



ESG Regulation Across the Globe: Does ESG Regulation Pay Off?

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Abstract

A growing number of investors and other stakeholders are demanding greater transparency about companies' sustainability performance. Countries around the world are responding with mandatory environmental, social and governance (ESG) disclosure regulations. On the one hand, this has led to a fragmented regulatory landscape. On the other hand, there is little empirical evidence on how these mandatory ESG disclosure requirements affect reporting companies. This paper addresses the gap through a three-part approach. First, it examines the evolution and status quo of global ESG regulation. Second, it provides a comprehensive literature review on the impact of such regulation on affected firms. Finally, it applies a difference-in-difference analysis to assess whether the EU's Non-Financial Disclosure Directive (NFRD), an unprecedented supranational ESG disclosure regime, has led to the adoption of more sustainable business practices. The results show a stronger increase in ESG scores for regulated EU companies compared with a control group of non-regulated US companies. This finding has practical relevance not only for the EU, but also for other legislators considering the introduction or expansion of ESG reporting requirements.

Keywords: disclosure; ESG regulation; NFRD; reporting; sustainability

1. Introduction

Sustainable investing has been on the rise in recent years, with global investments in sustainable assets exceeding USD 30 trillion in 2022 (GSIA, 2023, p. 10). To make well-informed investment decisions, investors (and other stakeholders) are increasingly demanding reliable and comprehensive information on companies' environmental, social, and governance (ESG) data (Amel-Zadeh & Serafeim, 2018, p. 2). However, voluntary ESG disclosure has often resulted in insufficient quality and quantity of reported data (H. B. Christensen et al., 2021, p. 1208). Recognizing this problem, regulators around the world are increasingly implementing mandatory ESG disclosure regimes to improve the comparability, consistency, and reliability of ESG reporting. As a result, more companies are being forced to provide detailed ESG information. (European Commission, 2014, p.2; Ioannou and Serafeim, 2017, p. 2; SEC, 2022b, pp. 28-29)

This regulatory shift has sparked intense public debate. Proponents argue that mandatory ESG reporting not only increases transparency for stakeholders, but also provides

significant benefits to the reporting companies themselves. These benefits range from enhancing corporate reputation and attracting talent to improving operational efficiency by identifying and mitigating risks and inefficiencies. (Ioannou & Serafeim, 2017, p. 5) However, critics point to several challenges associated with ESG reporting. The lack of standardized ESG metrics leads to diverse and potentially less comparable data across companies. Because ESG information is often qualitative in nature, the reporting relies on management's subjective assessment. Even quantitative ESG aspects are difficult to verify by external auditors, whose review is typically limited to an assessment of the company's policies and processes. In addition, companies often lack control and oversight over certain ESG disclosure requirements, such as those related to their supply chain. As a result, companies subject to ESG disclosure requirements may face significant operational and financial burdens associated with data collection and disclosure, as well as potential necessary changes to business processes. (H. B. Christensen et al., 2021, pp. 1227-1228; Ioannou and Serafeim, 2017, p. 5)

The impact of ESG disclosure on firms therefore remains uncertain and has become the subject of empirical research. Although *voluntary* ESG disclosure has been extensively studied in the literature, research on the effects of *mandatory* ESG disclosure requirements is still limited and inconclusive (H. B. Christensen et al., 2021, p. 1208; Mittelbach-Hörmanseder et al., 2021, p. 313). Studies provide mixed evidence on whether ESG disclosure requirements lead to changes in corporate reporting practices (e.g., Chauvey et al., 2015; Hummel and Rötzel, 2019; Ottenstein et al., 2022), their impact on firm value and financial performance (e.g., Y.-C. Chen et al., 2018; Grewal et al., 2019; Ioannou and Serafeim, 2017), and whether they are effective in encouraging companies to adopt more sustainable business practices (e.g., Downar et al., 2021; Fiechter et al., 2022; Tomar, 2023). With respect to the latter, research tends to focus on targeted disclosure requirements. This includes mandates aimed at specific industries, such as the US manufacturing and retail sectors (She, 2022), specific countries, such as China (Y.-C. Chen et al., 2018), or specific disclosure metrics, such as greenhouse gas (GHG) emissions (Bauckloh et al., 2023; Tomar, 2023). However, the extent to which these findings on targeted regulation can be generalized across different regulatory environments remains uncertain (Fiechter et al., 2022, p. 1500).

Given the global trend towards more comprehensive and widespread ESG disclosure requirements, it is critical to gain a deeper understanding of the implications of such frameworks, particularly in the context of the European Union (EU). The EU's introduction of the Non-Financial Disclosure Directive (NFRD) in 2014 marked a significant milestone, imposing broad ESG reporting requirements on approximately 11,000 companies across countries and industries (European Commission, 2014, p. 2; European Parliament, 2023). Based on the notion that greater transparency promotes greater accountability, the NFRD also aims to encourage companies to improve their ESG-related corporate practices (European Commission, 2014, p. 1). Initial studies suggest a positive impact of the NFRD on ESG performance, but these primarily focus on anticipatory effects (i.e. prior to its entry into force) or early impacts from the first reporting years (e.g., Cuomo et al., 2022; Fiechter et al., 2022), leaving a gap in evidence on the longer-term effects. Understanding the effectiveness of the NFRD in driving real change is particularly relevant with the introduction of the Corporate Sustainability Reporting Directive (CSRD), which will require more companies to provide more detailed disclosure from 2024, for reports published in 2025 (European Commission, 2023d).

Based on the identified gaps in the literature, the objective of my thesis is threefold. First, I provide a comprehensive overview of the development and current state of mandatory ESG disclosure regulations across the globe. This is crucial as the rapid evolution has led to an untransparent regulatory landscape, leading to the first research question: *What is the evolution and current state of mandatory ESG disclosure regulations across the globe?*

Second, I critically review the existing literature to assess the impact of these regulations on affected firms. The rapidly evolving nature of mandatory ESG regulation underscores the need for timely analyses, especially given that much of the prior literature reviews focus primarily on voluntary reporting (Haji et al., 2023, p. 178). This leads to the second research question: *What is the impact of mandatory ESG disclosure requirements on affected firms, according to current findings in the literature?*

Third, I aim to fill the research gap regarding the effectiveness of comprehensive ESG disclosure regimes in promoting the adoption of more sustainable corporate behavior. I empirically examine the impact of the NFRD on the ESG scores of affected EU firms relative to a control group of unregulated US firms, using a difference-in-difference (DID) design. The third question is therefore: *What is the impact of the NFRD on the ESG performance of affected firms?*

This thesis contributes to the literature in several meaningful ways. First, it shows that while global mandatory reporting requirements differ across categories (such as scope, disclosure content, and enforcement mechanisms), there is a trend toward greater convergence of regulations. Second, the literature review shows that ESG disclosure regulation seems to have a positive impact on the quantity and quality of disclosure, although there is also conflicting evidence. The literature on the financial impact of ESG disclosure regulation provides mixed evidence on both capital market and profitability effects. ESG disclosure requirements appear to be effective in encouraging companies to improve their ESG performance, although the evidence to date is mostly focused on targeted regulation. Third, the empirical analysis of the effects of the NFRD provides new insights into role of ESG reporting requirements in transitioning towards a more sustainable economy. I provide empirical evidence that the comprehensive disclosure directive positively affects firms' ESG behavior, thereby filling a critical gap in long-term impact studies. A thorough understanding of the different ESG disclosure requirements and their consequences on reporting firms is crucial for regulators, companies potentially affected by the mandates, and researchers seeking to study their impact.

The remainder of this paper is structured as follows: Chapter 2 provides an overview of global ESG disclosure regulations. Chapter 3 reviews the literature on the effects of mandatory ESG regulations, focusing on three areas: impact on ESG disclosure practices (Section 3.1), financial impact (Section 3.2), and impact on ESG-related firm performance (Section 3.3). Chapter 4 presents the empirical analysis of the impact of the NFRD on ESG performance. Chapter 5 concludes.

2. ESG disclosure regulations across the globe

In this chapter, I first provide background information on ESG disclosure, including its origins and a definition of ESG (Section 2.1). Second, I provide an overview of the main developments of mandatory ESG disclosure regimes in selected

regions around the world (Section 2.2). A summary of the regulations is also provided in Appendix 1. Third, I compare the different regulatory approaches across a number of dimensions (Section 2.3).

2.1. Background of ESG reporting

Voluntary sustainability reporting emerged in the 1960s in the US and Europe in response to a growing sense of social and environmental responsibility. In the 1980s, ethical funds in the UK and US adopted a negative screening investment approach, actively excluding companies in certain industries like tobacco and alcohol. In response to a major environmental disaster in the oil industry in the late 1980s, the first environmental reporting guidelines were developed. In the late 1990s, the Global Reporting Initiative (GRI) was launched with the aim of establishing comprehensive, credible and comparable corporate disclosure on economic, sustainability and social issues. The number of sustainability reports published on a voluntary basis has increased significantly as society demanded greater transparency and accountability. At the same time, investors have increasingly integrated sustainability factors into their investment decisions, further increasing the demand for comparable and reliable information. As social and environmental challenges become more pressing, concerns about the sufficiency of the voluntary approach have increased, leading to a growing number of jurisdictions around the world introducing mandatory reporting requirements. (Ioannou & Serafeim, 2017, pp. 6-7) While in the past mandatory regulations were mostly aimed at increasing environmental disclosure in specific sectors, there is a trend towards more comprehensive ESG disclosure regimes affecting companies across industries (Haji et al., 2023, p. 180).

ESG refers to the three pillars of sustainable corporate behavior, i.e., the activities companies undertake to be more economically and socially responsible, and their governance and control mechanisms. The environmental pillar includes issues related to climate change, toxic emissions, and waste, amongst others. Social issues include human rights and employee health and safety, and the governance pillar is related to issues regarding anti-corruption and anti-bribery measures, as well as auditing processes, management compensation, and disclosure practices, among others. (United Nations Global Compact, 2004, p. 6) *ESG disclosure* refers to the information that a company provides to the public on these issues (Ottenstein et al., 2022, p. 77).¹

¹ “ESG” is often used interchangeably with the terms “sustainability”, “corporate social responsibility” (CSR), and “non-financial” in related literature (Ioannou & Serafeim, 2017, p. 2). For consistency purposes, I use “ESG” throughout my thesis. In line with related literature, I also use the terms “disclosure” and “reporting” interchangeably, as I refer to information that is made available to the public (Ottenstein et al., 2022, p. 77).

2.2. Development of mandatory ESG disclosure regulations in selected regions

I limit the regulations in scope of my analysis to a few key criteria. First, I focus exclusively on ESG reporting requirements and exclude outcome-based regulations such as environmental protection laws. Second, I limit the analysis with respect to the target group of the regulations. ESG disclosure regulations can be divided into three categories: (1) disclosure regulations for corporations, (2) classification systems (i.e., taxonomies) for sustainable activities, and (3) fund disclosure requirements for financial market participants like asset managers or insurance companies (European Commission, 2023e). I focus on the first category. Third, I exclude voluntary reporting schemes and focus on mandatory requirements. This includes regulations that are implemented either on a fully mandatory basis or on a comply-or-explain basis. The latter gives companies the opportunity to provide explanations in the event of non-compliance with disclosure requirements (H. B. Christensen et al., 2021, p. 1228). The analysis includes both targeted, industry-specific regulations with limited disclosure requirements, as well as broad ESG disclosure regimes. A summary of the regulations is provided in Appendix 1.

2.2.1. Europe

This section first provides an overview of the evolution of ESG disclosure regulation in the EU, then discusses the main EU disclosure directives, and concludes with an overview of additional disclosure requirements implemented by selected European countries.

Development of ESG disclosure regulation in the EU

As shown in Figure 1, the EU first addressed ESG disclosure in its Directive 2003/51/EC, which emphasized the inclusion of environmental and social issues in firms’ financial reporting, on a voluntary basis (Agostini et al., 2022, p. 81; European Parliament and Council, 2003, p. 17). Since then, the EU has made several attempts to encourage voluntary ESG reporting, including through Directive 2013/34/EU (European Parliament and Council, 2013, p. 38). However, the voluntary provisions proved to be ineffective, resulting in less than 10% of large EU companies disclosing their ESG-related information. An important milestone towards mandatory ESG disclosure was the adoption of the Non-Financial Reporting Directive (Directive 2014/95/EU, NFRD) in 2014. The NFRD amends Directive 2013/34/EU by requiring large public interest corporations to include ESG information in their reports. (European Commission, 2014, pp. 1-2)

In 2015, the EU has committed to major international climate and sustainability goals by adopting the UN 2030 Agenda for Sustainable Development with its Sustainable

Development Goals (SDGs)², and the Paris Agreement³ on climate change (European Parliament and Council, 2020b, p. 13). In order to achieve the objectives of the UN 2030 Agenda and the Paris Agreement, the European Commission released its Action Plan: Financing Sustainable Growth (Action Plan) in March 2018. The plan proposes the creation of an EU sustainability taxonomy and the improvement of corporate ESG disclosure requirements. (European Commission, 2018a, 2018b, 2018c)

As part of the 2019 European Green Deal, with its overarching goal of making Europe climate neutral by 2050, the EU committed to enhancing its Action Plan, including the commitment to further increase ESG transparency for stakeholders (European Commission, 2018b, 2023d). In the same year, the Commission adopted the Sustainable Finance Disclosure Regulation (SFDR). The SFDR requires financial market participants (such as asset managers, insurance companies, pension funds, and investment firms) to disclose ESG-related information about their financial services and products, and entered into force in 2021. (European Commission, 2023g; European Parliament and Council, 2019)

The EU Taxonomy in 2020 introduced a new classification system aimed at creating a common understanding of sustainable economic activities (European Parliament and Council, 2020b). The Corporate Sustainability Reporting Directive (CSRD) was released in 2022 and extends the NFRD in terms of the scope of companies affected and the breadth of reporting requirements (European Parliament and Council, 2022). In the same year, the Commission has also adopted a proposal for the Corporate Sustainability Due Diligence Directive (CSDDD), which requires companies to mitigate their negative impacts on human rights and the environment throughout their supply chains (European Commission, 2022b).

Current ESG disclosure regulations in the EU

This section provides a more detailed analysis of the EU regulations that target ESG disclosure of corporates: the NFRD, the CSRD, and the EU Taxonomy.⁴

Non-Financial Disclosure Directive (NFRD)

The NFRD was adopted by the EU in 2014 to make ESG-related disclosures more transparent, consistent, and com-

parable across companies in the European Union. It targets large public interest entities⁵, such as listed companies, banks, and insurance companies with more than 500 employees (Recital 14). (European Parliament and Council, 2014) Approximately 11,000 companies across the EU are affected (European Parliament, 2023).

