Insert Table 1 here]

3.2 Variables and descriptive statistics

[19] The treatment group includes the United Kingdom since it was part of the EU during the sample period.

Our choice of the two main outcome variables follows Fiechter et al. (2022). The first dependent variable, *CSR Transparency*, examines the impact of the NFRD on firms' sustainability reporting practices. *CSR Transparency* is an aggregate measure of several indicators, including whether firms prepare a standalone CSR report (*CSR Report*), the global scope of the CSR report (*Report Scope*), international comparability of CSR reporting indicated by the adoption of the Global Reporting Initiative (*GRI*) standards, or the reporting guidelines developed by the Organization for Economic Co-operation and Development (*OECD*), and whether the CSR reports have been reviewed by independent third-party experts (*Assurance*). While the individual indicators provide valuable information, the overall *CSR Transparency* score offers a comprehensive understanding of firms' CSR reporting by considering the combined effect of these indicators.

Our second dependent variable, *CSR Performance*, combines the *Environmental Performance* and *Social Performance* pillar scores, which represent the firm's relative performance in sustainability, commitment, and effectiveness[20]. The *Environmental Performance* score includes the categories of resource use, emissions, and innovation, while the *Social Performance* score covers workforce, human rights, community, and product responsibility (LSEG Data & Analytics, 2024). While the individual environmental and social scores offer insights into specific aspects of an entity's performance relative to others in each domain, the overall CSR Performance score provides a more comprehensive performance in corporate social responsibility, encapsulating the entity's collective CSR efforts.

[20] LSEG Data & Analytics. Environmental, social, and governance (ESG) data, "ESG Scores." Accessed [2024]. https://www.lseg.com/en/data-analytics/sustainable-finance/esg-scores.

The indicator variable, *EU*, distinguishes between treated and control U.S. firms. Firms with at least one subsidiary in the EU are assigned a value of 1, while firms without EU subsidiaries are assigned a value of 0.

We control for variables that are potentially associated with the decision to report CSR or increase related sustainability activities in our analyses. We control for firm size (*TA*) and the number of employees (*EMP*), as larger firms typically face greater external pressure to enhance their CSR practices (e.g. Wang, 2023) and are more frequently targeted by CSR regulations[21]. Furthermore, as suggested by prior literature (Fiechter et al., 2022; Wang, 2023), financial constraints may limit a firm's engagement in CSR activities. Therefore, we include the following financial control variables: leverage (*LEV*), cash from operations (*CFO*), asset turnover (*ATO*), dividends per share (*DPS*), asset structure (*PPE*), growth opportunities (*TQ*), and operating profitability (*ROA*). We also control the total number of analysts following a firm (*AF*), as analysts can potentially serve as intermediaries for the effects of CSR disclosure mandates, thereby driving increased CSR performance and reporting. Detailed descriptions of all variables can be found in the appendix.

We use the covariates mentioned above as well as industry membership (Fama–French 12 industry groups), as matching parameters for entropy balancing. To account for time-invariant, unobservable differences in firm characteristics and year-specific trends in CSR reporting and performance, we employ firm-fixed effects and year-fixed effects, respectively.

Table 2 presents the descriptive statistics for our firm-year-level variables. As seen in Panel A, the mean CSR Transparency is 1.19 for the treatment firms and 0.60 for the control firms. The

[21] The NFRD, which focuses on large firms, defines "large" as having an average of more than 500 employees during the fiscal year, and meeting at least one of the following criteria: a balance sheet total exceeding €20 million or net turnover over €40 million.

mean CSR Performance during our sample period is 39.76 for the treatment firms and 26.45 for the control firms. To better understand the baseline for treated and control firms before the NFRD took effect, we present CSR Transparency and CSR Performance statistics for both the pre- and post-periods. In Panel B, prior to the implementation of the NFRD, the mean CSR Transparency score was 1.00 for the treatment group and 0.49 for the control group. Similarly, during the pre-period, the mean CSR Performance score was 37.62 for the treatment group and 26.14 for the control group.

The descriptive statistics for firm characteristics in Panel D present the results before balancing, while Panel E shows the harmonized results after balancing the treatment and control firms' covariates for mean, variance, and skewness using entropy balancing.

[Insert Table 2 here]

Table 3 presents the Pearson correlation coefficients among the main variables. Notably, there is a strong correlation (0.73) between the two CSR performances (Environmental and Social). Additionally, we observe a high correlation between the CSR report and the environmental performance score (0.76), as well as between the global scope of the report and the environmental performance score (0.73). Furthermore, there is an exceptionally high correlation (0.97) between the presence of a CSR report and its global scope.

[Insert Table 3 here]

4. Effects of regulatory spillovers on U.S. multinationals

4.1 CSR Transparency

To assess the impact of the NFRD implementation on U.S. firms with EU subsidiaries compared to the control group, we conduct our primary analysis estimating the following OLS regression model:

$$\boldsymbol{CSR\ Transparency/Performance = \beta_0 + \beta_1(Post \times EU) + \sum \beta_i Controls_i + Year\ fixed\ effect + Firm\ fixed\ effect + \epsilon.} \quad (1)$$

In the regression model, *CSR Transparency* is regressed on the interaction between a post-period dummy variable (*Post*) and an indicator variable identifying U.S. firms with EU subsidiaries (*EU*), with firm and year fixed effects included, along with controls for firm characteristics. Our findings confirm that the implementation of the NFRD has significantly increased CSR reporting for U.S. firms with EU subsidiaries as measured by the comprehensive CSR Transparency score, relative to U.S. firms without EU subsidiaries. Specifically, Panel A (column 1) of Table 4 reveals that the interaction between the post-period and EU subsidiaries is statistically significant at the 1% level, with a coefficient of 0.257 (t = 3.228), indicating a notable increase in CSR Transparency following the NFRD implementation. This effect remains consistent in magnitude and significance even when incorporating industry-year fixed effects (column 2) or when not applying entropy balancing. These results suggest a substantial and robust spillover effect of NFRD on U.S. firms with EU subsidiaries.

The yearly treatment effects, visualized in Figure 1, further support this conclusion. The estimates, along with 95% confidence intervals, reveal that the effect on CSR Transparency is statistically significant from 2018 to 2020. To illustrate the contrast with U.S. firms without EU subsidiaries, Figure 2 presents the fitted values for CSR Transparency scores over time, showing a clear divergence starting in 2018.

Breaking down CSR Transparency into its components in Panel B, the analysis further shows positive and statistically significant effects on specific CSR reporting areas. The NFRD led to an increase of 0.087 units in *CSR Report* (t = 3.181) and 0.083 units in *Reporting Scope* scores (t = 3.025), both significant at the 1% level. There is also a positive but weaker effect on *GRI Report* scores, with a coefficient of 0.045 (t = 1.658), significant at the 10% level. *OECD* reporting saw a slight increase with a coefficient of 0.015 (t = 4.584), while *Assurance* experienced a modest increase of 0.037 (t = 2.878), both significant at the 1% level.

Overall, these results confirm that the NFRD had a positive and statistically significant impact on the overall CSR transparency of U.S. firms with EU subsidiaries. Mostly so in areas such as the number of standalone CSR reports disclosed and the scope of reports regarding global activities.

[Insert Table 4 here]
[Insert Figure 1 here]
[Insert Figure 2 here]

4.2 CSR Performance

We estimate firms' CSR performance using the same model as in Equation (1), with *CSR Performance* as the outcome variable. Table 5 presents the results of the Difference-in-Difference (DiD) regression. Our findings suggest that the NFRD has positively influenced the CSR practices of U.S. firms with EU subsidiaries, with a particularly strong impact on both environmental and social performance. Panel A, column 1 of Table 5 shows a statistically significant interaction between the post-period and EU subsidiaries at the 1% level, with a coefficient of 2.559 for the CSR Performance score (t = 2.974). Similarly to CSR transparency, the effect remains consistent in magnitude and significance with industry-year fixed effects (column 2) and without entropy balancing.

The yearly treatment effects, presented in Figure 3, reinforce this finding, with estimates and 95% confidence intervals indicating statistically significant effects from 2018 to 2020. Additionally, to highlight the difference compared to U.S. firms without EU subsidiaries, Figure 4 presents the fitted values for CSR Performance scores over time, showing a clear divergence starting in 2017, but the effects become statistically significant only from 2018 onward.