Specifically, companies subject to the NFRD must report on environmental matters (e.g., environmental and health and safety impacts, energy use, greenhouse gas emissions, water use, and air pollution), social and employee-related matters (e.g., working conditions and measures to ensure gender equality), protection of human rights, and anti-corruption and anti-bribery matters (e.g., mechanisms in place to prevent such matters) (Recital 7). In relation to these matters, companies are required to provide details of their policies, outcomes and risks, as well as their due diligence processes, including of their supply chain, where relevant (Recital 6). The information must be presented in such a way that the company's development, performance, position, and impact in relation to these issues are sufficiently clear (Article 19a(1)). In addition, certain large companies must disclose their policy on board diversity (i.e., gender, age, and background of board members) (Recital 19). EU Member States had to transpose the NFRD into national law until December 2016.⁶ 2018 was the first year companies subject to the law had to disclose ESG information in line with the NFRD for the 2017 financial year (Article 4). (European Parliament and Council, 2014)

However, several shortcomings led to a revision of the NFRD and ultimately to the adoption of the new CSRD (European Parliament, 2023). The shortcomings include a lack of mandatory compliance with reporting standards and formats, and a lack of external assurance requirements on disclosed content. In addition, companies can justify their non-compliance with the NFRD's disclosure requirements by providing reasoned explanations on a comply-or-explain basis. Finally, although companies are required to report according to the double materiality principle⁷, the directive lacks a clear definition of this. (EPRS, 2021, pp. 2-4)

Corporate Sustainability Reporting Directive (CSRD)

The CSRD entered into force in January 2023 and introduced stricter reporting requirements. The scope of com-

² The UN 2030 Agenda is a global initiative promoting sustainable development through 17 Sustainable Development Goals (SDGs), covering areas such as poverty, health, education, gender equality, access to water and energy, and environmental sustainability. (United Nations, 2015, p. 14)

³ 195 countries have committed to the Paris Agreement, which is a legally binding international treaty aiming to strengthen global resilience to climate change, and to limit global warming to well below 2°C. (European Union, 2016)

⁴ Both the SFDR and the CSDDD are outside the scope of my analysis, as the former is aimed at financial market participants and the latter is not primarily considered a transparency tool (but rather a due diligence obligation). Although sustainability taxonomies are not specifically within scope, I do include the EU Taxonomy as it requires companies subject to the NFRD to disclose the proportion of their activities that is considered sustainable.

⁵ As defined in Article 3(4) of Directive 2013/34/EU, companies qualify as large undertakings if they exceed at least two of the three thresholds: a net turnover of EUR 40 million, a balance sheet total of EUR 20 million, and/or an average number of 250 employees during the year. (European Parliament and Council, 2013, p. 30)

⁶ The NFRD provides EU member states some freedom in the transposition into their respective national law. For example, France, Italy, and Spain adopted mandatory external assurance requirements, while most of the other countries have not (Accountancy Europe, 2020, p. 2). A comprehensive overview of the differences in requirements between member states is provided by CSR Europe and GRI (2017).

⁷ Double materiality refers to the underlying methodology for assessing material (i.e., relevant) information to be disclosed, which considers both financial and impact perspectives. See Section 2.3 for a detailed discussion.



Figure 1: Development of ESG disclosure regulation in the EU
(source: own representation, based on Blaschke et al., 2023, p. 14)

panies affected was extended to all large companies⁸ (regardless of capital market orientation) and all listed Small and Medium Enterprises (SMEs), except micro-enterprises (Recital 17). The CSRD also covers non-EU companies generating a net turnover of over EUR 150 million in the EU, and with a subsidiary in the EU being a large company or a listed SME, or with a branch generating a turnover of over EUR 40 million, are subject to the CSRD (Recital 20). (European Parliament and Council, 2022, pp. 19-20) Under the CSRD, approximately 50,000 companies will be affected by mandatory ESG disclosure requirements, a significant expansion from the 11,000 companies subject to the NFRD (European Parliament, 2023).

The CSRD requires reporting in accordance with the European Sustainability Reporting Standards (ESRS), addressing the lack of comparability and reliability of reporting under the NFRD. The ESRS were developed by the European Financial Reporting Advisory Group (EFRAG) and endorsed by the EU in July 2023 (European Commission, 2023f). The framework consists of twelve standards: two overarching standards (ESRS 1 and ESRS 2) outline the fundamental reporting principles and obligations (European Commission, 2023a, p. 3). These are followed by ten topical disclosure standards, which cover the environmental (climate change, pollution, water and marine resources, biodiversity and ecosystems, resource use and circular economy), social (own workforce, workers in the value chain, affected communities, consumers, and end users), and governance pillar (business conduct, including animal welfare, political engagement, and corruption and bribery) (European Commission, 2023a, pp. 24-26). With respect to these topics, the ESRS require disclosure in the areas of governance, strategy, impact, risk and opportunity management, as well as certain quantitative metrics and targets. In addition, the ESRS define certain industry-specific standards that only apply to companies in specific industries. (European Commission, 2023a, pp. 3-4)

Companies must report on all topics that are material (i.e., relevant) to them, and otherwise provide a detailed explanation as to why the specific topic is not material to them.⁹

⁸ Large companies are defined by Article 3(4) of Directive 2013/34/EU (see footnote 5).

⁹ For a detailed explanation of the materiality assessment process, please

In assessing the materiality of topics, companies are required to adopt a double-materiality approach. This means that issues must be evaluated in terms of both their *financial materiality*, which refers to the company's exposure to climate change risks and opportunities, and their *impact materiality*, which refers to the company's impact on the environment and society. A topic must be disclosed if it is material to either or both dimensions. (European Commission, 2023a, pp. 7-8) The materiality assessment is also subject to mandatory verification by an external assurance provider (European Commission, 2023f). The CSRD will be phased in, with the first group (consisting of companies already subject to the NFRD) required to comply from financial year 2024 for reports published in 2025 (European Commission, 2023f; European Parliament, 2023).¹⁰ The directive must be transposed into national law by all EU member states until July 2024 (European Parliament and Council, 2022).

EU Taxonomy Regulation

The EU Taxonomy Regulation (Regulation (EU) 2020/852) is a classification system that aims to provide a common understanding and definition of sustainable economic activities. To be considered sustainable, activities must contribute to at least one of six environmental objectives: (1) climate change mitigation, (2) climate change adaptation, (3) sustainable use and protection of water and marine resources, (4) transition to a circular economy, (5) pollution prevention and control, and (6) protection and restoration of biodiversity and ecosystems. In addition, the activity must not harm any of the other objectives. The Taxonomy became effective in July 2020. (European Parliament and Council, 2020a)

Since January 2022, the Disclosures Delegated Act complements the EU Taxonomy by requiring companies subject to the NFRD to disclose the proportion of their taxonomy-

refer to Appendix E of the ESRS. (European Commission, 2023a, p. 33)

¹⁰ Other large companies not currently covered by the NFRD will have to report in accordance with the CSRD from 2025 for reports published in 2026. Listed SMEs will have to report from 2026 for reports published in 2027 (with a reduced set of standards), with the possibility to opt out for a further two years. Non-EU companies with significant activities in the EU that fall within the scope of the CSRD will have to comply from 2028 for reports published in 2029, and will also be subject to separate reporting standards. (European Commission, 2023f; European Parliament, 2023)

aligned economic activities that contribute to their revenue, capital expenditure (CapEx), and operating expenditure (OpEx). (European Parliament and Council, 2021)

Additional regulations of selected European countries

This section gives an overview of individual reporting requirements enacted by certain European countries, focusing on Germany, France, and the UK.

Germany

Prior to the NFRD, Germany did not have a comprehensive mandatory ESG disclosure requirement. Germany transposed the NFRD into national law as the *Gesetz zur Stärkung der nichtfinanziellen Berichterstattung der Unternehmen in ihren Lage- und Konzernlageberichten (CSR-Richtlinie-Umsetzungsgesetz)* in April 2017 (Bundestag, 2017). Compared to other EU member states such as Italy and France, Germany has taken a conservative implementation approach, as reflected by the adoption of the minimum reporting requirements prescribed by the NFRD (Jeffery et al., 2017, pp. 2-3). In an analysis of countries' positions during the Commission's negotiations regarding the enactment of the NFRD, Kinderman (2020, p. 680) finds that Germany was the strongest opponent of the directive.

In July 2021, Germany passed the Act on Corporate Due Diligence in Supply Chains (*Lieferkettensorgfaltspflichtengesetz*), which became effective in January 2023. To ensure corporate responsibility for respecting human rights and protecting the environment in global supply chains, the Act implements specific due diligence obligations with respect to the company itself and its contractual partners and direct and indirect suppliers (Paragraph 3). It applies to companies with more than 3,000 employees in Germany from 2023 and to companies with more than 1,000 employees in Germany from 2024 (Paragraph 1). According to Paragraph 10(2) of the Act, affected companies are required to annually publish a report on the fulfillment of their due diligence obligations on their corporate website. The disclosure must include information on human rights and environmental risks and violations, measures taken to fulfill the obligations, and an assessment of their effectiveness. (Bundestag, 2021)

France

France already introduced mandatory disclosure of a social report (*Bilan Social*) in 1977. The law required companies with more than 300 employees to report on 134 social indicators related to their employment activities (Antal and Sobczak, 2007, p. 15; Government of France, 1977).

In 2001, the Law on New Economic Regulations (*Loi Nouvelle Régulation Economique*, NRE) was introduced, requiring listed French companies to disclose social and environmental impacts in their annual reports (Government of France, 2001; Ministère des Affaires Étrangères France, 2012, p. 1). With this regulation, France became one of the first coun-

tries in the world to require social and environmental disclosure (Chauvey et al., 2015, p. 789). The NRE was amended by the *Loi Grenelle I* and *Loi Grenelle II* in 2009 and 2010, respectively (Government of France, 2009, 2010). All companies with more than 500 employees were required to disclose ESG-related information on a comply-or-explain basis. The regulations expand the disclosure requirements to more than 40 social and environmental topics, which are subject to mandatory independent verification. (Ministère des Affaires Étrangères France, 2012, pp. 4-5)

In March 2017, the French Law on Corporate Duty of Vigilance (*Devoir de Vigilance*) came into force, aiming to prevent human rights violations, safeguard public health and safety, and protect the environment. The law requires French companies with more than 5,000 employees in France and international companies with more than 10,000 employees in France to disclose a plan outlining their due diligence processes with respect to specific ESG-related matters. Companies may face penalties for not providing a vigilance plan. (Business & Human Rights Resource Centre, 2017; Government of France, 2017a)

France transposed the NFRD into national law as the Ruling No. 2017-1180 of July 19, 2017 (Aureli, Salvatori, and Magnaghi, 2020, p. 9; Government of France, 2017b). The ESG-related disclosure requirements go beyond those mandated by the NFRD, including, for example, mandatory disclosure of employee diversity, impact on biodiversity, and measures taken in relation to the circular economy (Aureli, Salvatori, & Magnaghi, 2020, p. 15).

UK

Since 2006, quoted companies¹¹ in the UK are required to publish a business review as part of the Companies Act 2006. Section 417 of the Act mandates the disclosure of a companies' environmental impact, as well as their impact on employees and the society. (Parliament of the United Kingdom, 2006b)

In October 2013, the Companies Act (Strategic Report and Directors' Report) Regulations 2013 became effective. The amendment to the Companies Act 2006 replaces the business review (i.e., Section 417 of the Companies Act 2006) with the requirement for large and medium-sized companies to disclose a more comprehensive strategic report.¹² (Jackson et al., 2020, p. 339) Specifically, the Act mandates the disclosure of non-financial Key Performance

¹¹ A UK quoted company is defined as a company incorporated in the UK whose equity share capital is either listed on the Main Market of the London Stock Exchange, is officially listed in an EEA state, or is admitted to trading on the Nasdaq or the New York Stock Exchange. (Parliament of the United Kingdom, 2006a, p. 11, section 385(2))

¹² Small companies are exempt from the obligation to publish a strategic report. According to section 382 of the Companies Act, a company qualifies as small by meeting at least two of the three conditions: maximum turnover of GBP 10.2 million, maximum balance sheet total GBP 5.1 million, or a maximum of 50 employees. (Parliament of the United Kingdom, 2006a, p. 3)

Indicators (KPIs) concerning environmental and employee matters (Section 414C Subsection 4(b)). In addition, it requires disclosure of principal risks and uncertainties, which also include ESG issues (Section 414C Subsection 2(b)). For UK quoted companies, the strategic report must include information regarding environmental issues (including the company's impact on the environment), its employees, as well as social, community and human rights matters (Section 414C Subsection 7(b)). Quoted companies are also mandated to include information regarding gender diversity on board level and in senior management positions as well as the entire company (Section 414C Subsection 8(c)). (Parliament of the United Kingdom, 2013, pp. 2-4) As the first country worldwide (Krueger, 2015, p. 3), the UK requires mandatory Scope 1 and 2 GHG emissions¹³ disclosure for quoted companies (Part 7) (Parliament of the United Kingdom, 2013, p. 5).

The NFRD was transposed into national law through the addition of Section 414CA and 414CB to the Companies Act 2006. This expands the scope of companies subject to mandatory ESG disclosure, and imposes additional disclosure requirements regarding anti-corruption and anti-bribery matters. (Parliament of the United Kingdom, 2016)

In 2022, the Companies Act 2006 was further amended by the Companies (Strategic Report) (Climate-related Financial Disclosure) Regulations 2022 (Parliament of the United Kingdom, 2022). Economically significant companies¹⁴ within the scope of the regulation are required to disclose their risks and opportunities related to climate change in alignment with the Task Force on Climate-related Financial Disclosures (TCFD) standards. (UK Department for Business, Energy and Industrial Strategy, 2022, pp. 5-6; UK Government, 2023b)

Depending on the type of company, certain entities are also required to disclose additional information, i.e., regarding modern slavery (for companies with more than GBP 36 million turnover) or the gender pay gap (for companies with more than 250 employees). (UK Government, 2023a, 2023b)

Other European countries

Other countries that have introduced ESG disclosure regulations prior to the enactment of the NFRD are Denmark, Sweden, and Spain (European Commission, 2014, p. 1). Denmark has mandated large companies to disclose ESG-related information together with their annual statements

since 2008. Sweden and Spain have introduced ESG disclosure requirements in 2007 and 2011, respectively. However, the Swedish regulation covered only state-owned enterprises, and the Spanish requirement was implemented on a recommendation basis, and not on a mandatory basis. (Ioannou and Serafeim, 2017, p. 8; Jackson et al., 2020, p. 328)

2.2.2. United States

The US lags behind the EU in terms of mandatory ESG disclosure regulation (Cicchello et al., 2023, p. 1122). While existing regulations require companies to include environmental issues in financial, litigation, and risk disclosures, there are no mandatory requirements for broad ESG disclosures to date. Nonetheless, the Securities and Exchange Commission (SEC) has issued a proposed rule on climate disclosure in 2022, which would introduce extensive ESG disclosure requirements if adopted (SEC, 2022a). Individual states, especially California, are also progressing to advance their own ESG disclosure regime.

Regulations at the federal level

In 1971, the SEC has first published a proposal for registered companies to disclose how complying with federal, state, and local environmental laws impacts them financially. In 1982, the SEC mandated the disclosure of business costs (including litigation costs) resulting from compliance with environmental protection laws. In addition, companies are required to report on climate change-related matters as part of other, more general SEC disclosure requirements. (SEC, 2022b, pp. 15-16) In 2010, the SEC issued the Interpretive Guidance on Disclosures Related to Climate Change, to assist companies in complying with these disclosure regulations related to climate change (SEC, 2010, p. 3). Specifically, companies must consider climate change issues that could have a material impact on their financial condition in their SEC filings¹⁵ (SEC, 2010, pp. 12-15). However, these obligations have not resulted in sufficiently comparable and consistent ESG disclosures across reporting companies, as demanded by investors (SEC, 2022b, p. 296).

In an effort to strengthen the 2010 voluntary guidance, the SEC proposed the Enhancement and Standardization of Climate-Related Disclosures for Investors in March 2022, which would make climate-related disclosures mandatory. The proposed rules would require SEC registrants to disclose information including on climate risks and their (potential) impact on the company, the governance and management processes in place to address these risks, GHG emissions

¹³ Scope 1 are direct emissions from a company's own operations, Scope 2 refers to indirect emissions from the generation of purchased energy, and Scope 3 includes all other indirect emissions across a company's value chain, both upstream and downstream. (GHG Protocol, 2023)

¹⁴ The following companies qualify as being "economically significant": listed companies, banks or insurers with at least 500 employees, UK-based AIM companies with at least 500 employees; LLPs with at least 500 employees and a turnover of over GBP 500 million, and non-listed companies with at least 500 employees and a turnover of over GBP 500 million. (UK Government, 2023b)

¹⁵ Particularly, disclosure requirements related to climate change include reporting on the impact of climate change related regulation and international accords, such as the Kyoto Protocol. Registrants are furthermore required to disclose any indirect risks or opportunities of regulation or business trends, such as lower demand for high GHG-emitting goods, or a rising demand for alternative energy. Companies must also include physical consequences of climate change in their disclosures, such as the risks and effects of severe weather conditions and other climate related events. (SEC, 2010, pp. 22-27)

(Scope 1, 2 and, if material, Scope 3 emissions), specific climate-related financial figures, and climate-related targets with a transition plan. The proposed rules are based on commonly used disclosure frameworks (such as the TCFD). Disclosure would be required as part of companies' registration statements and periodic reports. In addition, accelerated filers and large accelerated filers¹⁶ would be required to obtain external assurance on at least their Scope 1 and Scope 2 GHG emissions. The SEC is proposing initial disclosure under the new rule in 2024 reports for fiscal year 2023 for large accelerated filers, and in 2025 reports for fiscal year 2024 for accelerated filers (excluding Scope 3 emissions). (SEC, 2022a, 2022b, pp. 41-43) The rulemaking is currently pending. Opponents argue that the proposed requirements are beyond the SEC's authority. The scope of the reporting requirements is also likely to be compromised, as the current version of the proposal is expected to face legal challenges. (McGowan, 2023)

In addition to these developments towards a broad ESG disclosure regime, the SEC has also adopted several more targeted disclosure requirements. For example, Section 1502 of the Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank Act) requires SEC-registered companies to report on the use of conflict minerals (i.e., tantalum, tin, gold, and tungsten) from the Democratic Republic of the Congo (DRC) or neighboring countries since 2012 (SEC, 2012a, 2012b). Section 1503 requires mine owners to disclose health and safety violations, and mining-related fatalities, among others (SEC, 2012c). Section 1504 requires listed oil and gas companies to disclose payments made to the US or foreign governments (SEC, 2020; US Congress, 2010, p. 2220), aiming to improve governance in extraction countries (Healy & Serafeim, 2020, p. 112).

The SEC has also recently passed disclosure requirements related to diversity and cybersecurity. Since August 2021, Nasdaq-listed companies must have at least two diverse board members (on a comply-or-explain basis). In addition, racial identity, LGBTQ+ status and voluntary self-disclosed gender identity of all board members must be disclosed. (Nasdaq, 2023; SEC, 2021, pp. 3-4) Since September 2023, public companies are required to report any material cybersecurity incident promptly, and to disclose information on cybersecurity risk management, strategy, and governance annually (SEC, 2023)

The Environmental Protection Agency (EPA) has released regulatory programs requiring the disclosure of specific environmental information. Under the Greenhouse Gas Reporting Program (GHGRP), major emitters in the US are required to disclose their GHG emissions since 2010 (US EPA, 2009). The information is verified and published by the EPA on their website (US EPA, 2023a). The Toxics Release Inventory (TRI) requires larger facilities in specific industries (including metal mining and electric power generation) to an-

nually disclose their emission of certain toxic chemicals (US EPA, 2023b).

Regulations at the state level

ESG disclosure regulations at the state level are mostly specific to certain disclosure items and aim to indirectly nudge companies towards the adoption of more sustainable behavior (Ho, 2017, p. 326). For example, at least 17 US states have implemented additional GHG emissions disclosure requirements, mostly regarding Scope 1 emissions (SEC, 2022b, pp. 298-299).

In California, the California Transparency in Supply Chains Act (CTSCA) of 2010 requires large retail sellers and manufacturers doing business in California to disclose their due diligence processes and efforts to ban human rights abuses from their supply chains since 2012 (California Government, 2010).

In October 2023, the California Senate enacted two bills which introduce extensive climate-related disclosure requirements for large public and private firms operating in California, becoming effective in 2026 (Engler, 2023). Senate Bill (SB) 253 (The Climate Corporate Data Accountability Act) requires companies with more than USD 1 billion revenues doing business in California to disclose Scope 1, 2, and 3 GHG emissions, including independent assurance requirements (California Government, 2023a). SB 261 (Greenhouse gases: climate-related financial risk) requires companies doing business in California with annual revenues over USD 500 million to report their climate-related financial risk, in line with TCFD reporting recommendations (California Government, 2023b). The California laws are even more stringent than the SEC's proposed rules. First, they apply to large private companies, whereas the SEC proposal applies only to SEC-registered companies (Engler, 2023). Second, they require Scope 3 emissions reporting in all cases, while the SEC proposal exempts some companies (SEC, 2022b, p. 43).

2.2.3. APAC region

In Asia Pacific, the analysis focuses on ESG disclosure developments in India, China, Hong Kong, Japan, Malaysia, and Australia.

India

In India, the two main sources of ESG regulation are the Ministry of Corporate Affairs (MCA) and the Securities and Exchange Board of India (SEBI). Mandatory ESG reporting was introduced by the SEBI in 2012, requiring the top 100 companies by market capitalization to disclose their ESG-related performance in a Business Responsibility Report (BRR) as part of their annual reports (SEBI, 2012). The scope of affected companies has been extended to the top 500 companies in 2015 and to the top 1,000 companies in 2017 (PwC India, 2021, p. 5).

In 2013, the MCA enacted the Indian Companies Act, which came into force in April 2014 (MCA, 2013, p. 14).

¹⁶ An accelerated filer has a public float of USD 75 million or more, a large accelerated filer has a public float of USD 700 million or more. For a detailed definition, see footnote 122 and 123 of SEC (2022b, p. 41).

Section 135 of the Act requires companies above a certain size threshold¹⁷ to establish a CSR committee and disclose their ESG-related policies and expenditures, as well as the composition of their CSR committee. In contrast to the other disclosure regulations discussed, it also requires companies to spend at least 2% of their average net profits over three years on ESG activities annually on a comply-or-explain basis. (MCA, 2013, p. 87) Under Section 134(3)(m), companies must disclose information on energy conservation as part of their annual financial statements (MCA, 2013, p. 85). The Act is the first mandatory regulation in the world to require ESG spending in addition to ESG disclosure (Manchiraju & Rajgopal, 2017, p. 1269).

In 2021, SEBI replaced the BRR with the Business Responsibility and Sustainability Report (BRSR) and introduced new ESG disclosure requirements for the top 1,000 listed companies by market capitalization, effective from the financial year 2022-23 (SEBI, 2021a). Under the BRSR framework, companies are required to provide disclosures in three categories, namely general disclosures, management and process disclosures and principle-based performance disclosures. In the latter category, companies must provide quantitative measures along the nine principles of the National Guidelines on Responsible Business Conduct (NGRBC). These include issues related to human rights, employee welfare, resource use, GHG emissions (Scope 1 and 2), and anti-corruption and anti-bribery measures. (SEBI, 2021b, 2021c)

In July 2023, SEBI introduced independent assurance requirements for certain ESG metrics (BRSR Core). In addition, the top 250 companies by market capitalization are now subject to new value chain disclosure requirements for (on a comply-or-explain basis). (SEBI, 2023) Despite this general movement towards greater ESG transparency through mandatory disclosure requirements in India, actual compliance by companies is questionable due to weak enforcement in the country (Dharmapala & Khanna, 2018, p. 102).

China

In China, the scope of mandatory ESG regulation is still relatively limited to a subset of publicly listed companies and companies operating in highly polluting industries. ESG disclosure mandates were first introduced in 2008 by the Shenzhen Stock Exchange (SZSE) and the Shanghai Stock Exchange (SSE), both government-owned and overseen by the China Securities Regulatory Commission (CSRC). (Y.-C. Chen et al., 2018, p. 171)

The SZSE made reporting mandatory for companies listed on its Shenzhen 100 Index in December 2008. Article 11 of the Notice on the Preparation of 2008 Annual Reports of Listed Companies mandates ESG reporting in line with the

Requirements for the Disclosure of Corporate Social Responsibility (as stated in Appendix 3 of the Notice). The regulation requires reports to be approved by the board of directors and published as a separate report accompanying the annual report. The reports must include at least the following: First, it must provide an overview of the company's purpose in fulfilling its corporate social responsibility. Second, it must provide information on how it protects the interests of shareholders and creditors and the rights of employees, how it protects suppliers, customers, and consumers, how it preserves the environment and promotes sustainable development, and how it engages in public relations and social welfare initiatives. Third, it must disclose issues related to the company's fulfillment of its social responsibilities and specific plans and actions for improvement. (SZSE, 2008)

Similarly, the SSE issued the Notice of Doing a Better Job for Disclosing 2008 Annual Reports, which requires listed companies in its Corporate Governance Sector, companies with overseas listed shares, and financial companies to include ESG reports in their annual reports from 2008 (SSE, 2008, Article 10). The disclosure requirements are similar to those introduced by the SZSE (Y.-C. Chen et al., 2018, p. 172). Neither regulation requires mandatory assurance of reports, but companies face penalties in the form of delisting and public shaming for non-compliance (Y.-C. Chen et al., 2018, p. 171). Prior to these disclosure regulations, ESG reporting was rather uncommon for Chinese companies (Ioannou & Serafeim, 2017, p. 9).

Also in 2008, the State-owned Assets Supervision and Administration Commission of the State Council (SASAC) released the Notification on the Issuance of the Guideline on Fulfilling Social Responsibility by Central Enterprises. Article 18 of the notice mandates central state-owned enterprises to disclose ESG reports. (SASAC, 2008)

Besides these broader ESG disclosure regulations, several laws specifically target major polluting companies. In 2014, the Chinese government enacted the Environmental Protection Law. Article 55 of the law requires major emitters to disclose detailed information on their pollutant discharge. (Chinese Government, 2014) Since 2021, the CSRC requires listed key polluting companies to disclose specific environmental information regarding pollution and environmental discharge (CSRC, 2021; OECD, 2023). In the same year, the Ministry of Ecology and Environment (MEE) enacted the Administrative Measures for Legal Disclosure of Corporate Environmental Information. These measures require all key pollutant discharge units and listed companies with a history of environmental violations (as defined in Chapter 2 of the regulation) to disclose various environmental information, including information on emissions of pollutants, carbon emissions, and environmental emergency plans and measures (Chapter 3, Article 12). (MEE, 2021a)

Looking forward, the Plan for the Reform of the Legal Disclosure System of Environmental Information, released by the MEE in 2021, outlines the intention to establish a comprehensive disclosure system regarding environmental information by 2025 (MEE, 2021b).

¹⁷ The regulation applies to companies fulfilling at least one of the three criteria: (1) net worth of at least 5 billion Indian Rupees (about USD 60 million), (2) turnover of at least 10 billion Rupees (about USD 120 million), or (3) net profit of at least 50 million Rupees (about USD 0.6 million).

Hong Kong

The ESG Reporting Guide of the Hong Kong Stock Exchange (HKEX) requires all listed companies to disclose specific information regarding different ESG topics. Since its first introduction in 2013, the ESG Reporting Guide has continuously been revised, and its latest amendments came into effect in July 2020. (HKEX, 2021, p. 2) Part B of the current Guide outlines the mandatory ESG disclosure requirements, and Part C lists the provisions that must be disclosed on a comply-or-explain basis. Part B includes disclosure requirements on the governance structure (e.g., oversight of ESG issues, ESG strategy, and an assessment of progress against ESG goals and targets). In addition, the mandatory requirements include disclosure of the materiality approach and the quantitative measures used. (HKEX, 2019, p. 4) In Part C, environmental disclosure provisions include information on emissions (e.g., Scope 1 and Scope 2 emissions and waste disposal), use of resources (e.g., efficient use of water, energy, and other raw materials), environment and natural resources (e.g., measures to reduce environmental impact), and climate change (e.g., identification and mitigation strategies of climate issues). (HKEX, 2019, pp. 5-7) The social disclosure provisions include information on employment, health and safety, development and training, labor standards, supply chain management, product responsibility, anti-corruption, and community investment. (HKEX, 2019, pp. 7-11) Unlike the mainland Chinese stock exchanges, HKEX's ESG reporting requirements apply to all listed companies (and not just a subset of listed companies above a certain size threshold).

Japan

The Tokyo Stock Exchange (TSE) expanded its Corporate Governance Code in June 2021 to include new disclosure requirements for companies listed on the Prime Market (Japan Exchange Group, 2021). These include disclosure of companies' sustainability initiatives and investments in human capital, as well as the climate-related risks and opportunities in line with the TCFD recommendations (TSE, 2021, pp. 14-15). It also requires social disclosure on diversity in senior management and human resource development policies to promote diversity (TSE, 2021, p. 11).

Since 2021, the Financial Services Agency (FSA) requires all listed companies in Japan to disclose their sustainability-related policies and initiatives, including information on governance and risk management. Disclosure of sustainability-related strategy, metrics and targets (including Scope 1 and 2 GHG emissions) are required on a comply-or-explain basis. The requirements include diversity disclosures. (FSA, 2023; Lawless et al., 2023)

In terms of targeted regulation, high energy consuming factories are required to disclose their annual energy consumption under the Act on the Rational Use of Energy (Article 15(1)) (Government of Japan, 1979). In addition, large emitting companies are required to disclose their GHG emis-

sions to the government under the Mandatory Greenhouse Gas Accounting and Reporting System since 2006 (Japan Ministry of the Environment, 2006, 2021).