Breaking down the CSR Performance score into its components, Panel B of Table 5 reveals that the NFRD led to a significant increase in environmental performance (*ENV Performance*), with a coefficient of 2.685 (t = 2.730), significant at the 1% level, representing a meaningful enhancement in firms' environmental initiatives. The social performance score (*SOC Performance*) also experienced a positive and statistically significant increase, with a coefficient of 2.433 (t = 2.552), significant at the 5% level, though slightly smaller in magnitude compared to environmental performance.

These results indicate that the implementation of the NFRD has led to substantial improvements in both environmental and social performance among treated firms. The increase in environmental performance is particularly notable, contrasting with previous findings by Fiechter et al. (2022), who observed that the NFRD primarily impacted social activities in EU firms. Here, our results suggest that the directive had a spillover effect on U.S. firms, not only in their CSR disclosure but also in their CSR practices.

[Insert Table 5 here]
[Insert Figure 3 here]
[Insert Figure 4 here]

4.3 The effect of higher exposure measured by the number of subsidiaries

To confirm that the regulatory spillover is driven by parent-subsidiary relationships, we examine whether the magnitude of EU exposure, measured by the number of subsidiaries,

moderates the spillover effect. We employ the following OLS regression model to test whether CSR reporting and performance are more pronounced for firms with greater exposure to the EU and, consequently, the CSR Directive:

$$\boldsymbol{CSR\ Transparency/Performance = \beta_0 + \beta_1(EU \times Post \times High\ Exposure) + \beta_2 (Post \times EU) + \beta_3 High\ Exposure + \sum \beta_i Controls_i + Year\ fixed\ effect + Firm\ fixed\ effect + \epsilon.} \quad (2)$$

In the regression model, we use the same post-period (*Post*) dummy as in Equation 1. We define *High Exposure* as firms with a number of EU subsidiaries above or equal to the sample median. Control variables, firm fixed effects, and year fixed effects are included in the regression, as in Equation 1. Out of the total sample of 9,040 observations, 2,878 have a number of EU subsidiaries above the median.

The regression results in Table 6 provide insights into the impact of the NFRD on CSR transparency and its components, analyzed through the lens of higher levels of EU exposure. The interaction term for high EU exposure and the post-2018 period (*EU x Post x High Exposure*) shows a significant positive effect on CSR Transparency[22] at the 5% level, with a coefficient of 0.142 (t = 2.562).

The results show that the NFRD has a more pronounced impact on CSR transparency and reporting practices for U.S. parents with higher number of EU subsidiaries. This supports that the spillover effects are driven by knowledge transfer from subsidiaries. Aside from assurance practices, all other areas show a more pronounced impact: CSR reports, reporting scope, adherence

[22] Breaking down the aggregated score, the interaction was statistically significant at the 10% level for CSR Report (0.040, t = 1.913) and Reporting Scope (0.035, t = 1.646). The GRI Report showed a 5% level significance (0.045, t = 2.552), while OECD reporting was significant at the 10% level (0.012, t = 1.858). Assurance practices were not statistically significant (0.017, t = 1.113).

to GRI standards, and OECD reporting. The adjusted R-squared values suggest a strong model fit across the different components of CSR Transparency.

[Insert Table 6 here]

We test the same Equation 2 for CSR Performance to assess whether the high level of exposure to the EU influences firms' sustainability initiatives following the implementation of the NFRD. The regression results in Table 7 highlight the impact of the NFRD on CSR performance based on higher EU exposure level. The interaction term for high EU exposure and the post-2018 period (*EU x Post x High Exposure*) shows a significant positive effect at the 1% level on CSR Performance, with a coefficient of 2.017 (t = 3.254). For the Environmental Performance (column 2), the high exposure interaction term demonstrates a significant positive effect at the 1% level, with a coefficient of 3.588 (t = 4.334). In contrast, for Social Performance (column 3), the interaction is not statistically significant.

These results suggest that the NFRD has a more pronounced impact on firms with higher exposure to the EU, enhancing particularly environmental performance, while its effect on social performance is not significant. The adjusted R-squared values indicate a strong model fit across the different CSR dimensions, reinforcing the robustness of these findings.

[Insert Table 7 here]

4.4 Previous CSR performance

The magnitude of learning from EU subsidiaries may depend on the U.S. parent's prior CSR performance. U.S. firms that were already leading CSR disclosure and performance may have less to learn from the regulatory change in the EU, while U.S. firms with less experience in managing CSR issues may benefit more. Therefore, we employ the following OLS regression model to test how U.S. firms' prior CSR performance moderates the regulatory spillover effect:

$$\boldsymbol{CSR\ Transparency/Performance = \beta_0 + \beta_1(EU \times Post \times Prior\ CSR) + \beta_2(Post \times EU) + \sum \beta_i Controls_i + Year\ fixed\ effect + Firm\ fixed\ effect + \epsilon.} \quad (3)$$

In the regression model, we use the same post-period (*Post*) dummy as in Equation 1. The *Prior CSR* is represented by a continuous variable based on the score for the year 2015, obtained from LSEG ESG. Control variables, as well as firm and year fixed effects, are included in the regression, consistent with Equation 1. The sample size comprises 5,797 observations, indicating that fewer firms received a CSR score in 2015.

The regression results in Table 8 indicate that the interaction term for the prior CSR performance of firms with EU subsidiaries and the post-2018 period (*EU x Post x Prior CSR*) has a significant negative effect on CSR transparency at the 1% level, with a coefficient of -0.006 (t = -4.660). The results also show a negative and significant effect on CSR performance at the 1% level, with a coefficient of -0.173 (t = -12.814). These results indicate that U.S. firms with lower CSR scores in 2015 showed more significant improvements, suggesting that the directive may have had a stronger impact on U.S. firms with initially weaker CSR practices and greater potential for learning from subsidiaries.

[Insert Table 8 here]

4.5 Robustness test by excluding U.S. firms cross-listed in the EU

We conduct a robustness test by excluding U.S. firms that are cross-listed in the EU to better isolate the spillover effect of the NFRD on U.S. firms with EU subsidiaries. Cross-listed firms are subject to additional regulatory and reporting requirements in the EU, which could independently influence their CSR practices. By excluding these firms, we can more accurately assess whether the observed changes in CSR behavior among U.S. firms with EU subsidiaries are attributable to the NFRD spillover effect, rather than the direct impact of cross-listing.

As shown in Column 1 of Table 9, Panel A, the results remain robust and positive for *CSR Transparency*. The interaction term *Post 2018 x EU* is statistically significant at the 1% level for the overall *CSR Transparency* score (coefficient = 0.214; t = 2.715). Breaking it down, the interaction remains significant at the 1% level for *CSR Report* (0.072; t = 2.663) and *OECD Report* (0.013; t = 4.024), and at the 5% level for *Reporting Scope* (0.066; t = 2.460) and *Assurance* (0.028; t = 2.311). The effect is not significant for *GRI Report* (0.042; t = 1.527). These findings align with the main analysis, reinforcing the positive link between the NFRD and CSR transparency.

Panel B of Table 9 highlights positive results for *CSR Performance* after excluding cross-listed firms. The interaction term *Post 2018 x EU* is statistically significant at the 1% level for overall *CSR Performance* (coefficient = 2.713; t = 3.252), environmental performance (coefficient = 2.611; t = 2.604), and social performance (coefficient = 2.814; t = 3.104). These results suggest a pronounced impact of the NFRD on CSR practices among U.S. firms with EU subsidiaries.

These results confirm that the NFRD exerts a substantial influence on the CSR performance and transparency of U.S. firms with EU subsidiaries, particularly those not subject to direct EU regulatory oversight via cross-listing.

[Insert Table 9 here]

4.6 Placebo test: the effect of U.S. multinational firms with non-EU subsidiaries

To examine whether multinational firms behave differently from purely domestic U.S. firms, we conduct a placebo test by separately comparing the regression results of U.S. multinational firms with EU subsidiaries and those with foreign non-EU subsidiaries against a common control group of U.S. firms with only domestic subsidiaries[23].

[23] In our main sample, firms with non-EU subsidiaries serve as part of the control group alongside domestic U.S. firms.

To isolate the intended effect, we exclude non-EU firm-year observations that include subsidiaries in European countries outside the EU, as these nations are known to have close economic and strategic agreements with the EU. Additionally, we include only observations that consistently fall within the defined treatment and control groups (EU, Non-EU, or US-only). This results in a sample of 5,525 firm-year observations for U.S. firms with EU subsidiaries (Table 10, column 1) and 863 firm-year observations for U.S. multinational firms with non-EU subsidiaries (Table 10, column 2).