Malaysia

Bursa Malaysia, the country's stock exchange, requires listed companies to disclose ESG initiatives and activities in their annual reports since 2007, on a comply-or-explain basis (Bursa Malaysia, 2006, p. 8). Since 2015, companies must include a sustainability statement in their annual reports, including information on material risks and opportunities related to economic, environmental, and social matters¹⁸ (Bursa Malaysia, 2015c, p. 1; 2022, p. 8). Since 2023, the regulation requires disclosure of specific sustainability matters, including risks and opportunities related to anti-corruption, diversity, energy use, employee health and safety, supply chain management, data security, water and waste management, and emissions management (including Scope 1, 2, and 3 emissions) (Bursa Malaysia, 2022, pp. 72-73). Companies listed on the Main Market must report in accordance with the TCFD guidelines. In addition, companies must indicate whether their report has been subject to internal or independent assurance. (Bursa Malaysia, 2022, p. 8)

Australia

In 2023, the Australian Government released new consultation papers that initiate the transition from a voluntary to a mandatory ESG disclosure regime. The proposed rules are closely aligned with the International Sustainability Standards Board (ISSB) framework (Australian Government, 2023, p. 10). Disclosure requirements include information on material climate-related risks and opportunities, as well as the identification, assessment and mitigation strategies in place. In addition, disclosure of certain ESG metrics and targets (including Scopes 1, 2 and 3 emissions) would be mandatory. (Australian Government, 2023, pp. 12-17) The proposal also includes external assurance requirements (Australian Government, 2023, pp. 22) and application of financial materiality principles regarding risks and opportunities assessment (Australian Government, 2023, pp. 11-12). Large companies would be required to comply from the 2024 financial year (for reports filed in 2025) and medium and small companies from 2025 and 2026, respectively¹⁹ (Australian Government, 2023, pp. 8-9). Importantly, the new

¹⁸ As defined in Paragraph 29, Part A of Appendix 9C, of the Main Market Listing Requirements, and Paragraph 30 of Appendix 9C of the ACE Market Listing Requirements. (Bursa Malaysia, 2015a, 2015b)

¹⁹ Large enterprises fulfil two of the three criteria: more than 500 employees, over AUD 500 million revenues or over AUD 1 billion assets. Medium-sized companies fulfil two of the three size thresholds: more than 250 employees, over AUD 200 million revenue or AUD 500 million assets. Small companies fulfil two of the three thresholds: over 100 employees, over AUD 50 million revenues or over AUD 25 million assets. (Australian Government, 2023, pp. 8-9)

regulation would apply to both public and private companies meeting the size thresholds that are currently required to file financial reports under the Corporations Act (Australian Government, 2023, p. 6).

Besides the current development towards a broad mandatory ESG disclosure regime, some targeted reporting regulations exist already today in Australia. The National Greenhouse and Energy Reporting (NGER) Act 2007 mandates disclosure of GHG emissions, energy production and energy consumption for the largest emitting entities (as defined by Section 13 of the Act) (Australian Government, 2007, p. 42). Under the Modern Slavery Act 2018, large companies incorporated or doing business in Australia (as defined by Section 5 of the Act) are required to disclose their modern slavery risks in their operations and their supply chains, as well as their processes and mechanisms to address these risks (Part 2 of the Act) (Australian Government, 2018, p. 10).

2.2.4. Latin America

Although the implementation of mandatory ESG disclosure rules has been comparatively slow in Latin America, several jurisdictions have started to move towards a mandatory ESG disclosure regime.

Brazil

Since January 2023, the Brazilian Securities Commission (CVM) requires listed companies to disclose ESG-related information as part of its Resolution No. 59 (RCVM 59). On a comply-or-explain basis, Item 1.9 includes disclosure requirements on the location of ESG disclosure (i.e. annual report or other type of document), the methodologies used to prepare the report, the use of ESG KPIs and the materiality assessment, the status of independent verification, whether GHG emissions are measured (and, if so, their scope) and whether the TCFD recommendations (or other ESG standard) are taken into account (CVM, 2021, pp. 15-16). In addition, companies must disclose the environmental and social risks they face and the strategies and policies in place to mitigate them (CVM, 2021, pp. 27-28). The requirements also include information on diversity in management (CVM, 2021, pp. 38-39) and among employees (CVM, 2021, p. 60). However, RCVM 59 lacks a requirement to report on specific ESG issues and a proper enforcement mechanism, such as the imposition of penalties for non-compliance (Lavigne et al., 2021).

From 2026, listed companies in Brazil will be subject to more comprehensive ESG disclosure requirements. The CVM has issued Resolution No. 193 (RCVM 193) in October 2023, which requires ESG disclosure in line with the ISSB reporting standards and also includes mandatory reasonable assurance requirements. (CVM, 2023)

In terms of targeted disclosure regulations, since 2006, energy companies are required to publish an annual sustainability report, in accordance with the Aneel Guidelines for Annual Sustainability Report – Despacho 3034/2006. (UNEP, 2019, p. 17)

Chile

As part of the new climate change strategy, the Chilean Financial Markets Commission (CMF) announced in September 2020 its intention to increase ESG transparency, including through the implementation of stricter disclosure rules (CMF, 2020). In November 2021, the CMF introduced General Rule No. 461, which requires listed companies as well as financial institutions to include sustainability and governance matters in their annual reporting. The requirements include disclosure of climate-related risks and opportunities and respective mitigation measures, in line with international reporting guidelines like the TCFD (Paragraph 3.6). Additionally, companies are required to disclose industry-specific ESG metrics in line with the SASB reporting requirements, on a comply-or-explain basis (Paragraph 8.2). (CMF, 2021, 2022)

Argentina

Argentina does not have broad ESG disclosure requirements established. However, Law No. 2594 requires national and international companies in Buenos Aires with more than 300 employees to disclose an annual sustainability report (*Balance de Responsabilidad Social y Ambiental*) since 2008, in line with GRI reporting standards. (Government of Buenos Aires, 2007)

2.2.5. Other regions

This section extends the analysis of ESG disclosure requirements to regions not previously covered, focusing on Canada and South Africa.

Canada

To date, Canada does not have comprehensive mandatory ESG disclosure requirements. However, National Instrument 51-102 Continuous Disclosure Obligations requires public companies to disclose in their annual reports environmental and health risks material to their business (Item 5.2), as well as social and environmental policies (Item 5.1(4)), and the financial and operational impact of environmental regulations (Item 5.1(1)) since 2004 (CSA, 2004, pp. 3512-3513). In addition, there is a move towards more explicit mandatory ESG disclosure regulation. The Canadian Securities Administrators (CSA) has published the proposed National Instrument 51-107 Disclosure of Climate-related Matters in October 2021, which would mandate ESG reporting for listed companies in line with the TCFD recommendations. (CSA, 2021, p. 6)

With regards to GHG emissions reporting, Canada's largest emitters²⁰ are required to disclose their emissions as part of the Greenhouse Gas Reporting Program (GHGRP),

²⁰ Facilities with more than 10,000 tonnes of GHG emissions annually.

which was established under Section 46 of the Canadian Environmental Protection Act (CEPA) in 2004. (Government of Canada, 2023)

South Africa

Although South Africa does not have an explicit ESG disclosure regime, listed companies on the Johannesburg Stock Exchange (JSE) are required to disclose an integrated report since 2010, as recommended by the King IV Report (Institute of Directors Southern Africa, 2016). Compliance with the King Code is part of the JSE Listing Requirements (JSE, 2022) and includes disclosure requirements on financially material ESG information in annual reports on a comply-or-explain basis, as well as mandatory external assurance (Ioannou and Serafeim, 2017, p. 9; Stolowy and Paugam, 2018, p. 527). In addition, mineral companies are mandated by the Listing Requirements to include information regarding their environmental management and funding (Paragraph 12.13(iii)(13)), as well as major environmental issues (Paragraph 12.10(h)(viii)) in their annual reports (JSE, 2022).

2.3. Comparative analysis of mandatory ESG disclosure regulatory approaches

ESG regulatory regimes vary widely across countries, as shown in Section 2.2. The EU has adopted the most comprehensive mandatory ESG disclosure regime. The CSRD will expand the scope of companies covered and the range of issues to be reported to an unprecedented degree (European Parliament, 2023). Although the US does not yet have a wide-ranging federal ESG disclosure regime, the SEC has issued a proposal for comprehensive climate-related disclosure requirements in 2022 (SEC, 2022b). Progress is also being made at the state level, with California in particular moving forward with its own regulatory framework (California Government, 2023a, 2023b). In APAC, the level of mandatory ESG requirements varies. In China, only a subset of listed companies and state-owned enterprises are covered by comprehensive ESG disclosure requirements (SASAC, 2008; SSE, 2008; SZSE, 2008). In contrast, India goes beyond mere disclosure requirements by requiring certain companies to actively invest in ESG-related activities (MCA, 2013). While Hong Kong, Japan, and Malaysia have implemented more comprehensive reporting regimes (Bursa Malaysia, 2022; FSA, 2023; HKEX, 2019), Australia is just starting to move from voluntary to mandatory ESG reporting (Australian Government, 2023). Latin America is lagging behind, but countries such as Chile and Brazil are increasingly recognizing the importance of ESG transparency and implementing ESG disclosure requirements (CMF, 2021; CVM, 2023).

The remainder of this section provides an overview of the differences and similarities between mandatory ESG disclosure regulations along several dimensions, namely regulator type, basis of reporting, reporting standards, scope of companies affected, content, materiality assessment, disclosure

format, level of enforcement, and institutional and cultural factors.²¹

Regulator type: First, ESG regulations can be issued by the government (or regulatory bodies such as securities regulators) or by a stock exchange. For example, the EU disclosure directives are transposed into national law by member states' governments, while the Hong Kong regulation is issued by the stock exchange. The type of issuer is likely to influence the effectiveness of the regulation. According to Leuz (2010, p. 12), government regulation is characterized by stricter enforcement mechanisms, as governments have the power to impose criminal penalties on companies that do not comply with the law. Non-compliance by companies subject to stock exchange regulations, on the other hand, can usually only be punished by fines or delisting. While exchanges can tailor regulations to the companies they affect, government regulations, which cover a broader range of companies, benefit from standardization and network effects. Ernstberger et al. (2021, p. 5) provide evidence that government-imposed ESG disclosure requirements lead to a greater reduction in information asymmetry than do stock exchange requirements. Similarly, Krueger et al. (2023, p. 4) find that liquidity improves significantly more for firms subject to government requirements than for firms subject to stock exchange requirements.

Basis of reporting: Disclosure requirements can be implemented on a comply-or-explain basis or on a fully mandatory basis. The former is used by many jurisdictions to give companies the flexibility to either comply with the requirements or explain why they are not complying. For example, the NFRD allows companies to provide reasons for not implementing certain ESG-related policies (EPRS, 2021, p. 3). Some countries, such as Hong Kong, also opt for a mixed approach, which includes both mandatory and comply-or-explain disclosure requirements (HKEX, 2019, p. 1). In contrast, neither the SEC's nor the Australian government's proposed climate disclosure rules currently include a comply-or-explain principle (SEC, 2022b).

On the one hand, comply-or-explain provisions reduce compliance cost as companies are exempt from reporting information that is not relevant to them. The principle may also lead to greater acceptance by affected companies compared to a stricter, mandatory disclosure regime. Finally, the explanations provided by companies in the event of non-compliance could make it easier for policymakers to identify inefficiencies and weaknesses in the regime, enabling them to review and improve the relevant areas of the law. (Ho, 2017, pp. 345-347)

On the other hand, comply-or-explain may reduce the number of companies that do comply with the regulation, as companies can simply choose to provide an explanation. This reduces the effectiveness of the mandate and leads to

²¹ It is important to note that I do not attempt to evaluate the regulatory regimes in terms of potential strengths and weaknesses, nor do I analyze the potential costs and benefits for the companies subject to the mandates.

an increase in the quantity, but not the quality of disclosures. (Ho, 2017, p. 331) According to Haji et al. (2023, p. 181) the impact of these different reporting models on regulatory outcomes remains unclear.

Reporting standards: Many organizations have developed ESG disclosure standards with the goal of increasing harmonization of ESG disclosures. However, this has resulted in a fragmented ESG standards landscape: Common standards have been developed by the GRI, the TCFD²², the Sustainability Accounting Standard Board (SASB), the Climate Disclosure Standards Board (CDSB), and the International Integrated Reporting Council (IIRC), among others. (H. B. Christensen et al., 2021, p. 1177) To improve the comparability and consistency of information disclosed across companies and jurisdictions, the International Financial Reporting Standards (IFRS) Foundation has established the ISSB to consolidate the variety of existing standards. The ISSB has published their first set of standards in June 2023. (IFRS, 2023a, 2023b) Multiple jurisdictions have already announced that they are considering to adopt the ISSB standards, including the UK, Australia, and Canada, which would make compliance mandatory (EY, 2023, p. 2). Other major reporting frameworks are emerging in the EU and in the US. With the entry into force of the CSRD, the EU will require reporting according to the new ESRS standards developed by EFRAG (European Commission, 2023c). In the US, the SEC has developed its own reporting standards with its Proposed Rule on Climate-Related Disclosure (SEC, 2022b). The ISSB, ESRS, and the SEC Proposed Rule are all aligned with the TCFD recommendations. Although differences in requirements remain (i.e., regarding the scope, materiality definition, assurance requirements, and content to be disclosed), there is a trend towards more comparable and consistent reporting. Especially companies operating in multiple jurisdictions would highly benefit from a harmonization of reporting requirements. (EY, 2023, pp. 1-2)

Scope of affected companies: ESG disclosure requirements differ in terms of the scope of companies covered. Criteria used to define the scope include size thresholds (e.g. number of employees, annual revenue), whether a company is listed or not, or industry membership. Regulations can either cover a broad range of companies (e.g. the NFRD) or be targeted at a specific group of companies, such as large emitters (e.g. the US GHGRP).

Scope of content to be disclosed: Broad ESG disclosure regimes, such as the NFRD, cover multiple ESG issues, while targeted regulations, such as Section 1502 of the Dodd-Frank Act, focus on specific ESG concerns. Broad ESG regimes also vary in scope. For example, the SEC's proposed rule and the ISSB standards focus primarily on climate-related disclosures, although the ISSB is expected to expand the scope to include other issues. The ESRS, on the other hand, are more comprehensive, covering other environmental aspects such

as water use and pollution, social aspects such as those related to employees and consumers, and governance aspects such as business conduct (EY, 2023, p. 4). In addition, some regulations provide considerable detail on the content to be provided (e.g., Hong Kong's ESG Reporting Guide), while other requirements are more general (e.g., Brazil's Resolution No. 59). While prescribing the specific ESG matters, metrics and KPIs to be disclosed allows for better comparability of information across companies, the latter approach reduces the regulatory burden on companies by giving them the flexibility to assess which information is most material to them (European Commission, 2021, pp. 13-14).

Materiality: Reporting requirements also differ in their underlying definition of materiality, which is the concept used to identify relevant ESG issues for disclosure. In general, ESG issues can be material from a financial (or outside-in) perspective and/or from an impact (or inside-out) perspective. The financial materiality perspective considers those ESG issues that (potentially) have a material impact on the financial performance of the company. The impact materiality perspective requires companies to disclose their impact on the environment and society. (European Commission, 2021, pp. 15-16)

Most jurisdictions, including the SEC's proposed rule and countries adopting the ISSB standards, require reporting under the financial materiality perspective. The EU is the first jurisdiction to adopt a double-materiality approach, which requires companies to report on issues that are material from both perspectives combined, as well as issues that are material only from a financial or only from an impact perspective. (EY, 2023, p. 15)

Disclosure format: ESG regulations differ in their requirements for the location of disclosure. Information can be disclosed either as a separately published ESG report, as part of the annual report or as part of an integrated report. The integrated report is a combination of the first two disclosure formats, in that both ESG-related and financial information are comprehensively covered. (Ernstberger et al., 2021, p. 7) Hence, the integrated report aims to provide a broader view of the material financial, environmental, and social impacts on the company's value creation process (Cohen & Simnett, 2015, p. 16). For example, South Africa requires ESG information in the form of an integrated report since 2010, while Malaysia requires ESG information to be included in annual reports. Companies subject to the NFRD can either include ESG information in their annual report or as a separate report. Ernstberger et al. (2021, p. 5) find that regulations that require disclosure of ESG information in dedicated, standalone reports result in a greater reduction in information asymmetry than mandates that require reporting as part of annual or integrated reports. They argue that investors can access the ESG information more easily when presented separately (and not included in predominantly financial reports). However, there is still limited empirical evidence on the effect of different types of disclosure format (Haji et al., 2023, p. 193).

²² The TCFD takes a slightly different approach, being more of a framework to provide guidance to others, rather than being a standard in itself (Murray, 2021)

Targeted regulations may also require information disclosure on the company's website, or direct reporting to a specific authority (European Commission, 2021, p. 19). For example, companies subject to the US GHGRP have to disclose GHG emissions to the EPA, which will verify and consolidate the information and make it available on their own website (US EPA, 2023a).

Level of enforcement: The level of enforcement is likely to have a large impact on the effectiveness of the respective ESG disclosure rules (H. B. Christensen et al., 2021, p. 1190). The imposition of assurance requirements or penalties for non-compliance are two ways in which regulators enforce disclosure requirements.

According to Ioannou and Serafeim (2017, p. 12), external assurance is likely to reduce intentional misreporting in the form of missing or incorrect information. However, most regulations currently do not mandate external verification of ESG disclosures (Haji et al., 2023, p. 181). While the NFRD only requires assurance on the provision of ESG information, but not on the specific content (European Parliament and Council, 2014, p. 3, Recital 16), the CSRD requires more comprehensive external assurance (European Commission, 2023d).²³ Companies subject to Section 1502 of the Dodd-Frank Act are required to obtain external verification when claiming not to use conflict minerals (SEC, 2017). The SEC's current proposed rule requires external verification of Scope 1 and Scope 2 emissions for certain large companies (SEC, 2022a, p. 3).

Regulators can also pose penalties on companies in case of non-compliance to enforce disclosure rules. However, many ESG disclosure regulations do not state any specific sanction in case of non-compliance by reporting companies (Ioannou & Serafeim, 2017, p. 3). The NFRD, for example, does not prescribe specific penalties but urges member states to ensure that an effective enforcement mechanism is installed (European Parliament and Council, 2014, p. 2, Recital 10). Under the CSRD, penalties will also be subject to specification by member states (European Parliament and Council, 2022, p. 38, Recital 73). Some stock exchanges, such as the SSE and the SZSE in China, have made ESG reporting a listing requirement, meaning that companies risk delisting if they do not comply (Y.-C. Chen et al., 2018, p. 187). According to Ioannou and Serafeim (2017, p. 11), however, no company has yet been delisted for failing to publish ESG information.

Institutional environment and cultural aspects: The institutional environment of the country, consisting of formal and informal institutions, also influences the level of effectiveness of a regulation. A country with a strong formal enforcement mechanism is characterized by an effective regulatory environment and government, as well as strict rules of law.²⁴ While countries such as Germany, the US, and Aus-

tralia have strong formal institutions, regulations in India, Argentina, and South Africa are less likely to be strictly enforced (Krueger et al., 2023, pp. 44–45). Informal institutions refer to the society's norms and values. In the ESG context, social and environmental values in particular can influence the extent to which companies comply with disclosure requirements. (Krueger et al., 2023, pp. 4–5)

For instance, Krueger et al. (2023, p. 5) find that ESG mandates have a stronger positive effect on stock liquidity in countries with strong informal institutions, while a strong formal environment does not seem to have an impact. Mittelbach-Hörmanseder et al. (2021, p. 311) provide evidence that a stronger regulatory framework and a higher level of enforcement in EU member states have a positive impact on the value relevance (i.e. the explanatory power) of disclosed ESG information under the NFRD.

Similar to the institutional environment, cultural differences are also likely to influence the effectiveness of ESG disclosure regulation. Mittelbach-Hörmanseder et al. (2021, p. 335) find that differences in national culture, as measured by Hofstede's (1983) cultural dimensions, affect the value relevance of ESG disclosure (except for environmental issues). Their results suggest that power of distance (i.e., the degree of acceptance of hierarchy and authority) and individualism (i.e., the extent to which individuals prioritize themselves over the group) have a significant positive impact. Conversely, masculinity (i.e. the degree of competition in a society) and uncertainty avoidance (i.e. the degree of tolerance for ambiguity and risk) have significantly negative effects.

Overall, it is important to consider these differences in regulatory frameworks and the specific institutional and cultural contexts of each jurisdiction when interpreting the findings on the impact of ESG disclosure requirements on covered companies. This is particularly important when assessing their relevance and applicability to other regulatory environments.

3. Impact of ESG disclosure regulation on affected companies

This chapter reviews the relevant literature on the impact of ESG disclosure regulation on affected companies. I limit the scope of the analysis in two ways. First, I analyze the effects of ESG disclosure rather than the effects of firms' underlying ESG performance (although there is a close link between disclosure and firms' activities) (H. B. Christensen et al., 2021, p. 1184). Second, I focus on mandatory requirements, consistent with my review of mandatory regulatory developments in Chapter 2. Studies focused on mandatory disclosure regimes mitigate the dual selection bias found in studies of voluntary disclosure. That is, companies can first

²³ Under the NFRD, EU member states can choose to voluntarily implement mandatory assurance requirements, as well as whether penalties will be imposed in case of non-compliance. (CSR Europe and GRI, 2017, p. 7)

²⁴ Government effectiveness is defined as the overall efficiency of the gov-

ernment in implementing policies and its credibility in committing to them. The rule of law refers to the quality of the country's legal system and its ability to enforce the law. (Krueger et al., 2023, p. 18)

voluntarily choose which ESG activities to engage in and second, companies then choose whether and what ESG information to disclose (H. B. Christensen et al., 2021, p. 1198).

My literature review covers three areas of impact. First, the impact on the ESG reporting practices of affected firms (see Section 3.1); second, the financial impact of ESG disclosure regulation (see Section 3.2); and third, the ESG-related behavior of affected firms, also referred to as real effects²⁵ in the literature (see Section 3.3). A summary of the studies reviewed is provided in Appendix 2. Results vary across institutional contexts, likely reflecting the differences in mandates and country characteristics.

3.1. Impact on ESG disclosure practices

Several studies examine whether mandatory ESG disclosure regulations achieve their primary goal of increasing ESG transparency, as measured by changes in the quantity and quality of ESG reporting. The majority of studies suggest that ESG disclosure mandates lead to an increase in the quantity of disclosure (e.g., Cuomo et al., 2022; Fiechter et al., 2022; Ioannou and Serafeim, 2017), although this is not unanimously supported (Cordazzo et al., 2020). ESG disclosure mandates appear to have a positive or no effect on ESG reporting quality (D. M. Christensen et al., 2022; Ottenstein et al., 2022).

3.1.1. Quantity of ESG disclosure

ESG disclosure requirements potentially increase the number of reporting companies by requiring disclosure from companies that have not previously engaged in voluntary ESG reporting. They may also increase the depth of disclosures by requiring more comprehensive information beyond what is voluntarily disclosed. (Gulenko, 2018, p. 8)

However, the precise impact on the level of disclosure is unclear a priori. Many regulations operate on a comply-or-explain basis, allowing firms to avoid disclosure by justifying non-compliance (e.g. due to unreasonable costs or complexity of disclosure). In addition, the lack of robust enforcement mechanisms and penalties for non-compliance, as well as vague guidelines for reporting metrics, further contribute to this ambiguity. (Haji et al., 2023, p. 184); Ioannou and Serafeim, 2017, p. 11

Despite the comply-or-explain principle, several studies suggest that the EU's NFRD has led to an increase in ESG disclosure. For example, Fiechter et al. (2022, pp. 1509–1512) provide evidence that both the number of companies publishing ESG reports and the breadth of the individual reports increase. These effects already materialize after the passage of the directive (before companies are required to comply) and are stronger for firms with prior low levels of voluntary ESG disclosure. Similarly, Ottenstein et al. (2022, p. 56) find that the number of reporting companies and the

quantity of disclosed information per company increases after the NFRD comes into effect (2017 to 2018). Since the large public companies subject to the NFRD already tend to have high pre-mandate reporting levels, the effect is however less pronounced than expected (Ottenstein et al., 2022, p. 75). Cuomo et al. (2022, pp. 1–2) also find that more companies disclose ESG information following the NFRD's passage. Companies with certain characteristics show stronger positive effects, such as smaller firm size, stronger legal systems in the country of headquarter, and a higher number of analysts following. Mion and Adai (2020, p. 72) support these results as they find that the number of published ESG reports by affected companies in Germany and Italy increases in the first year of the NFRD's effectiveness.

Studies on mandates in France and the UK provide supporting evidence. Chauvey et al. (2015, p. 800) observe a significant increase in disclosure quantity following the introduction of the NRE in France, as measured by the amount of space used for ESG-related information in disclosure reports. Similarly, Hummel and Rötzel (2019, pp. 229–232) suggest that firms affected by the UK's Companies Act Regulations 2013 significantly increase disclosure levels. In additional analyses, they find a weaker positive effect for firms with high reporting incentives, as these companies tend to have higher pre-regulation voluntary disclosure levels.

In an international study, Ioannou and Serafeim (2017, pp. 4–5) also show that disclosure levels of companies in China, Denmark, Malaysia, and South Africa increase significantly after the implementation of respective mandatory disclosure regulations, as measured by ESG disclosure scores. The results do not seem to be influenced by the level of prior voluntary disclosure. Similar to the NFRD, the regulations are based on a comply-or-explain principle (Ioannou & Serafeim, 2017, p. 11).

In contrast, there is some evidence that the quantity of ESG information disclosed is not affected or even decreases after the introduction of disclosure requirements. For example, Cordazzo et al. (2020, p. 3476) find no evidence that affected Italian companies significantly increase the level of disclosure in the first year after the NFRD takes effect. In particular, companies with a history of voluntary ESG reporting seem to limit their disclosure even to the extent of meeting the required minimum standards. Similarly, companies reporting for the first time only disclose the minimum required. Bell (2021, pp. 23–25) analyses the impact of the *Indian Companies Act 2013*, which requires affected companies to disclose ESG-related information and to spend on ESG-related activities. The results do not suggest an improvement in the level of ESG disclosure, as measured by the number of ESG-related words in annual reports. In addition, the study finds that companies with previously lower disclosure levels relative to their peers significantly reduce disclosure levels after the regulation. This suggests that, on average, the mandate reduces disclosure levels compared to a voluntary environment. However, Bell (2021, p. 65) notes that the lack of improvement in disclosure may be due to weak enforcement in India. Therefore, it is questionable whether these re-

²⁵ Consistently with Leuz and Wysocki (2016, p. 530), real effects are defined as companies adapting their behaviour as a consequence of disclosure mandates, for example by reducing their resource consumption.

sults are generalizable to other regulatory environments with stronger enforcement mechanisms.

3.1.2. Quality of ESG disclosure

Research assessing the quality of mandatory ESG reporting often measures key aspects such as credibility, comparability, and completeness of reporting. It is important to examine whether mandatory disclosure improves reporting quality, as previous literature has mostly found low quality in voluntary ESG disclosures. (Haji et al., 2023, p. 184)

Several studies suggest that the NFRD positively impacts reporting quality. For example, Fiechter et al. (2022, pp. 1509–1510) find that ESG reports improve both in terms of credibility (as measured by the level of external assurance on disclosure) and comparability (as measured by the adoption of international reporting standards). These effects are more significant for companies with previously lower levels of voluntary reporting. Furthermore, the improvements already occur after the NFRD's passage in 2014 but before coming into effect in 2018. Ottenstein et al. (2022, p. 56) also find an overall improvement in reporting quality, which is driven by an increase in the credibility of ESG reports (as measured by external assurance levels). However, they find no increase in the adoption of international reporting standards, which suggests that the comparability of reports is likely to remain low. Mion and Adaui (2020, pp. 72–74) find that reporting quality increases in the first year of the NFRD's effectiveness for German and Italian companies. In line with Fiechter et al. (2022) and contrary to Ottenstein et al. (2022), they find that comparability of ESG reports increases as more companies adopt international reporting standards (although the degree of compliance with reporting guidelines varies across companies). However, the results of the study should be considered indicative due to the limited scope of the dimensions included in the content analysis, the short time period covered, the small sample size and the lack of control for firm-level characteristics.

Examining different mandates across jurisdictions, Ioannou and Serafeim (2017, pp. 4–5) report an improvement in the quality of ESG disclosure by affected companies. This improvement relates to both credibility and comparability, as measured by changes in voluntary external assurance of ESG information and adoption of international reporting standards. D. M. Christensen et al. (2022, p. 160) also conduct an international analysis and find that companies subject to regulation significantly improve their reporting quality, as measured by the Bloomberg ESG disclosure score.

In contrast, other studies do not provide evidence for a positive impact of mandatory ESG disclosure on reporting quality. For example, Lock and Seele (2016, pp. 187–189) compare the quality of ESG reports of companies in European countries with mandatory non-financial disclosure regulations to those without such regulation (before passage of the NFRD). They measure the credibility of reports as defined by four characteristics: understandability, truth, sincerity, and appropriateness. The results do not provide evidence that disclosures from countries with ESG reporting

regimes are significantly more credible than those from countries without respective laws (Lock & Seele, 2016, p. 192). The study differs from those mentioned above in that it does not compare changes in disclosure quality before and after the passage of ESG disclosure mandates, but rather compares disclosure quality of companies in countries with regulation to those in countries without regulation. Therefore, it does not rule out the possibility that other country-specific factors influence the outcome.

Chauvey et al. (2015, pp. 800–801) study the change in quality of ESG reports in the years following the introduction of mandatory ESG disclosure in France in 2001 as mandated by the NRE. Although they find a slight improvement, disclosure quality remains at a low level. Their analysis further indicates that the number of companies reporting about negative ESG incidents decreases. However, the significance of the results is limited by the small sample size and by the fact that only two reporting years are included in the analysis.

Birkey et al. (2018, pp. 827–828) find that while companies affected by the CTSCA (the Californian disclosure mandate to address modern slavery in the supply chain) seem to generally comply with the disclosure mandate, reporting is rather symbolic. Companies do not provide detailed and substantial information with respect to the required disclosure areas.

3.1.3. Discussion of findings on corporate reporting practices

Overall, the majority of studies suggest that ESG disclosure regulation positively impacts disclosure quantity, both in terms of the number of companies reporting and the level of reporting per company (Fiechter et al., 2022; Ottenstein et al., 2022). Nonetheless, some studies do not provide supporting evidence (Cordazzo et al., 2020). In terms of disclosure quality, several studies find evidence for a positive impact of ESG disclosure regulation, as measured by higher credibility through voluntary external assurance (Fiechter et al., 2022; Ioannou & Serafeim, 2017; Ottenstein et al., 2022), higher comparability through the adoption of reporting standards (Fiechter et al., 2022; Ioannou & Serafeim, 2017; Mion & Adaui, 2020), or higher overall ESG disclosure scores (D. M. Christensen et al., 2022).