In the CSR transparency model in Panel A of Table 10, the interaction term for Post 2018 x EU is positive and significant at the 5% level (0.245, t = 2.441), whereas the interaction term for Post 2018 x Non-EU is insignificant (0.105, t = 0.994). This indicates no measurable effect for U.S. firms with non-EU subsidiaries, yet substantial improvements in CSR transparency for U.S. firms with EU subsidiaries following the NFRD.

The results in Panel B of Table 10 are similar in the CSR performance model, the interaction term for Post 2018 x EU is positive and significant at the 1% level (3.013, t = 3.092), while the interaction term for Post 2018 x Non-EU is insignificant (0.335, t = 0.318).

These results confirm that improvements in CSR transparency and performance are specifically driven by exposure to the EU's regulatory environment under the NFRD, rather than broader global CSR trends or unrelated factors. Furthermore, they show that U.S. firms with EU subsidiaries have enhanced their CSR practices despite having a higher starting point mean in both CSR performance and transparency, which can make further improvements more challenging.

[Insert Table 10 here]

4.7 Validation using alternative data

We utilize MSCI ESG Ratings data to test the robustness of our results and apply it in the regression analysis following Equation 1. MSCI ESG Ratings consist of three pillars: Environment, Social, and Governance. These pillars are derived from 33 Key Issues, each corresponding to one of ten macro themes identified by MSCI as important to investors. Our focus is on the Environment and Social Pillars, which include the following eight themes: climate change, natural capital, pollution and waste, environmental opportunities, human capital, product liability, stakeholder opposition, and social opportunities. Both regressions include 8,507 observations.

Our findings indicate that the NFRD Directive has had a positive impact on environmental issues (*ENV Pillar*) for the treated firms. In column 1 Table 11 we can see that the interaction term between the post period and firms with EU subsidiaries (*Post 2018 x EU*) is statistically significant at 5% level, with a coefficient of 0.173 and a t-value of 2.159, suggesting a significant positive impact on their environmental performance.

In column 2, the interaction term between the post-period and EU subsidiaries (*Post 2018 x EU*) for the social pillar score (*SOC Pillar*) is not statistically significant, with a coefficient of 0.117 and a t-value of 1.12. This indicates that U.S. firms with EU subsidiaries did not experience a statistically significant change in their aggregated social pillar score after the implementation of the NFRD.

[Insert Table 11 here]

5. Characteristics of EU subsidiaries driving knowledge spillovers

To observe more factors affecting the regulatory spillover on U.S. multinationals, we run cross-sectional analyses to assess whether the effect is stronger under specific conditions. Using

the Orbis database, we analyze how the characteristics of EU subsidiaries shape the spillover effects of the NFRD on their parent firms' CSR outcomes. By constructing cross-sectional variables from the Orbis subsidiary data and integrating them into the parent firm dataset used in the main analysis, we obtain a data sample of 8,264 firm-year observations, with 776 firm-years excluded compared to the main analysis.

We predict that the regulatory spillover effect on U.S. firms is greater when EU subsidiaries with higher headquarter (or parent firm) attention are exposed to the CSR Directive. The adoption of CSR practices in these subsidiaries are expected to promote greater knowledge transfer and learning. We use three binary variables to indicate high levels (above the median) of the headquarter attention factors: the size of subsidiaries (*High LNTA*), the subsidiary-to-parent asset ratio (*High TA Ratio*), and operational similarity (*High Similarity*), which reflects the number of EU subsidiaries operating in the same industry as the parent company. We use a triple interaction approach (Equation 2) to test the effects of these cross-sectional variables.

Table 12, Panel A presents the results for subsidiary size (*High LNTA*). The interaction term *EU x Post 2018 x High LNTA* is significant for CSR transparency at the 1% level (0.217, t=3.690), indicating that U.S. firms with larger EU subsidiaries are associated with greater improvements in transparency after 2018. However, the same interaction term is not significant for CSR performance, suggesting that subsidiary size influences parent firms' CSR transparency more directly than performance outcomes.

Table 12, Panel B examines the subsidiary-to-parent asset ratio (*High TA Ratio*). The interaction term *EU x Post 2018 x High TA Ratio* is significant for CSR transparency at the 10% level and (0.102, t =1.723) and CSR performance at the 1% level (1.828, t =2.694). These results

suggest that U.S. firms with EU subsidiaries possessing a higher asset ratio relative to the parent company experience greater improvements in transparency and performance in the post period.

Table 12, Panel C explores operational similarity (*High Similarity*), which reflects the number of EU subsidiaries operating in the same industry as the parent company. The interaction term *EU x Post 2018 x High Similarity* is significant for CSR transparency at the 5% level (0.151, t=2.435) and CSR performance at the 1% level (2.102, t=2.998), indicating that U.S. firms with EU subsidiaries operating in the same industries experience a stronger effect of the CSR Directive in the post-period.

Overall, these results indicate that subsidiary size, asset ratio, and operational similarity amplify the NFRD impact on parent firms' CSR transparency and performance.

[Insert Table 12 here]

Continuing with our subsidiary analysis in Table 13, we conduct Principal Component Analysis (PCA)[24] using three binary variables from Table 12: the size of subsidiaries (*High LNTA*), the subsidiary-to-parent asset ratio *(High TA Ratio*), and operational similarity (*High Similarity*). This allows us to create an aggregate headquarter (or parent firm) attention variable (*HQ Attention*) derived from the principal component scores. To construct the *HQ Attention* variable, we used the first principal component (Component 1), which explains 74.07% of the total variance, as indicated by its Eigenvalue of 2.222. The loadings for Component 1 reveal that all three variables contribute positively, with loadings of 0.5923 for *High LNTA*, 0.5948 for *High TA Ratio*, and 0.5435 for *High Similarity*. Scaling is performed to ensure that the PCA variable reflects the standardized contributions of these factors, with Component 1 being a linear combination of the variables weighted by their eigenvector coefficients.

[24] Summing the three headquarter attention factor variables instead of using PCA yields similar regression results.

We test the moderating effect of *HQ Attention* on the impact of the NFRD implementation on U.S. firms with EU subsidiaries using the same triple interaction approach (Equation 2). Table 13 presents the results. The interaction term *EU x Post 2018 x HQ Attention* is significant at 1% level for both CSR transparency (0.061, t = 3.161) and CSR performance (0.605, t = 2.652). These findings suggest that higher *HQ Attention* amplifies the positive spillover effects of the NFRD on CSR outcomes for U.S. parent firms.

[Insert Table 13 here]

6. Conclusion

Our study explores the regulatory spillover effects of the EU's Non-Financial Reporting Directive (NFRD) on U.S. multinational corporations with subsidiaries in the EU. We find robust evidence that U.S. firms with EU subsidiaries significantly improved both their CSR transparency and performance following the implementation of the NFRD. These improvements were particularly pronounced for firms with greater exposure to the EU market, as measured by the number of their subsidiaries. Moreover, firms with lower prior CSR engagement showed relatively greater gains, indicating that the NFRD prompted firms with more room for improvement to adopt meaningful sustainability practices. Our cross-sectional analyses further reveal that characteristics such as subsidiary size, asset ratio, and industry alignment amplify the spillover effects, demonstrating the role of strategically significant subsidiaries in facilitating knowledge transfer.

Our contributions to the literature are threefold. First, we extend the understanding of CSR disclosure mandates by providing novel evidence of their real effects. While Cascino et al. (2024) examine how multinational business groups may engage in regulatory arbitrage by shifting irresponsible ESG practices to subsidiaries in countries with weaker enforcement, our study takes a different angle. We explore how CSR practices from highly regulated environments, such as the

EU, are absorbed by multinational parent firms. Second, we contribute to the literature on knowledge transfer within MNCs by showing how strategically significant subsidiaries serve as conduits for regulatory-driven knowledge, enabling parent firms to adapt their sustainability strategies to evolving stakeholder expectations and market demands. Third, we highlight cross-jurisdictional regulatory spillovers, showing that CSR disclosure mandates do not operate in isolation but have far-reaching effects. Through internal organizational mechanisms, particularly parent-subsidiary relationships, sustainability practices diffuse across borders, influencing firms in less-regulated markets.