However, other studies do not find evidence that ESG disclosure requirements increase the credibility (Lock & Seele, 2016) or comparability (Ottenstein et al., 2022) of reports. According to Chauvey et al. (2015, p. 800), firms seem to be selective in their disclosures, as the number of firms reporting about negative ESG incidents decreases post-regulation. In addition, Birkey et al. (2018, p. 828) finds that disclosure is rather symbolic. Despite the mixed evidence regarding reporting quality, broad ESG disclosure regimes like the NFRD seem to have a positive impact (Cuomo et al., 2022; Fiechter et al., 2022).

The impact of regulation on disclosure quantity and quality seems to be more pronounced for companies that are more affected by the regulation. That is, firms with certain firm-level characteristics such as lower prior voluntary disclosure

levels²⁶ (Fiechter et al., 2022, p. 1510; Hummel and Rötzel, 2019, p. 229), smaller firm size (Cuomo et al., 2022, p. 2; Ottenstein et al., 2022, p. 75), or firms located in countries with stronger legal systems (Cuomo et al., 2022, p. 2). Fiechter et al. (2022, p. 1510) also suggests that companies improve their reporting practices in anticipation of the new regulations taking effect.

3.2. Financial impact of ESG disclosure regulation

When ESG disclosures reveal new and relevant information, they are expected to provide capital market benefits such as higher firm valuation, increased liquidity, and lower cost of capital. However, ESG disclosure is also associated with costs and risks, including the potential revelation of strategic business details. In addition, greater ESG transparency may increase legal or litigation risks. As a result, the ultimate impact of ESG disclosure on a company's financial market position and profitability is not readily predictable. (H. B. Christensen et al., 2021, p. 1208)

The first three parts of this section focus on the capital market effects of ESG disclosure requirements, including on firm value (Section 3.2.1), stock liquidity and information asymmetry (Section 3.2.2), and the cost of capital (Section 3.2.3). Section 3.2.4 focuses on the impact on firms' financial operating performance, as reflected in changes in firm profitability. Section 3.2.5 discusses the findings on the financial impact of ESG regulation.

3.2.1. Firm value

ESG disclosure can increase firm value if it provides useful information to investors, as discussed above. However, mandatory disclosure could also lead to companies being forced to provide less beneficial information, potentially harming firm value (Mittelbach-Hörmanseder et al., 2021, p. 316). Market perceptions of high compliance costs, including those for preparing ESG reports and adopting ESG-related governance practices, could also reduce firm value (Ioannou & Serafeim, 2017, p. 5). However, negative market reactions may be mitigated if the market expects a symbolic response to ESG regulation. In addition, costs may decline over time as firms become more efficient in complying with the requirements. (Haji et al., 2023, pp. 185–186)

Researchers have used a variety of approaches to study the impact of ESG disclosure requirements on firm value. One strand examines the longer-term valuation effects on companies following the introduction of regulation. Another examines capital market reactions to events that increase or decrease the likelihood of adoption of ESG disclosure mandates. The third examines the impact on firm value immediately after mandatory reporting begins.

Long-term valuation effects: With respect to the first strand of research, studies in different institutional settings

show mixed results. Ioannou and Serafeim (2017, pp. 5–6) find that increased transparency following ESG mandates is significantly positively associated with higher firm value (as measured by Tobin's Q) in different regulatory environments, including China and South Africa. This effect is attributed to both environmental and social disclosures. Krueger (2015, pp. 2–4) finds that the UK's 2013 GHG emissions disclosure mandate has a positive effect on firm value (as measured by Tobin's Q) of companies that did not voluntarily disclose emissions before the mandate. The positive effect is stronger for large firms and those in carbon-intensive industries. This suggests that investors particularly value the transparency of companies with high environmental impacts. The impact is already observed in 2011, before the new requirements take effect (Krueger, 2015, p. 19). Swift et al. (2019, pp. 424–426) report that firms with greater transparency experience improved stock market valuation (as measured by Tobin's Q) following the conflict minerals disclosure rule in Section 1502 of the Dodd-Frank Act, with effects also occurring before compliance is required.

Contrasting evidence finds a negative impact on firm value. For example, Lu et al. (2021, p. 1495) and Y.-C. Chen et al. (2018, pp. 176–177) show a significant decrease in firm value of Chinese firms subject to the 2008 ESG disclosure rules of the Shenzhen and Shanghai stock exchanges (as measured by price-to-book ratio and Tobin's Q, respectively). Mittelbach-Hörmanseder et al. (2021, p. 324) find that the introduction of the NFRD turns the previously positive or neutral relationship between ESG disclosure and firm value into a significantly negative one (as measured by share price). This decline is attributed to the involuntary disclosure of less beneficial information, investor anticipation of additional costs, content ambiguity, and lack of external assurance (Mittelbach-Hörmanseder et al., 2021, p. 327).

The institutional context also influences this relationship, with ESG disclosure showing lower value relevance in countries with high ESG awareness and labour protection, but higher relevance in countries with stronger legal systems and enforcement mechanisms (Mittelbach-Hörmanseder et al., 2021, pp. 335–336).

Valuation effects around relevant regulatory events: Most studies find that markets react negatively to key events that increase the likelihood of mandatory ESG reporting adoption. Grewal et al. (2019, p. 3062) observe a significant decline in the value of affected firms around three important events leading up to the passage of the NFRD in the EU, as measured by cumulative abnormal returns (CAR)²⁷. Firms with higher pre-mandate ESG disclosure and performance show a less pronounced negative reaction. Companies with above-median ESG disclosure and performance even experience positive reactions, suggesting that investors are mostly

²⁶ With the exception of Ioannou and Serafeim (2017, p. 11), who find no difference in disclosure levels between high and low reporting companies prior to regulation.

²⁷ The three events are considered to increase the likelihood of the introduction of mandatory ESG disclosure in the EU, namely (1) the European Commission presenting the proposal, (2) the European Council agreeing on the proposal, and (3) the Commission adopting the proposal. (Grewal et al., 2019, p. 3067)

concerned about higher costs for firms with lower ESG performance. Y.-C. Chen et al. (2018, pp. 184–186) find more negative market reactions to the announcement of mandatory ESG regulation in China for regulated firms (as measured by CAR). Unregulated firms also experience a negative (but less pronounced) market reaction, suggesting that investors expect regulation to be extended to currently unaffected firms.²⁸ According to Manchiraju and Rajgopal (2017, pp. 1260–1261), affected firms experience a negative stock market reaction around several events related to the passage of India's ESG disclosure and spending mandate (as measured by CAR and stock prices). The negative impact is mitigated for firms with higher advertising spending, which is a proxy for greater consumer awareness. Birkey et al. (2018, p. 834) report significant negative market reactions around major legislative events leading to the passage of California's 2010 CTSCA, especially for larger firms and those with higher supply chain risks (as measured by CAR).

Event studies related to the enactment of the US Dodd-Frank Act also observe negative market reactions around events increasing the likelihood of passage. Healy and Serafeim (2020, pp. 120–121) find stock price declines for companies affected by Section 1504 of the Act, which mandates disclosure of government payments in the extractive industries. The negative effects are stronger for firms with previously low government payment transparency, firms with higher foreign assets, firms that lack sufficient anti-corruption measures, and firms that operate in countries with high expropriation risk or that prohibit government payment disclosure. However, a small sample size of 26 firms limits the transferability of the results.

Similarly, Elayan et al. (2021, pp. 22–25) observe negative cumulated average abnormal returns (CAAR) for firms using conflict minerals around various announcements that are thought to increase the likelihood of passage of Section 1502 of the Act. The negative impact is stronger for less transparent companies, high-tech companies, companies dependent on conflict minerals in their production process, and companies with a history of human rights issues. However, companies with strong reputations and good governance experience less of a negative impact, as investors perceive them as less likely to be involved in human rights abuses.

In contrast, Cousins et al. (2020, pp. 32–34) find on average no effect on stock returns of affected companies around events leading to the passage of the UK Modern Slavery Act 2015. Firms with higher slavery risk experience more negative effects, while firms with better labor protection standards experience more positive stock price responses.

H. B. Christensen et al. (2021, p. 1200) raise issues with the event study approach. Market reactions may reflect anticipation not only of the effects of ESG disclosure, but also of actual changes in firms' ESG activities. In addition, it is difficult to identify specific dates when investor expectations

change. Finally, they point out the challenge of disentangling the effects of simultaneous external shocks, all of which can reduce the accuracy of the results.

First-time ESG reporting: Research on market reactions to first-time mandatory ESG reporting shows mixed results. Jouvenot and Krueger (2019, p. 7) find that among companies subject to the UK's GHG emissions disclosure mandate, those with lower emissions benefit from a positive market reaction (as measured by abnormal stock returns), while high-emission companies experience negative abnormal returns. Elayan et al. (2021, pp. 34–35) find that negative market reactions to initial disclosure under Section 1502 of the Dodd-Frank Act on conflict minerals disclosure are limited to firms with unclear disclosures, those with a history of human rights abuses, and those sourcing from the DRC or neighboring countries. Conversely, companies with risk mitigation strategies experience more positive reactions.

Cordazzo et al. (2020, pp. 3480–3481) find no evidence for a negative impact of first-time ESG disclosure on share prices of Italian companies subject to the NFRD. This may be due to unchanged disclosure levels of these companies after regulation (see Section 3.1.1). Veltri et al. (2020, pp. 2227–2230) analyze the impact of a subtopic of ESG reporting, namely ESG-related risk disclosure, on market value in the same setting and find a positive effect, although their findings are limited by a small sample size of 51 firms. While Veltri et al. (2020) analyze the impact of differences in risk disclosure levels post-mandate, Cordazzo et al. (2020) analyze the value relevance of ESG information pre- and post-regulation.

3.2.2. Stock liquidity and information asymmetry

In theory, ESG disclosure requirements increase transparency and reduce information asymmetry, which may positively impact stock liquidity.²⁹ However, these effects may not materialize if the disclosed ESG information lacks validity, comprehensibility, or financial relevance. (Krueger et al., 2023, p. 2)

Multiple studies observe improvements in stock liquidity and decreases in information asymmetry following mandated ESG disclosure. Krueger et al. (2023, pp. 35–36) provide evidence that several ESG disclosure requirements worldwide lead to positive stock liquidity effects. These are stronger for regulations enacted by governments (as opposed to stock exchanges) and regulations that do not adopt a comply-or-explain principle. While strong informal institutions (i.e., societal norms and values) also lead to a more pronounced positive effect on stock liquidity, no such effect was observed for jurisdictions with strong formal institutions (i.e., regulatory environment and government). Companies that did not disclose ESG information on a voluntary basis pre-mandate have the strongest increase in stock liquidity. These findings are in line with the results from Barth et al. (2017, p. 53).³⁰

²⁸ The study design differs slightly from other event studies in that it considers only the announcement of the regulation, as opposed to several events that increase the likelihood of its passage.

²⁹ Stock liquidity and information asymmetry are inversely related, meaning that a lower information asymmetry is often associated with a higher stock liquidity, and vice versa (Barth et al., 2017, p. 44).

³⁰ In contrast to most studies focusing on mandatory ESG disclosure

They provide evidence that stock liquidity increases for affected companies with higher quality disclosures following the mandatory integrated reporting disclosure regulation in South Africa in 2010, while information asymmetry (measured in terms of bid-ask spread) decreases.

In an international study setting, Ernstberger et al. (2021, pp. 19–21) find that companies subject to different ESG reporting regimes have a 18% stronger decrease in information asymmetry (as measured by bid-ask spread) compared to unaffected companies. In line with Krueger et al. (2023), they report stronger effects for regulations implemented by governments, and no significant effects for stock exchange regulations. The same applies to regulations requiring standalone ESG reports, whereas disclosure as part of annual or integrated reports do not have significant effects. In addition, the effects are stronger for firms in industries with a high proportion of affected companies, which increases the comparability of reports for investors. Ernstberger et al. (2021, pp. 24–26) also find stronger reductions in information asymmetry for companies using specific reporting guidelines (e.g., the GRI).

3.2.3. Cost of capital

If disclosure requirements reduce the information asymmetry between the capital market and the companies concerned, investor uncertainty would be reduced, which may lead to a reduction in the cost of capital (H. B. Christensen et al., 2021, p. 1202). In a voluntary setting, many studies provide corroborating evidence of this effect (e.g., Dhaliwal et al., 2011; Eliwa et al., 2021; Raimo et al., 2021).

Although there is limited research on mandatory settings, prior studies provide evidence in support of this notion. For example, Cuomo et al. (2022, pp. 12–13) find a reduction in cost of equity and systematic risk for affected companies after the introduction of the NFRD. Similarly, Xu et al. (2021, p. 2203) show that companies subject to the SSE and SZSE ESG disclosure requirements in China have a lower cost of debt, relative to unregulated companies. These effects are stronger for companies with longer ESG reports and companies that publish higher quality ESG reports. In contrast, Barth et al. (2017, p. 54) find no significant effect on cost of capital of affected companies in their study regarding the introduction of mandatory integrated reporting regulation in South Africa for JSE-listed companies.

H. B. Christensen et al. (2021, pp. 1211–1212) argue that lower cost of capital through disclosure mandates can also have real effects. First, a lower cost of capital can incentivize firms to invest, as it typically sets the threshold for new investments. Second, increased ESG transparency allows investors to assess a company's ESG risk exposure, which has an influence on the companies' cost of capital. This can prompt

reporting companies to mitigate risk, align with investor preferences, or generally improve ESG performance.

3.2.4. Firm profitability

Empirical evidence suggests a correlation between higher ESG engagement and improved operational performance, including higher productivity and sales (e.g., S. Chen et al., 2023, p. 9; Flammer, 2015, p. 2550). If mandatory disclosure encourages companies to adopt more sustainable practices (see Section 3.3), this implies a potential positive impact of ESG disclosure on financial performance. On the other hand, ESG disclosure is also associated with higher costs (Ioannou & Serafeim, 2017, p. 5). Based on the rationale discussed in Section 3.2.1 on firm value, companies would have already engaged in voluntary ESG disclosure and activities if they were beneficial to their financial performance, suggesting that a mandate would be detrimental to their performance (e.g., Y.-C. Chen et al., 2018, p. 172). This may also explain the mostly positive effect on financial performance found in studies based on a voluntary regulatory context, again pointing to a potential selection bias of these studies (H. B. Christensen et al., 2021, p. 1198). The evidence on the impact of ESG disclosure requirements on profitability (as measured by accounting metrics such as return on assets (ROA), return on equity (ROE), gross margin, or sales) is inconclusive.

Several studies suggest that ESG disclosure mandates negatively impact profitability of affected firms. For example, Y.-C. Chen et al. (2018, pp. 175–177) find a significant decline in the profitability of firms affected by the 2008 ESG disclosure regulations of the Chinese SSE and SZSE. Specifically, they report a 26% (20%) decline in ROA (ROE) compared to non-affected companies. Revenues and CapEx also decline after the mandate, while OpEx and impairment charges increase. The authors attribute these effects to potential plant closures or increased spending on pollution control and personnel following the mandates. Similarly, Lu et al. (2021, p. 1495) report a decline in corporate profitability that is noticeable two years after the regulation. The decline in ROA and ROE affects both state-owned enterprises (SOEs) and non-state-owned enterprises (NSOEs). This finding contrasts with Y.-C. Chen et al. (2018, pp. 182–183), who find the decline in profitability mainly in SOEs.³¹ Lu et al. (2021, p. 1510) suggest that the difference in findings may be due to the shorter time frame of the study of Y.-C. Chen et al. (2018), which may not have captured the longer-term effects seen in their own research.