These findings carry important implications for policymakers and practitioners. From a policy perspective, our results highlight the effects of sustainability regulations like the NFRD, even beyond their immediate jurisdiction. As the EU transitions to the stricter Corporate Sustainability Reporting Directive (CSRD), understanding these dynamics becomes crucial for anticipating global regulatory impacts. By fostering knowledge transfer and aligning with global sustainability standards, firms can not only mitigate reputational risks but also gain a competitive edge in increasingly sustainability-conscious markets (drawing on Chen et al., 2023).

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APPENDIX

Definition of variables

Variable name	Definition	Source
Dependent variable		
CSR Performance (Score)	CSR score based on LSEG social score (soscore) and environmental score (enscore)	Constructed based on LSEG
ENV Performance	Environmental Score (enscore)	LSEG
SOC Performance	Social Score (soscore)	LSEG
CSR Transparency (Score)	CSR transparency score assigning a score of 1 for each of the following LSEG categories: CSR report available (cgvsdp026), CSR report covers global activities (cgvsdp029), GRI report (cgvsdp028) or OECD report (socodp013) available, and CSR report is audited (cgvsdp030). The score ranges from 0, indicating low levels of CSR reporting, to 4, representing high levels of CSR reporting.	Constructed based on LSEG
CSR Report	Indicates (1/0) whether CSR report is published (cgvsdp026)	LSEG
GRI	Indicates (1/0) whether CSR report is compliant with GRI reporting guidelines (cgvsdp028)	LSEG
OECD	Indicates (1/0) whether CSR report is compliant with OECD reporting guidelines for multinational enterprises (socodp013)	LSEG
Reporting Scope	Indicates (1/0) whether CSR report covers global activities (cgvsdp029)	LSEG
Assurance	Indicates (1/0) whether CSR report is audited (cgvsdp030)	LSEG
ENV Pillar (Score)	ENV Pillar Score is the annual average of the monthly Environmental Pillar Scores provided by MSCI.	MSCI
SOC Pillar (Score)	SOC Pillar Score is the annual average of the monthly Social Pillar Scores provided by MSCI.	MSCI
Independent variable		
EU	Indicates (1/0) whether U.S. firm has EU subsidiaries.	Compustat
Post	Indicator that equals one for the period after NFRD implementation (2018-2020) and zero otherwise.	
Cross sectional variable		
High Exposure	Indicates (1/0) whether the number of EU subsidiaries are above median	Compustat
Prior CSR	2015 CSR score based on LSEG social score (soscore) and environmental score (enscore)	Constructed based on LSEG
High LNTA	Indicates (1/0) whether the size of EU subsidiaries are above median (log of total assets)	Orbis
High TA Ratio	Indicates (1/0) whether the EU subsidiary-to-parent asset ratio is above median	Orbis and Compustat

High Similarity	Indicates (1/0) whether the number of EU subsidiaries in same industry as parent is above median based on the two-digit NAICS code.	Orbis and Compustat
HQ Attention	Aggregated headquarter attention variable constructed using High LNTA, High TA Ratio, and High Similarity through Component Principal Analysis	Orbis and Compustat
Firm characteristics		
LN(TA)	Log of fiscal year's total assets	Compustat
LEV	Total liability to total assets	Compustat
CFO	Cash from operations (Operating Activities - Net Cash Flow) to total assets	Compustat
ATO	Net sales divided by total assets	Compustat
DPS	Dividends per share divided by earnings per share	Compustat
PPE	Net property, plant & equipment divided by total assets	Compustat
LN(TQ)	Log of market value calculated by: (total assets + (common shares outstanding * prcc_f) – common / ordinary equity) divided by total assets	Compustat
ROA	Net income divided by total assets	Compustat
LN(EMP)	Log of number of employees	Compustat
LN(AF)	Log of number financial analyst following a firm	I/B/E/S

TABLE 1 – Sample description

Panel A: Sample selection

Compustat data for U.S. firms, 2015-2020	62,934
After cleaning and removing observations without subsidiary data	19,548
After removing observations with missing values	10,406
After removing inconsistencies in the EU indicator	9,040

Panel B: Sample distribution per year

	2015	**2016**	**2017**	**2018**	**2019**	**2020**	**Total**
Treated U.S. firms	702	901	974	1,029	974	945	5,525
Control U.S. firms	329	514	626	675	712	659	3,515

Panel C: Sample distribution per industry

	Treated U.S. Firms		Control U.S. Firms	
	Firm-Years	Percentage (%)	Firm-Years	Percentage (%)
(1) Consumer Non-Durables	296	5.36	81	2.30
(2) Consumer Durables	206	3.73	27	0.77
(3) Manufacturing	839	15.19	165	4.69
(4) Oil, Gas, and Coal Extraction (Energy)	118	2.14	239	6.80
(5) Chemicals and Allied Products	285	5.16	20	0.57
(6) Computers, Software, and Electronic Equipment	1,374	24.87	138	3.93
(7) Telephone and Television Transmission	91	1.65	67	1.91
(8) Utilities	32	0.58	289	8.22
(9) Wholesale, Retail, and Some Services	460	8.33	459	13.06
(10) Healthcare, Medical Equipment, Drugs	690	12.49	286	8.14
(11) Finance	535	9.68	1,180	33.57
(12) Other (e.g., Hotels, Entertainment)	599	10.84	564	16.05
Total	**5,525**	**100.00**	**3,515**	**100.00**

TABLE 2 – Descriptive statistics

Panel A: CSR statistics

	Treated U.S. Firms (N = 5,525)			Control U.S. Firms (N = 3,515)		
	Mean	Mdn	S.D.	Mean	Mdn	S.D.
CSR Performance						
CSR Performance	39.76	35.46	23.22	26.45	20.39	18.32
ENV Performance	31.11	24.81	28.67	17.60	6.84	22.73
SOC Performance	48.42	46.72	21.23	35.31	32.01	17.40
CSR Transparency						
CSR Transparency	1.19	0.00	1.50	0.60	0.00	1.16
CSR Report	0.42	0.00	0.49	0.23	0.00	0.42
Report Scope	0.39	0.00	0.49	0.22	0.00	0.42
GRI Report	0.25	0.00	0.43	0.11	0.00	0.31
OECD Report	0.02	0.00	0.15	0.00	0.00	0.05
Assurance	0.13	0.00	0.33	0.04	0.00	0.20

Panel B: CSR statistics for pre period

	Treated U.S. Firms (N =2,577)			Control U.S. Firms (N = 1,469)		
	Mean	Mdn	S.D.	Mean	Mdn	S.D.
CSR Performance						
CSR Performance	37.62	32.41	22.81	26.14	21.11	17.64
ENV Performance	29.27	22.12	28.20	18.18	11.85	21.94
SOC Performance	45.97	44.16	20.93	34.10	31.11	16.84
CSR Transparency						
CSR Transparency	1.00	0.00	1.45	0.49	0.00	1.10
CSR Report	0.35	0.00	0.48	0.18	0.00	0.38
Report Scope	0.33	0.00	0.47	0.18	0.00	0.38
GRI Report	0.22	0.00	0.42	0.10	0.00	0.30
OECD Report	0.02	0.00	0.13	0.00	0.00	0.04
Assurance	0.10	0.00	0.31	0.03	0.00	0.18

TABLE 2 – Descriptive statistics (Continued)

Panel C: CSR statistics for post period

	Treated U.S. Firms (N = 2,948)			Control U.S. Firms (N =2,046)		
	Mean	Mdn	S.D.	Mean	Mdn	S.D.
CSR Performance						
CSR Performance	41.64	37.81	23.42	26.68	19.75	18.80
ENV Performance	32.72	28.26	28.99	17.18	4.81	23.27
SOC Performance	50.55	48.85	21.27	36.18	32.90	17.74
CSR Transparency						
CSR Transparency	1.34	0.00	1.52	0.68	0.00	1.20
CSR Report	0.47	0.00	0.50	0.26	0.00	0.44
Report Scope	0.45	0.00	0.50	0.26	0.00	0.44
GRI Report	0.27	0.00	0.44	0.12	0.00	0.32
OECD Report	0.03	0.00	0.17	0.00	0.00	0.05
Assurance	0.14	0.00	0.35	0.05	0.00	0.21