In the US, H. B. Christensen et al. (2017, pp. 3–5) find that the requirement for SEC-registered companies to include mine safety information in financial statements under Section 1503 of the Dodd-Frank Act leads to a decrease in labor

regimes, the study of Barth et al. (2017, p. 64) is slightly different in that it focuses on a regulation mandating the adoption of integrated reporting. An integrated report comprises both financial and sustainability-related information (Barth et al., 2017, p. 45).

³¹ Agency problems are likely to arise in state-owned enterprises between the government and minority shareholders as well as between the SOE managers and shareholders, as explained by Y.-C. Chen et al. (2018, p. 182).

productivity. The decrease in productivity results in an increase in labor costs of approximately 0.9% of total revenues. Because the safety information was already published online by the government before the mandate, the study measures the incremental effect of including the information in financial reports, i.e., the effect of increased public awareness.

In contrast, Downar et al. (2021, p. 1166) find that requiring UK firms to disclose GHG emissions does not lead to a significant change in operating performance (as measured by gross margin). In particular, neither costs nor sales increase significantly for companies subject to the Companies Act 2006 Regulations 2013. Therefore, they do not support the notion that ESG disclosure regulation has a negative impact on the operating performance of affected companies.

Swift et al. (2019, pp. 421–424) find that Section 1502 of the 2010 Dodd-Frank Act regarding the disclosure of conflict minerals positively affects the profitability of reporting companies. Specifically, firms with higher supply chain transparency experience a larger increase in ROA compared to firms with lower transparency. This improvement is driven by both better sales performance and reductions in direct and overhead costs. In addition, companies appear to be improving their operations even before the mandate takes effect, as they gain greater visibility into their supply chain during the process of preparing for the new disclosure requirements.

3.2.5. Discussion of findings on the financial impact

Overall, literature on the financial impact of ESG disclosure regulation provides mixed evidence. Evidence on the longer-term valuation effects of ESG reporting mandates (e.g., Ioannou and Serafeim, 2017; Lu et al., 2021; Manchiraju and Rajgopal, 2017; Swift et al., 2019), as well as on the first reporting year post-regulation (e.g., Cordazzo et al., 2020; Elayan et al., 2021; Jouvenot and Krueger, 2019; Velti et al., 2020) is inconclusive. Events increasing the likelihood of adoption of regulation are mostly found to negatively impact firm value, suggesting that the capital market expects the regulation to impose additional costs on reporting companies (e.g., Birkey et al., 2018; Y.-C. Chen et al., 2018; Grewal et al., 2019; Healy and Serafeim, 2020). However, mandatory ESG disclosure regulations seems to have rather positive impacts on stock liquidity and information asymmetry (Barth et al., 2017; Ernstberger et al., 2021; Krueger et al., 2023), as well as on the cost of capital of affected companies (Cuomo et al., 2022; Xu et al., 2021). In addition, there are mixed findings on the direction of impact of ESG disclosure regulations on companies' financial performance (e.g., Y.-C. Chen et al., 2018; H. B. Christensen et al., 2017; Downar et al., 2021).

Several studies report more pronounced effects for firms that are more affected by the regulation. Grewal et al. (2019, p. 3062), Elayan et al. (2021, p. 25) and Healy and Serafeim (2020, p. 121) find that the negative stock market reaction around key legislative events prior to ESG mandate adoption are more pronounced for firms with prior lower levels of disclosure. In contrast, Krueger (2015, p. 4) provides evidence

that companies without prior voluntary disclosure experience a more positive impact on longer-term firm valuation.

In addition, several studies suggest that companies that are expected to be more negatively affected by a disclosure mandate experience more negative valuation effects. This includes companies with higher emissions (Jouvenot & Krueger, 2019, p. 7) or higher supply chain risk (Birkey et al., 2018, p. 834), as well as companies with a history of social incidents (Cousins et al., 2020, p. 33) or human rights violations (Elayan et al., 2021, p. 34), or companies operating in high expropriation risk countries (Healy & Serafeim, 2020, p. 121). Companies with positive firm characteristics, such as good reputation, better ESG performance, or better labor protection standards, seem to be able to mitigate any potential negative effects from ESG disclosure regulation (Cousins et al., 2020, p. 33; Elayan et al., 2021, p. 22; Grewal et al., 2019, p. 3062).

Moreover, there is evidence that positive effects on stock liquidity and information asymmetry are stronger for government regulations (as opposed to stock exchange regulations), and for regulations without comply-or-explain provisions and those requiring disclosure in stand-alone reports (Ernstberger et al., 2021, pp. 19–21; Krueger et al., 2023, pp. 35–36). Finally, the strength of the institutional environment also seems to influence the outcome of ESG disclosure regulations (Mittelbach-Hörmanseder et al., 2021, p. 335).

Finally, Krueger (2015, p. 19) and Swift et al. (2019, p. 425) report that Tobin's Q of affected companies already increases before mandatory compliance with the regulation, which suggest anticipatory effects. In contrast, Lu et al. (2021, p. 1495) reports that the impact on profitability may be delayed and unfold over a longer period of time.

3.3. Impact on ESG-related company performance

Besides its primary goal to increase transparency for various stakeholders, ESG disclosure requirements also aim to foster sustainable corporate behavior by holding companies more accountable (Haji et al., 2023, p. 178). For example, the EU states that ESG disclosure plays a central role in creating a sustainable economy which protects the environment and society (European Parliament and Council, 2014, Recital 3), demonstrating the intention to encourage more responsible firm behavior (Fiechter et al., 2022, p. 1500).

According to H. B. Christensen et al. (2021, pp. 1212–1213), several mechanisms may drive the desired impact of ESG mandates on companies' ESG performance. First, ESG disclosure requirements make it easier for investors to monitor companies' ESG activities. As a result, investors can exert pressure if the company's activities are not aligned with their preferences, e.g. through shareholder activism or the sale of shares. Second, disclosing companies may be pressured by various stakeholders other than investors. The anticipation of potential negative reactions, such as reduced product demand or public shaming from stakeholders like consumers and social activists, may encourage companies to improve their ESG performance. Third, peer benchmarking could lead

to firms improving their ESG performance. Higher transparency of ESG practices enables firms to learn from their peers and encourages them to outperform competitors. Finally, ESG disclosure regulation could lead to the adoption of more ESG activities if this enhances firms' financial performance. The notion is that higher transparency leads to increased customer awareness of a firm's ESG performance. Customers may reward good ESG performance with higher trust and loyalty, which could positively impact financial performance.³²

On the other hand, legitimacy theory suggests that instead of improving ESG performance through actual adaptation of corporate operations, companies subject to ESG disclosure regulation may respond by strategically increasing disclosure in areas where they already have good ESG performance, and neglecting areas of poor performance in their reports (Haji et al., 2023, p. 188). Nonetheless, Bauckloh et al. (2023, p. 143) argue that while this is a common issue in voluntary reporting settings, the switch to a mandatory regulatory setting is likely to mitigate such legitimization strategies, and incentivize companies to implement real changes. Relevant studies of various jurisdictions provide mixed evidence on whether ESG disclosure regulation leads to the desired outcome of better ESG performance.

This section is organized into a review of studies that examine the impact on overall ESG performance (Section 3.3.1) and studies that examine the impact on specific outcomes related to the environmental (Section 3.3.2), social (Section 3.3.3) or governance pillar (Section 3.3.4). Section 3.3.5 discusses and summarizes the findings of the literature.

3.3.1. Overall ESG performance

According to Fiechter et al. (2022, pp. 1512–1514), companies subject to the NFRD increase their ESG activities in 2018, i.e. the first mandatory reporting year. This positive effect is on average only significant for the social dimension, and the effects are stronger for companies with previously lower levels of ESG-related activities and disclosure. Fiechter et al. (2022, pp. 1515–1517) argue that stakeholder pressure and the possibility to benchmark ESG performance against peers are potential underlying mechanisms for improved ESG performance. In addition, they observe that companies already begin to improve their ESG performance in 2014, i.e. after the passage of the NFRD but before the disclosure requirements become effective. The early onset of the effect could be due to three possible reasons. First, companies may reveal and potentially mitigate inefficiencies in their ESG policies whilst preparing for the new disclosure requirements. Second, increasing ESG awareness of the public could pressure companies to adopt more ESG-friendly behavior. Third, companies could increase ESG performance in anticipation of future stakeholder reactions, e.g. to maintain a high reputation with customers.

Cuomo et al. (2022, pp. 6–9) also find that the NFRD leads to a significant increase in ESG scores of affected companies. Contrary to Fiechter et al. (2022), their results suggest a positive impact on both social and environmental activities. Smaller firms show stronger improvements in ESG performance. As smaller firms tend to engage less in ESG-related activities prior to the NFRD (due to lack of resources), this aligns with the findings of Fiechter et al. (2022). Moreover, they find no evidence that requiring external assurance of ESG reports, as voluntarily adopted by some EU countries under the NFRD, significantly affects ESG performance. This finding is particularly interesting in light of the new CSRD, which includes external assurance requirements. As the improvements are observed in the period from 2015 to 2018, the results can also be interpreted as anticipation effects.

Cicchello et al. (2023, pp. 1124–1125) provide supporting evidence, as companies subject to the NFRD significantly increase in ESG scores in the period from 2018 to 2020. Thus, they measure the impact of the NFRD coming into force (as opposed to its passage).

In a different setting, Dharmapala and Khanna (2018, p. 104) find that firms subject to Section 135 of India's Companies Act of 2013 significantly increase their ESG activities (as measured by ESG spending). However, the Indian mandate is not a pure disclosure regulation, but also requires ESG-related spending. Interestingly, they find that out of the 100 largest firms in their sample, those companies already spending more than 2% on ESG prior to the mandate decrease their ESG-related expenditure following the introduction of the Act.

In their analysis of the evolution of Swedish companies' ESG performance between 2009 and 2018, Arvidsson and Dumay (2022, p. 1106) find no evidence of a significant improvement from 2015 onwards (i.e. after the NFRD's passage). They argue that their finding could be due to the fact that Swedish companies already had a comparatively high level of voluntary disclosure prior to the NFRD, which may have mitigated the impact of the directive. However, the sample includes only 27 listed companies (Arvidsson & Dumay, 2022, p. 1096).

3.3.2. Environmental performance

Studies focusing on environmental performance report a reduction in industrial wastewater pollution (Y.-C. Chen et al., 2018), GHG emissions (Downar et al., 2021; Jouvenot & Krueger, 2019; Tomar, 2023) and other types of pollution (Doshi et al., 2013; Gramlich & Huang, 2017).

Y.-C. Chen et al. (2018) and Gramlich and Huang (2017) provide evidence that the 2008 ESG disclosure regulations by Chinese SSE and SZSE have been effective in nudging firms to reduce their environmental impact. Y.-C. Chen et al. (2018, p. 170) analyze the impact on city-level pollution over the period 2006 to 2011. Their results show more significant reductions in wastewater and toxic sulfur dioxide emissions in cities with many companies affected by the regulation. Measuring changes in city-level pollution (as opposed

³² However, empirical studies does not provide unambiguous evidence on a positive impact on firm profitability (e.g., Y.-C. Chen et al., 2018; Lu et al., 2021), as discussed in Section 3.2.4

to company-level pollution) allows to observe the overall reduction in pollution, as it also considers a potential effect on pollution levels of unregulated companies in the same city. Gramlich and Huang (2017, pp. 4–5) examine the impact on company-level pollution between 2005 and 2013 and find a greater reduction for affected companies relative to unregulated companies. They observe the biggest reductions in water extraction, natural resource depletion and chemical emissions.

Doshi et al. (2013, pp. 1226–1228) examine whether affected firms reduce their environmental emissions following the expansion of the US EPA's TRI disclosure regulation, and find heterogeneous results. They find that the effectiveness of the disclosure mandate depends on the extent of internal and external pressure faced by the firm, as well as access to the necessary skills.³³ They also find that in sparsely populated regions, large firms reduce their emissions less than small firms, but no difference in performance is observed in dense areas. The authors argue that large firms have greater political power in sparsely populated regions, allowing them to resist institutional pressures to improve environmental performance. Finally, they find that subsidiaries of privately owned companies have greater emissions reductions than publicly traded companies. One potential reason may be that private companies are more willing to invest because they are not constrained by adverse capital market reactions.

Several studies investigate the impact of carbon disclosure mandates on GHG emission levels of affected companies. Downar et al. (2021) and Jouvenot and Krueger (2019) analyze the impact of the carbon disclosure requirement of the UK's Companies Act 2006 Regulations 2013, and find a reduction in GHG emissions for firms subject to the mandate. Downar et al. (2021, pp. 1139–1140) report absolute carbon reductions of 8%. Carbon intensity, as measured by absolute emissions relative to cost of goods sold and sales, improves by 13% and 10%, respectively. In addition, they find weaker reduction in absolute and relative emissions for companies with more complex company structures (Downar et al., 2021, p. 1166). In comparison, Jouvenot and Krueger (2019, pp. 4–5) report a reduction in absolute (relative) GHG emissions³⁴ of about 15% (17%). The variance in magnitude may be due to differences in the methodology: while Downar et al. (2021, p. 1141) analyze the change in emissions of individual facilities affected by regulation³⁵, Jouvenot and Krueger (2019, pp. 14–15) focus on affected firms' global emissions.³⁶ Both Downar et al. (2021, pp. 1170–1171)

and Jouvenot and Krueger (2019, p. 32) identify stakeholder pressure to drive emissions reductions, with the latter also arguing that managers learning from industry peers are likely to drive the reductions.

Importantly, many of the affected UK companies were already subject to the European Union Emission Trading System (EU ETS) before the UK's Companies Act emission disclosure requirement. As the EU ETS is a carbon pricing scheme, it is difficult to isolate the effect of the disclosure requirement from the effect of carbon pricing on emissions. (Bauckloh et al., 2023, p. 130; Downar et al., 2021, p. 1147) The EU ETS also requires companies to report emissions data from their individual installations to a public registry. Therefore, the observed effect is the incremental effect of aggregated disclosure as part of the annual statements, i.e. making GHG emission data more easily accessible to stakeholders. (Downar et al., 2021, p. 1139)

Evidence from the US also suggest that targeted carbon reporting regulation, like the 2010 US EPA's GHGRP, has a positive impact on GHG emissions. Tomar (2023, p. 471) shows that absolute emissions decrease significantly by almost 8%, and carbon intensity by about 7%, which indicates that the reduction is not only due to a reduced economic activity. Tomar (2023, pp. 454–455) argues that reductions are driven by peer benchmarking and companies' anticipation of future GHG-related regulations. Only measuring emissions, without respective disclosure to the public, does also not lead to emission reductions. Bauckloh et al. (2023, p. 128) also analyze the impact of the GHGRP and provide evidence that affected firms significantly improve their carbon intensity ratio relative to unregulated firms. Contrary to Downar et al. (2021), Jouvenot and Krueger (2019), and Tomar (2023), they do not observe the same effect for absolute carbon emissions: affected firms have a weaker decrease in absolute emissions compared to unregulated firms. The study points to the need to further investigate why affected companies were unable to limit total emissions more than unaffected companies, despite better carbon intensity (Bauckloh et al., 2023, p. 144).