Panel D: Firm characteristics without entropy balancing

	Treated U.S. Firms (N = 5,525)			Control U.S. Firms (N = 3,515)		
	Mean	Mdn	S.D.	Mean	Mdn	S.D.
Firm Characteristics						
ROA	0.02	0.04	0.16	0.00	0.02	0.18
LN(TA)	22.00	21.85	1.74	21.80	21.81	1.68
LEV	0.61	0.60	0.26	0.66	0.69	0.26
CFO	0.08	0.09	0.13	0.05	0.06	0.16
ATO	0.82	0.69	0.58	0.67	0.37	0.76
DPS	0.24	0.00	0.69	0.27	0.11	0.67
PPE	0.18	0.12	0.17	0.28	0.12	0.30
LN(TQ)	0.72	0.61	0.59	0.40	0.23	0.51
LN(EMP)	1.87	1.96	1.68	0.74	0.71	1.85
LN(AF)	2.25	2.30	0.80	1.92	1.95	0.85

Panel E: Firm characteristics with entropy balancing

	Treated U.S. Firms (N = 5,525)			Control U.S. Firms (N = 3,515)		
	Mean	Mdn	S.D.	Mean	Mdn	S.D.
Firm Characteristics						
ROA	0.02	0.04	0.16	0.02	0.05	0.15
LN(TA)	22.00	21.85	1.74	22.02	21.81	1.74
LEV	0.61	0.60	0.26	0.61	0.61	0.26
CFO	0.08	0.09	0.13	0.08	0.09	0.13

ATO	0.82	0.69	0.58	0.81	0.75	0.58
DPS	0.24	0.00	0.69	0.25	0.09	0.69
PPE	0.18	0.12	0.17	0.18	0.13	0.17
LN(TQ)	0.72	0.61	0.59	0.72	0.64	0.58
LN(EMP)	1.87	1.96	1.68	1.86	1.77	1.67
LN(AF)	2.25	2.30	0.80	2.26	2.40	0.80

TABLE 3 – Correlation coefficients among firm-level variables (N = 9,040 firm-years)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
1 EU	1																
2 ENSCORE	0.241***	1															
3 SOSCORE	0.307***	0.727***	1														
4 REPORT	0.194***	0.758***	0.630***	1													
5 SCOPE	0.176***	0.729***	0.604***	0.965***	1												
6 GRI	0.170***	0.662***	0.572***	0.681***	0.647***	1											
7 OECD	0.086***	0.152***	0.201***	0.123***	0.121***	0.150***	1										
8 ASSUR.	0.142***	0.506***	0.451***	0.441***	0.439***	0.529***	0.142***	1									
9 ROA	0.055***	0.198***	0.119***	0.142***	0.138***	0.103***	0.034**	0.086***	1								
10 LN(TA)	0.057***	0.582***	0.508***	0.502***	0.491***	0.439***	0.101***	0.385***	0.298***	1							
11 LEV	-0.107***	0.110***	0.107***	0.089***	0.080***	0.095***	0.007	0.093***	-0.050***	0.320***	1						
12 CFO	0.091***	0.190***	0.107***	0.146***	0.146***	0.104**	0.035***	0.076***	0.770***	0.207***	-0.057***	1					
13 ATO	0.106***	0.027*	-0.025*	-0.012	-0.010	-0.029**	-0.003	-0.043***	0.215***	-0.213***	-0.066***	0.293***	1				
14 DPS	-0.022*	0.123***	0.094***	0.095***	0.084***	0.100***	0.025*	0.073***	0.110***	0.132***	0.091***	0.080***	-0.019	1			
15 PPE	-0.190***	0.197***	-0.001	0.187***	0.189***	0.151***	0.008	0.053***	0.014	0.077***	-0.009	0.170***	0.078***	0.010	1		
16 LN(TQ)	0.264***	-0.003	0.117***	-0.011	-0.010	-0.002	0.011	0.036***	0.003	-0.294***	-0.147***	0.077***	0.154***	0.003	-0.142***	1	
17 LN(EMP)	0.299***	0.563***	0.496***	0.441***	0.427***	0.375***	0.104***	0.312***	0.360***	0.647***	0.180***	0.358***	0.325***	0.055***	0.129***	-0.042***	1
18 LN(AF)	0.191***	0.464***	0.462***	0.394***	0.389***	0.350***	0.076***	0.284***	0.136***	0.585***	0.058***	0.184***	-0.035***	0.033**	0.111***	0.181***	0.502***

Table 3 presents the Pearson correlation coefficients between various variables. The variable EU serves as the independent indicator for EU subsidiaries. Variables 2-8 represent the outcome variables for CSR transparency and performance. The control variables include LN(TA) (firm size), LEV (leverage), CFO (cash flow from operations), ATO (asset turnover), DPS (dividends per share), PPE (asset structure), LN(TQ) (growth opportunities), ROA (operating profitability), LN(EMP) (number of employees), LN(AF) (analyst following/recommendations), and EXCH (an indicator for EU cross-listing). These covariates along with industry membership (using Fama–French 12 industry groups) are used as matching parameters for entropy balancing. The reported correlations are weighted accordingly.

TABLE 4 – Effect of the CSR Directive on firms' CSR transparency

Panel A: Aggregated CSR Transparency Score		
	(1)	(2)
	CSR Transparency	CSR Transparency
Post 2018 x EU	0.257***	0.257***
	(3.228)	(3.251)
Control variables	Included	Included
Firm FE	Included	Included
Year FE	Included	Not included
Industry Year FE	Not included	Included
Entropy balanced	Yes	Yes
N	9040	9040
adj. R^2	0.787	0.790

Panel B: Components of CSR Transparency Score					
	(1)	(2)	(3)	(4)	(5)
	CSR Report	Reporting Scope	GRI Report	OECD Report	Assurance
Post 2018 x EU	0.087***	0.083***	0.045*	0.015***	0.037***
	(3.181)	(3.025)	(1.658)	(4.584)	(2.878)
Control variables	Included	Included	Included	Included	Included
Firm FE	Included	Included	Included	Included	Included
Year FE	Included	Included	Included	Included	Included
Industry Year FE	Not included	Not included	Not included	Not included	Not included
Entropy balanced	Yes	Yes	Yes	Yes	Yes
N	9040	9040	9040	9040	9040
adj. R^2	0.701	0.686	0.730	0.708	0.797

This table reports results from estimating the difference-in-difference model (Eq. 1) with CSR Transparency Score and its components, including, CSR report (firms that prepared a CSR report), reporting scope (CSR report with a global reporting scope), GRI report, OECD report, and assurance as the dependent variables. POST period indicates the years between 2018 and 2020. Control variables comprise LN(TA) (firm size), LEV (leverage), CFO (cash from operations), ATO (asset turnover), DPS (Dividends per share), PPE (asset structure), LN(TQ) (growth opportunities), ROA (operating profitability), LN(EMP) (number of employees), LN(AF) (analysts following/recommendations). These covariates along with industry membership (Fama–French 12 industry groups) are used as matching parameters for Entropy balancing. The t-values, reported below coefficients, are based on robust standard errors clustered at the firm level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

TABLE 5 – Effect of the CSR Directive on firms' CSR performance

Panel A: Aggregated CSR Performance Score		
	(1)	(2)
	CSR Performance	CSR Performance
Post 2018 x EU	2.559***	2.423***
	(2.974)	(2.821)
Control variables	Included	Included
Firm FE	Included	Included
Year FE	Included	Not included
Industry Year FE	Not included	Included
Entropy balanced	Yes	Yes
N	9040	9040
adj. R^2	0.915	0.918
Panel B: Components of CSR Performance		
	(1)	(2)
	ENV Performance	SOC Performance
Post 2018 x EU	2.685***	2.433**
	(2.730)	(2.552)
Control variables	Included	Included
Firm FE	Included	Included
Year FE	Included	Included
Industry Year FE	Not included	Not included
Entropy balanced	Yes	Yes
N	9040	9040
adj. R^2	0.908	0.880

This table reports results from estimating the difference-in-difference model (Eq. 1) with CSR Performance Score and its components including Environmental Performance, and Social Performance as the dependent variables. POST period indicates the years between 2018 and 2020. Control variables comprise LN(TA) (firm size), LEV (leverage), CFO (cash from operations), ATO (asset turnover), DPS (Dividends per share), PPE (asset structure), LN(TQ) (growth opportunities), ROA (operating profitability), LN(EMP) (number of employees), LN(AF) (analysts following/recommendations). These covariates along with industry membership (Fama–French 12 industry groups) are used as matching parameters for Entropy balancing. The t-values, reported below coefficients, are based on robust standard errors clustered at the firm level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

TABLE 6 – Impact of high exposure level on firms' CSR Transparency

	(1) CSR Transparency	(2) CSR Report	(3) Reporting Scope	(4) GRI Report	(5) OECD Report	(6) Assurance
EU x Post 2018 x High Exposure	0.142**	0.040*	0.035*	0.045**	0.012*	0.017
	(2.562)	(1.913)	(1.646)	(2.552)	(1.858)	(1.113)
EU x Post 2018	0.174**	0.062**	0.062**	0.019	0.009**	0.029**
	(2.110)	(2.177)	(2.127)	(0.677)	(2.536)	(1.979)
High Exposure	0.024	0.021	0.015	0.002	-0.002	-0.015
	(0.371)	(0.868)	(0.576)	(0.097)	(-0.254)	(-0.912)
Control variables	Included	Included	Included	Included	Included	Included
Firm FE	Included	Included	Included	Included	Included	Included
Year FE	Included	Included	Included	Included	Included	Included
Entropy balanced	Yes	Yes	Yes	Yes	Yes	Yes
N	9040	9040	9040	9040	9040	9040
adj. R^2	0.788	0.701	0.686	0.731	0.708	0.797

This table reports results from estimating the difference-in-difference model (Eq. 2) with CSR Transparency Score and its components, including, CSR report (firms that prepared a CSR report), reporting scope (CSR report with a global reporting scope), GRI report, OECD report, and assurance as the dependent variables. The High Exposure indicator variable identifies U.S. firms with EU subsidiaries where the number of such subsidiaries is greater than the median. POST period indicates the years between 2018 and 2020. Control variables comprise LN(TA) (firm size), LEV (leverage), CFO (cash from operations), ATO (asset turnover), DPS (Dividends per share), PPE (asset structure), LN(TQ) (growth opportunities), ROA (operating profitability), LN(EMP) (number of employees), LN(AF) (analysts following/recommendations). These covariates along with industry membership (Fama–French 12 industry groups) are used as matching parameters for Entropy balancing. The t-values, reported below coefficients, are based on robust standard errors clustered at the firm level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

TABLE 7 – Impact of high exposure level on firms' CSR Performance

	(1) CSR Performance	(2) ENV Performance	(3) SOC Performance
EU x Post 2018 x High Exposure	2.017***	3.588***	0.446
	(3.254)	(4.334)	(0.697)
EU x Post 2018	1.341	0.577	2.104**
	(1.493)	(0.553)	(2.109)
High Exposure	1.077	0.859	1.295*
	(1.596)	(0.996)	(1.731)
Control variables	Included	Included	Included
Firm FE	Included	Included	Included
Year FE	Included	Included	Included
Entropy balanced	Yes	Yes	Yes
N	9040	9040	9040
adj. R^2	0.916	0.908	0.880

This table reports results from estimating the difference-in-difference model (Eq. 2) with CSR Performance Score and its components, including Environmental Performance, and Social Performance as the dependent variables. The High Exposure indicator variable identifies U.S. firms with EU subsidiaries where the number of such subsidiaries is greater than the median. POST period indicates the years between 2018 and 2020. Control variables comprise LN(TA) (firm size), LEV (leverage), CFO (cash from operations), ATO (asset turnover), DPS (Dividends per share), PPE (asset structure), LN(TQ) (growth opportunities), ROA (operating profitability), LN(EMP) (number of employees), LN(AF) (analysts following/recommendations). These covariates along with industry membership (Fama–French 12 industry groups) are used as matching parameters for Entropy balancing. The t-values, reported below coefficients, are based on robust standard errors clustered at the firm level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

TABLE 8 – Effect of the CSR Directive and prior CSR engagement (2015)

	(1) CSR Transparency	(2) CSR Performance
EU x Post 2018 x Prior CSR	-0.006***	-0.173***
	(-4.660)	(-12.814)
EU x Post 2018	0.622***	9.420***
	(5.041)	(6.961)
Control variables	Included	Included
Firm FE	Included	Included
Year FE	Included	Included
Entropy balanced	Yes	Yes
N	5,797	5,797
adj. R^2	0.799	0.925

This table reports results from estimating the difference-in-difference model (Eq. 3) with CSR Transparency Score and CSR Performance as outcome variables. Prior CSR is a continuous variable indicating the year 2015 CSR Performance score. POST period indicates the years between 2018 and 2020. Control variables comprise LN(TA) (firm size), LEV (leverage), CFO (cash from operations), ATO (asset turnover), DPS (Dividends per share), PPE (asset structure), LN(TQ) (growth opportunities), ROA (operating profitability), LN(EMP) (number of employees), LN(AF) (analysts following/recommendations). These covariates along with industry membership (Fama–French 12 industry groups) are used as matching parameters for Entropy balancing. The t-values, reported below coefficients, are based on robust standard errors clustered at the firm level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

TABLE 9 – Effect of the CSR Directive excluding U.S. firms cross-listed in the EU

Panel A: CSR Transparency

	(1) CSR Transparency	(2) CSR Report	(3) Reporting Scope	(4) GRI Report	(5) OECD Report	(6) Assurance
Post 2018 x EU	0.214***	0.072***	0.066**	0.042	0.013***	0.028**
	(2.715)	(2.663)	(2.460)	(1.527)	(4.024)	(2.311)
Control variables	Included	Included	Included	Included	Included	Included
Firm fixed effects	Included	Included	Included	Included	Included	Included
Year fixed effects	Included	Included	Included	Included	Included	Included
Entropy balanced	Yes	Yes	Yes	Yes	Yes	Yes
N	8414	8414	8414	8414	8414	8414
adj. R^2	0.767	0.687	0.672	0.704	0.707	0.784

Panel B: CSR Performance

	(1) CSR Performance	(2) ENV Performance	(3) SOC Performance
Post 2018 x EU	2.713***	2.611***	2.814***
	(3.252)	(2.604)	(3.104)
Control variables	Included	Included	Included
Firm fixed effects	Included	Included	Included
Year fixed effects	Included	Included	Included
Entropy balanced	Yes	Yes	Yes
N	8414	8414	8414
adj. R^2	0.903	0.894	0.866

This table reports the results from estimating the difference-in-difference model (Eq. 1) after excluding firms cross-listed on EU exchanges. Panel A reports the CSR Transparency Score and its components, while Panel B focuses on CSR Performance and the respective components. Control variables comprise LN(TA) (firm size), LEV (leverage), CFO (cash from operations), ATO (asset turnover), DPS (Dividends per share), PPE (asset structure), LN(TQ) (growth opportunities), ROA (operating profitability), LN(EMP) (number of employees), LN(AF) (analysts following/recommendations). These covariates along with industry membership (Fama–French 12 industry groups) are used as matching parameters for Entropy balancing. The t-values, reported below coefficients, are based on robust standard errors clustered at the firm level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

TABLE 10 – Comparison of U.S. multinational firms with EU and non-EU subsidiaries

Panel A: Comparison of CSR Transparency		
Outcome variable	CSR Transparency	
	(1)	(2)
	EU	Non-EU
Post 2018 x EU	0.245**	
	(2.441)	
Post 2018 x Non-EU		0.105
		(0.994)
LNTA_ACT	0.032	0.136
	(0.196)	(0.739)
LEV	-0.390**	-0.402*
	(-2.364)	(-1.867)
PPE	-0.418	0.243
	(-0.602)	(0.472)
ROA	-0.330	-0.292
	(-1.123)	(-1.423)
LNTQ	-0.029	-0.087
	(-0.306)	(-0.923)
ATO	-0.071	0.115
	(-0.343)	(0.708)
LNEMP	0.061	0.170
	(0.500)	(1.331)
CFO	0.196	-0.027
	(0.445)	(-0.106)
DPS	-0.007	0.055
	(-0.240)	(1.461)
LNAF	-0.052	0.010
	(-0.653)	(0.145)
Control variables	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
Entropy balanced	Yes	Yes
N	7771	3109
adj. R^2	0.811	0.713

This Panel of Table 10 presents the results of a comparison of CSR Transparency between U.S. multinational corporations (MNCs) with EU subsidiaries and those with non-EU international subsidiaries. The difference-in-difference model is based on Equation 1. The control group consists of U.S. firms with only domestic subsidiaries. The models include control variables. These covariates along with industry membership (Fama–French 12 industry groups) are used as matching parameters for Entropy balancing. The t-values, reported below the coefficients, are based on robust standard errors clustered at the firm level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

In Column 1, the sample consists of 5525 firm-year observations for U.S. firms with EU subsidiaries. In Column 2, the sample for U.S. firms with non-EU subsidiaries includes 863 observations. Only observations that consistently fall within the defined treatment and control groups (EU, Non-EU, or US-only) are included.

For the non-EU group, we excluded firms with subsidiaries in European countries that are not part of the EU but may maintain close economic and non-economic ties, agreements and strategic partnerships with it. The mean CSR Transparency score for U.S. firms with EU subsidiaries is 1.19, while MNCs with non-EU subsidiaries is 0.75. In comparison, U.S. firms with domestic subsidiaries have a lower mean score of 0.56.

TABLE 10 – Comparison of U.S. multinational firms with EU and non-EU subsidiaries (continued)

Panel B: Comparison of CSR Performance		
Outcome variable	CSR Performance	
	(1)	(2)
	EU	Non-EU
Post 2018 x EU	3.013***	
	(3.092)	
Post 2018 x Non-EU		0.335
		(0.318)
LNTA_ACT	-0.863	0.502
	(-0.503)	(0.221)
LEV	-1.588	-2.060
	(-0.885)	(-0.890)
PPE	-2.410	-6.700
	(-0.367)	(-0.929)
ROA	0.593	0.313
	(0.200)	(0.141)
LNTQ	-0.042	1.016
	(-0.040)	(0.978)
ATO	-1.813	-1.178
	(-0.972)	(-0.648)
LNEMP	2.110**	3.161**
	(1.976)	(2.474)
CFO	-2.641	-1.693
	(-0.617)	(-0.566)
DPS	-0.292	0.134
	(-1.203)	(0.349)
LNAF	-0.379	0.310
	(-0.451)	(0.381)
Control variables	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
Entropy balanced	Yes	Yes
N	7771	3109
adj. R^2	0.921	0.879

This Panel of Table 10 presents the results of a comparison of CSR Performance between U.S. multinational corporations (MNCs) with EU subsidiaries and those with non-EU international subsidiaries. The difference-in-difference model is based on Equation 1. The control group consists of U.S. firms with only domestic subsidiaries. All models include control variables. These covariates along with industry membership (Fama–French 12 industry groups) are used as matching parameters for Entropy balancing. The t-values, reported below the coefficients, are based on robust standard errors clustered at the firm level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

In Column 1, the sample consists of 5,525 observations for U.S. firms with EU subsidiaries. In Column 2, the sample for U.S. firms with non-EU subsidiaries includes 863 observations. Only observations that consistently fall within the defined treatment and control groups (EU, Non-EU, or US-only) are included.

For the non-EU group, we excluded firms with subsidiaries in European countries that are not part of the EU but may maintain close economic and non-economic ties with the EU, such as economic agreements and strategic partnerships.

The mean CSR Performance score for MNCs with non-EU subsidiaries is 29.17. In comparison, U.S. firms with domestic subsidiaries have a lower mean score of 25.5, while U.S. firms with EU subsidiaries exhibit a significantly higher mean of 39.76.

TABLE 11 – Robustness: MSCI Environmental and Social Pillar Scores

	(1) ENV Pillar	(2) SOC Pillar
Post 2018 x EU	0.173**	0.117
	(2.159)	(1.122)
Control variables	Included	Included
Firm FE	Included	Included
Year FE	Included	Included
Entropy balanced	Yes	Yes
N	8507	8507
adj. R^2	0.889	0.807

This table reports results from estimating the difference-in-difference model (Eq. 1) with outcome variables *ENV Pillar* and *SOC Pillar* derived from MSCI. POST period indicates the years between 2018 and 2020. Control variables comprise LN(TA) (firm size), LEV (leverage), CFO (cash from operations), ATO (asset turnover), DPS (Dividends per share), PPE (asset structure), LN(TQ) (growth opportunities), ROA (operating profitability), LN(EMP) (number of employees), LN(AF) (analysts following/recommendations). These covariates along with industry membership (Fama–French 12 industry groups) are used as matching parameters for Entropy balancing. The t-values, reported below coefficients, are based on robust standard errors clustered at the firm level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

TABLE 12 – Effect of the CSR Directive: subsidiary factors

Panel A: Size of subsidiaries (Log of total EU subsidiary assets)		
	(1)	(2)
	CSR Transparency	CSR Performance
EU x Post 2018 x High LNTA	0.217***	0.760
	(3.690)	(1.088)
Post 2018 x EU	0.177**	2.411**
	(2.042)	(2.420)
High LNTA	-0.121	1.441*
	(-1.593)	(1.782)
Control variables	Included	Included
Firm FE	Included	Included
Year FE	Included	Included
Entropy balanced	Yes	Yes
N	8,264	8,264
adj. R^2	0.788	0.918
Panel B: Subsidiary-to-parent asset ratio		
	(1)	(2)
	CSR Transparency	CSR Performance
EU x Post 2018 x High TA Ratio	0.102*	1.828***
	(1.723)	(2.694)
Post 2018 x EU	0.241***	2.006**
	(2.723)	(2.007)
High TA Ratio	-0.070	-2.110***
	(-0.866)	(-2.739)
Control variables	Included	Included
Firm FE	Included	Included
Year FE	Included	Included
Entropy balanced	Yes	Yes
N	8,264	8,264
adj. R^2	0.788	0.918
Panel C: Number of subsidiaries with operational similarity (same industry with parent)		
	(1)	(2)
	CSR Transparency	CSR Performance
EU x Post 2018 x High Similarity	0.151**	2.102***
	(2.435)	(2.998)
Post 2018 x EU	0.226***	2.053**
	(2.580)	(2.091)
High Similarity	0.129	-0.284
	(1.380)	(-0.283)
Control variables	Included	Included
Firm FE	Included	Included
Year FE	Included	Included
Entropy balanced	Yes	Yes
N	8,264	8,264
adj. R^2	0.788	0.918

The description of Table 12 appears under Table 13.

TABLE 13 – Effect of the CSR Directive: headquarter attention

	(1) CSR Transparency	(2) CSR Performance
EU x Post 2018 x HQ Attention	0.061***	0.605***
	(3.161)	(2.652)
Post 2018 x EU	0.238***	2.381**
	(2.813)	(2.493)
HQ Attention	-0.025	-0.220
	(-0.577)	(-0.502)
Control variables	Included	Included
Firm FE	Included	Included
Year FE	Included	Included
Entropy balanced	Yes	Yes
N	8,264	8,264
adj. R^2	0.788	0.918

For Tables 12 and 13, the t-values reported below the coefficients are based on robust standard errors clustered at the firm level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 12 on the previous page presents the results from estimating the difference-in-difference model (Eq. 2) with CSR Transparency and CSR Performance as dependent variables. The POST period refers to the years between 2018 and 2020. The analysis focuses on three factors: the size of subsidiaries (Log of Total EU Subsidiary Assets), the subsidiary-to-parent asset ratio, and the number of subsidiaries with operational similarity (same industry as the parent). Control variables include LN(TA) (firm size), LEV (leverage), CFO (cash from operations), ATO (asset turnover), DPS (dividends per share), PPE (asset structure), LN(TQ) (growth opportunities), ROA (operating profitability), LN(EMP) (number of employees), and LN(AF) (analysts following/recommendations). These covariates along with industry membership (Fama–French 12 industry groups) are used as matching parameters for Entropy balancing.

Table 13 on this page presents the results from estimating the difference-in-differences model (Eq. 2) using CSR Transparency Score and CSR Performance as the outcome variables. The *HQ Attention* variable is constructed using Principal Component Analysis (PCA) based on the principal component scores. The components used in the PCA are listed in Table 9: High LNTA, High TA Ratio, and High Similarity. POST period indicates the years between 2018 and 2020. Control variables comprise LN(TA) (firm size), LEV (leverage), CFO (cash from operations), ATO (asset turnover), DPS (Dividends per share), PPE (asset structure), LN(TQ) (growth opportunities), ROA (operating profitability), LN(EMP) (number of employees), LN(AF) (analysts following). Apart from LN(AF). These covariates along with industry membership (Fama–French 12 industry groups) are used as matching parameters for Entropy balancing.

To construct the *HQ Attention* variable, we used the first principal component (Component 1), which explains 74.07% of the total variance, as indicated by its Eigenvalue of 2.222. The loadings for Component 1 reveal that all three variables— the size of subsidiaries (High LNTA), the subsidiary-to-parent asset ratio (High TA Ratio), and operational similarity (High Similarity) — contribute positively, with loadings of 0.5923, 0.5948, and 0.5435, respectively. Scaling is performed to ensure that the PCA variable reflects the standardized contributions of these factors, with Component 1 being a linear combination of the variables weighted by their eigenvector coefficients.

FIGURE 1 – CSR Transparency: treatment effects over time

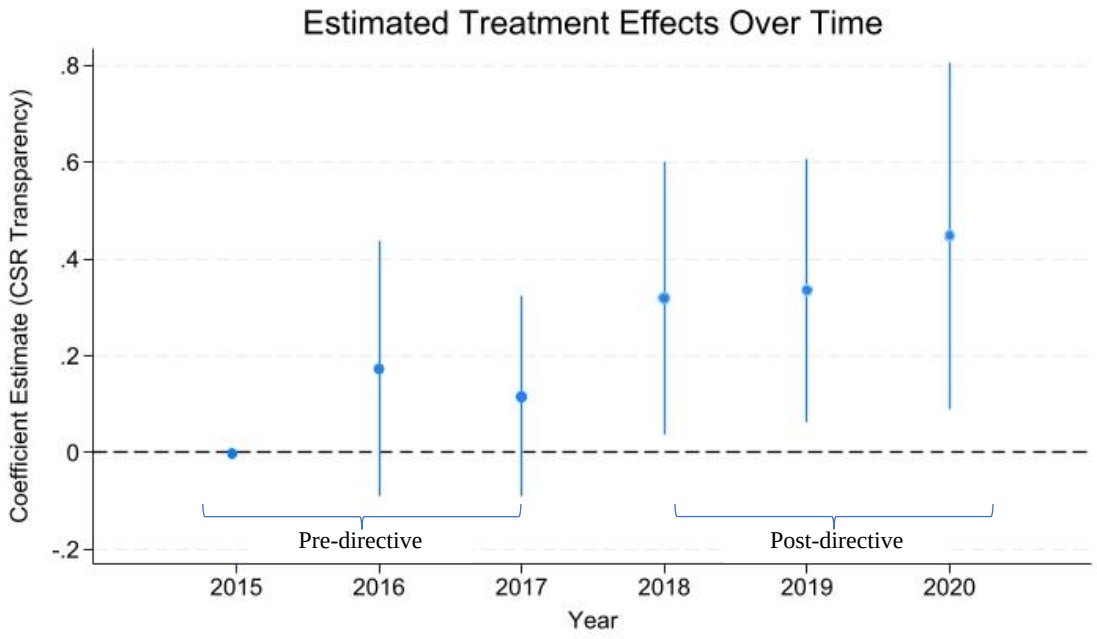

Figure 1 plots yearly treatment effects with 95% confidence intervals for total *CSR Transparency* as the outcome variable based on the regression model 1. The indicator 2015 × EU is omitted, with 2015 serving as the benchmark year. Treatment effects for the years 2018 to 2020 are statistically significant, while effects for earlier years are not.

FIGURE 2 – Impact of treatment on CSR Transparency over time

Figure 2 shows the fitted values for *CSR Transparency* over time for treated and control firms from 2015 to 2020. The year 2015 is the benchmark year. Treatment effects for the years 2018 to 2020 are statistically significant, while effects for earlier years are not.

FIGURE 3 – CSR Performance: treatment effects over time

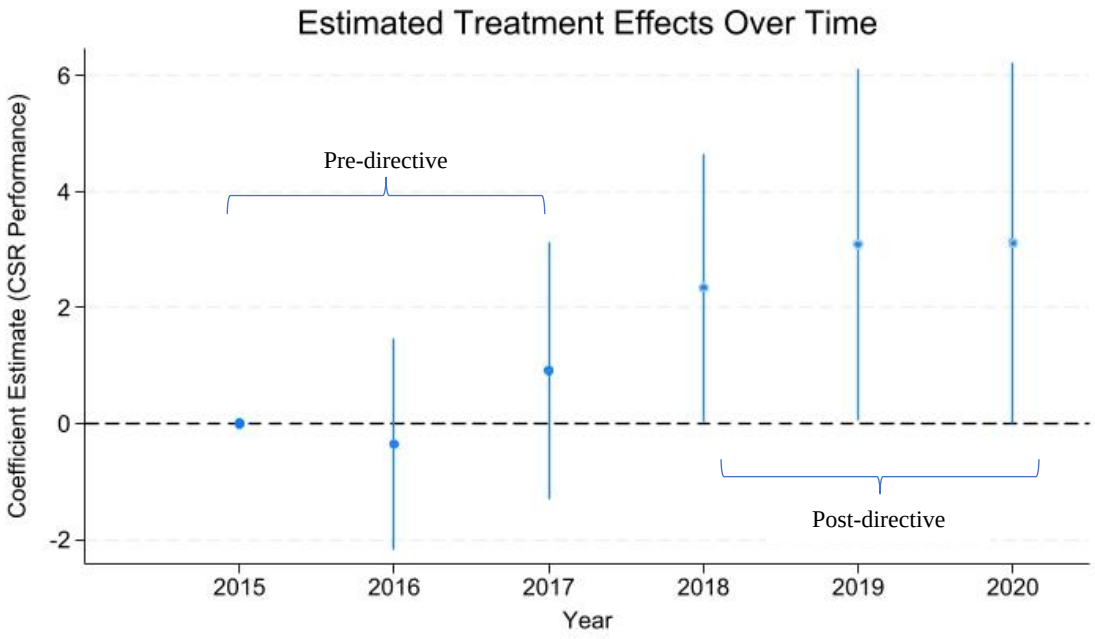

Figure 3 plots yearly treatment effects with 95% confidence intervals for total *CSR Performance* as the outcome variable based on regression model 1. The indicator 2015 × EU is omitted, with 2015 serving as the benchmark year. Treatment effects for the years 2018 to 2020 are statistically significant, while effects for earlier years are not.

FIGURE 4 – Impact of treatment on CSR Performance over time

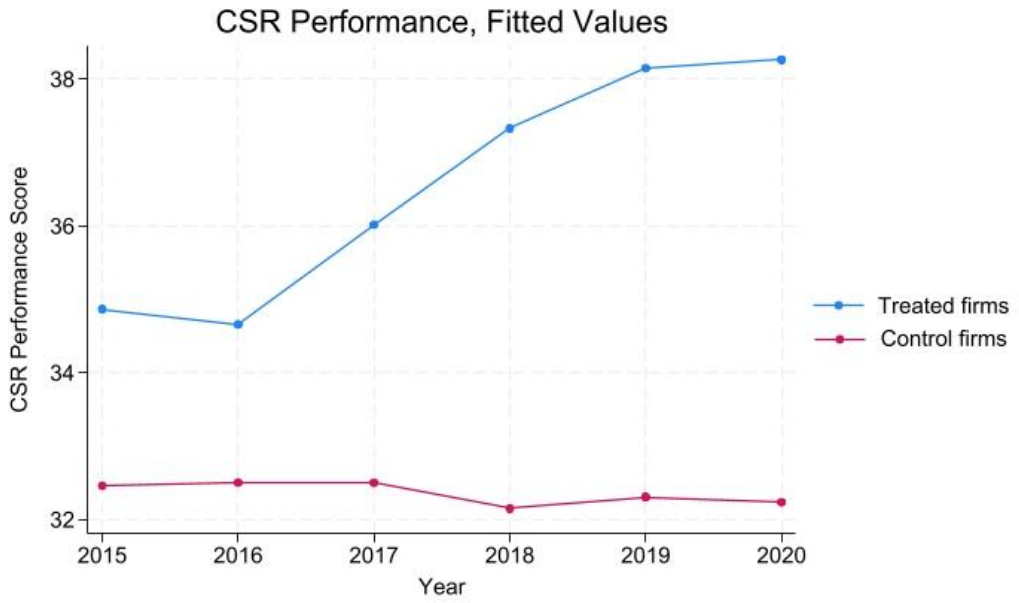

Figure 4 shows the fitted values for *CSR Performance* over time for treated and control firms from 2015 to 2020. The year 2015 is the benchmark year. Treatment effects for the years 2018 to 2020 are statistically significant, while effects for earlier years are not.