In contrast to the UK setting described above, most US companies did not disclose GHG data prior to the mandate. This means that the US studies observe the effect of initial disclosure rather than improved access to information. (Tomar, 2023, p. 452) Another difference is that emissions are published on the US EPA website, and do not have to be included in annual financial reports (Downar et al., 2021, p. 1141; US EPA, 2023a).

Matisoff (2013, pp. 588–589) analyses the impact of US state-level carbon disclosure mandates and finds no evidence of a reduction in absolute or relative GHG emissions. While these results contradict the studies mentioned above, it is important to note that they observe individual US state regulations.

Finally, the findings of Downar et al. (2021), Matisoff (2013), and Tomar (2023) are limited by the fact that they

from the Refinitiv ESG database.

³³ In particular, facilities located close to their headquarters or close to other facilities owned by the same parent company show a greater reduction in emissions. This supports the notion that these companies are subject to peer pressure and thus seek to maintain a good reputation. Companies that are close to sibling companies in the same industry also show greater improvements in environmental performance. This suggests that geographical proximity facilitates the transfer of skills. (Doshi et al., 2013, pp. 1226–1228)

³⁴ Jouvenot and Krueger (2019, pp. 3–4) define relative emissions as total emissions to tangible assets.

³⁵ Data as reported to and verified by the EU Transaction Log (EUTL).

³⁶ Data as aggregated by the non-profit organization CDP and estimations

examine the emissions of specific facilities that are subject to regulation, rather than the global emissions of affected companies. Therefore, they cannot rule out the possibility that affected companies simply shift emissions to facilities in unregulated regions. (Bauckloh et al., 2023, p. 130; Downar et al., 2021, p. 1139)

3.3.3. Social performance

Albeit limited, research focused on the social dimension suggests that ESG disclosure regulation has a positive impact on various outcomes, including employee-related matters in the US mining industry (e.g., H. B. Christensen et al., 2017) and other hazardous industries (e.g., Y.-C. Chen et al., 2018), and the due diligence of the supply chain (e.g., She, 2022).

In their analysis of 24 member countries of the Organization for Economic Cooperation and Development (OECD), Jackson et al. (2020, p. 334) provide evidence that companies subject to mandatory ESG regulation significantly increase activities related to the social pillar, with a stronger effect for companies with comparatively low levels of prior voluntary ESG activities. The analysis does not, however, provide evidence for a reduction in irresponsible actions.

H. B. Christensen et al. (2017, pp. 3-5) examine the real effects of Section 1503 of the 2010 Dodd-Frank Act, which mandates the disclosure of health and safety records in financial reports for SEC-registered mine-operating companies. They find that affected companies improve their compliance with safety regulations, as measured by a decrease in the number of citations issued to those companies for safety violations. In addition, they report a substantial decrease in mine injuries for companies affected by the mandate. As companies had already disclosed the required information online beforehand, the study measures the incremental effect of including the information in financial reports. Therefore, increased public awareness of the disclosed information is likely to create positive real effects.

Similarly, Y.-C. Chen et al. (2018, pp. 183-184) provide evidence that companies in dangerous industries experience a significant decline in workplace fatalities following the introduction of mandatory ESG disclosure regulation in China. Despite a relatively small sample due to limited data availability, these findings suggest that comprehensive ESG disclosure requirements lead to positive social externalities.

She (2022, pp. 400-401) finds an increase of supply chain due diligence for companies subject to California's CTSCA of 2010, which requires disclosure of due diligence processes regarding suppliers' labor abuses. The due diligence performance is proxied by the average human rights performance of the company's suppliers. The effects are stronger for companies facing external pressure from activist groups (e.g. Non-Governmental Organizations and shareholder advocacy groups) and for companies with suppliers located in countries considered to have low human rights standards. Also, the positive effects are more pronounced when the regulation enhances the comparability of the disclosed information.

3.3.4. Governance performance

Previous literature suggests that corporate governance mechanisms mediate the effect of ESG disclosure regulation. For example, Hummel and Rötzel (2019, p. 209) find that high reporting incentives, as measured by (among other things) the level of corporate governance, mitigate the positive effect of the UK Companies Act on disclosure, as these companies tend to have higher levels of voluntary disclosure prior to regulation (see Section 3.1.1). In addition, mandatory ESG disclosure regimes may also have a direct impact on corporate governance mechanisms by encouraging companies to establish internal monitoring mechanisms for their reporting practices (Gulenko, 2023, p. 33). Although limited, the literature provides positive evidence on the governance outcomes of ESG disclosure regulation.

Boamah (2022, pp. 1-2) examines the impact of the UK's GHG disclosure requirement as part of the Companies Act 2006 Regulations 2013 on the number of directors on board committees dealing with sustainability issues. The results show an absolute (relative) increase of 7.8% (2.6%), which suggests an improvement in ESG-related monitoring and compliance.

Aureli, Del Baldo, et al. (2020, pp. 2392-2394) conduct a paradigmatic case study to examine the effects of the NFRD on the reporting strategy and governance practices of the *Biesse Group*, an Italian listed company in the wood and glass processing industry. In order to comply with the new reporting requirements, the company has established an internal audit committee, which is found to play an essential role in guiding the company towards more sustainable behavior. The study also finds that normative and mimetic pressures³⁷ have led to improvements in ESG behavior beyond what is required by regulation. However, the study represents the response of a single company to an ESG disclosure mandate, which limits the generalizability of the results (Aureli, Del Baldo, et al., 2020, p. 2401).

3.3.5. Discussion of findings on real effects

In general, previous studies suggest that ESG disclosure requirements have positive real effects, including improvements in overall ESG performance (e.g., Cuomo et al., 2022; Fiechter et al., 2022), reductions in GHG emissions (e.g., Downar et al., 2021; Jouvenot and Krueger, 2019) and other environmental emissions (e.g., Y.-C. Chen et al., 2018; Gramlich and Huang, 2017), increases in workplace safety (e.g., Y.-C. Chen et al., 2018; H. B. Christensen et al., 2017), and improvements in corporate governance practices (e.g., Aureli, Del Baldo, et al., 2020; Boamah, 2022), among others.

Several studies suggest that the effects are driven by benchmarking mechanisms, such as firms' learning from their peers, or firms wanting to keep up with the performance of their competitors (Fiechter et al., 2022, p. 1515;

³⁷ Normative pressure refers to the pressure to conform with certain social values and norms, and mimetic pressures refers to the firms demand to imitate other companies' behavior. (Aureli, Del Baldo, et al., 2020, p. 2395)

Jouvenot and Krueger, 2019, p. 32; Tomar, 2023, p. 453). In addition, stakeholder pressure is likely to drive potential improvements in ESG activities (Downar et al., 2021, p. 1170; Fiechter et al., 2022, p. 1515; Jouvenot and Krueger, 2019, p. 32; She, 2022, p. 401).

The effectiveness of disclosure regulation in driving real changes in corporate activities appears to depend on certain firm characteristics, such as the voluntary level of ESG disclosure or performance prior to regulation (e.g., Cuomo et al., 2022, p. 7; Fiechter et al., 2022, pp. 1517–1518; Jackson et al., 2020, p. 334). In addition, Cuomo et al. (2022, p. 6) and Fiechter et al. (2022, pp. 1515–1516) argue that companies already begin to adopt more sustainable behaviors after legislation is passed, but before the disclosure requirements come into effect, which is reflected in the early measurement of ESG performance improvements. According to H. B. Christensen et al. (2017, p. 3), better accessibility of previously published information already leads to positive effects in ESG performance. This is measured by a positive incremental effect from the inclusion of ESG information in financial reports, which was already disclosed through other venues beforehand.

While Downar et al. (2021, pp. 1139–1141) report positive real effects with no negative impact on financial firm performance, Y.-C. Chen et al. (2018, p. 170) and H. B. Christensen et al. (2017, p. 5) find that improved ESG performance comes at the expense of profitability.

Much of the existing real effects literature focuses on targeted disclosure regimes, such as the impact of GHG reporting requirements on GHG emissions (e.g., Bauckloh et al., 2023; Downar et al., 2021; Jouvenot and Krueger, 2019; Tomar, 2023). Other studies are limited to single countries (e.g., Y.-C. Chen et al., 2018; Dharmapala and Khanna, 2018; Gramlich and Huang, 2017). As discussed above, the observed effects are therefore likely to be specific to the particular regulation and country setting, and most studies do not specifically account for the impact of these differences have on regulatory outcomes (Ernstberger et al., 2021, p. 3). It is therefore questionable to what extent the findings on these targeted disclosure requirements are applicable to the potential impact of broader ESG disclosure requirements, such as those implemented by the EU (H. B. Christensen et al., 2021, p. 1216; Haji et al., 2023, p. 181). My empirical analysis in Chapter 4 contributes to this ongoing debate.

4. Data analysis: Impact of the NFRD on ESG performance

In this empirical part, I examine the long-term effects of mandatory ESG disclosure regimes on firms' ESG performance. While the topic is increasingly studied, comprehensive empirical evidence remains scarce (H. B. Christensen et al., 2021, p. 1213).

4.1. Background and hypothesis development

Previous research has primarily focused on specific disclosure regulations, such as GHG reporting (e.g., Bauckloh

et al., 2023; Matisoff, 2013; Tomar, 2023), or has been limited to specific countries, such as China (e.g., Y.-C. Chen et al., 2018). Studies that focus on comprehensive disclosure regulations, such as the NFRD, have generally examined their short-term or anticipatory effects (e.g., Cuomo et al., 2022; Fiechter et al., 2022). I aim to fill this research gap by assessing the impact of the NFRD on the ESG performance of affected EU companies. The NFRD was transposed into the national laws of EU member states by December 2016, and applied from 2017 for reports published in 2018 (see Section 2.2.1 for more details).³⁸ In addition to increasing transparency, the NFRD also aims to positively influence companies' ESG behavior (European Parliament and Council, 2014, p. 1, Recital 3).

Previous studies indicate positive anticipatory or short-term effects of the NFRD on ESG performance. For example, Fiechter et al. (2022, pp. 1513–1514) provide evidence of a higher increase in ESG scores both after the announcement of the regulation and in the first year after the NFRD comes into effect. Cuomo et al. (2022, p. 6) also show that firms improve their environmental and social scores in the four years following the enactment of the NFRD (from 2015 to 2018). Similarly, Cicchiello et al. (2023, p. 1125) show that EU companies improve their overall ESG scores in the period from 2018 to 2020. Based on these findings, I derive the following null hypothesis, which I expect to reject through my empirical analysis:

H₀: EU companies subject to the NFRD do not show greater improvements in ESG scores compared to unregulated companies.

4.2. Data and research design

This section begins with an overview of the data and sample used in the analysis (Section 4.2.1), continues with descriptive and exploratory statistics (Section 4.2.2), and concludes with a detailed description of the research design used (Section 4.2.3).

4.2.1. Data and sample

Data collection: In line with related literature (e.g., Cuomo et al., 2022; Fiechter et al., 2022; Jackson et al., 2020; Ottenstein et al., 2022), I obtain ESG data from the LSEG ESG database (formerly Refinitiv ASSET4³⁹). In addition to its widespread use in academia, LSEG ESG provides both detailed and broad measures of companies' ESG activities. Company data is collected on an ongoing basis from sources including annual and ESG reports, company websites, and news sources. It covers over 630 ESG metrics, updated weekly, with ESG scores available for over

³⁸ Greece deviates from this requirement in that the country has mandated compliance with the disclosure requirements one year earlier than other EU member states (CSR Europe and GRI, 2017, p. 33, end note i).

³⁹ Refinitiv has been acquired by the London Stock Exchange Group (LSEG) in 2021. (LSEG, 2023a)

15,000 companies worldwide. (LSEG, 2022, pp. 3–6) Financial company data is sourced from the comprehensive LSEG Worldscope Fundamentals database (LSEG, 2023b).

Sample: My sample of treatment and control firms is based on the sample of Fiechter et al. (2022), who study the yearly treatment effect of the NFRD over the period 2011 to 2018.⁴⁰ Based on the ISINs⁴¹ of their final matched sample, which are published as part of the online supplements to the paper (Chicago Booth, 2023), I was able to extract relevant and current company information from the LSEG databases. The treatment group consists of large public EU companies subject to the NFRD.⁴² The control group is a propensity score matched sample of US companies.⁴³ Propensity score matching (PSM) is a statistical matching technique used to create a control group that is similar in characteristics (such as industry classification, prior disclosure levels, etc.) to the treatment group (Bell, 2021, p. 12; Rosenbaum and Rubin, 1983, p. 48). PSM is often used by researchers seeking to isolate the effects of a policy change from other confounding variables (e.g., Fiechter et al., 2022, p. 1506; Ioannou and Serafeim, 2017, p. 4).

US companies are an appropriate control group for two main reasons: first, no comprehensive ESG disclosure regulations were introduced in the US during the period under study (Cuomo et al., 2022, pp. 14–15; Fiechter et al., 2022, p. 1506) and second, LSEG ESG has a broad coverage of ESG data for US companies (LSEG, 2022, p. 7). Since some ISIN numbers of the original Fiechter et al. (2022) sample are no longer available (e.g. due to delisting), I eliminate these observations. I also eliminate duplicate entries.⁴⁴ This results in a final sample of 685 firms (528 treatment and 157 control firms) over an observation period of 8 to 12 years, leading to 7947 firm-year observations. I use the statistical software R (version 4.3.2) to conduct the empirical analysis.

Sample period: The analysis includes data from 2011 to 2022, divided into two phases: pre-directive (2011 to 2016) and post-directive (2017 to 2022). The analysis focuses specifically on the impact of the NFRD after 2017, which is consistent with the start of the new reporting requirements. This differs from other studies that assess the anticipatory

effects after 2014, i.e. after the adoption but before the entry into force of the NFRD (e.g., Cuomo et al., 2022, p. 6).

Sample distribution: Table 1 presents the sample distribution. The country distribution in Panel A shows that the majority of firms in the treatment group are incorporated in the UK (24.7%), France (10.1%), and Germany (8.6%).⁴⁵ This distribution is consistent with the original Fiechter et al. (2022) sample. All firms in the control group are incorporated in the US. Panel B shows the industry distribution of the treatment and control groups. Firms in the treatment group are predominantly in the industrial (22.3%), consumer cyclical (16.5%), and financial (16.3%) sectors. The distribution of the control group differs slightly but is overall aligned.

4.2.2. Descriptive and exploratory statistics

Next, I analyze the metric variables (i.e., firm characteristics and ESG scores) of the sample firms in more detail.⁴⁶ I visualize the distribution by creating histograms and box plots for each variable, which allows me to identify skewness and outliers (see Panel A and Panel B of Appendix 4, respectively). First, I perform logarithmic transformations to address high skewness of some variables. Second, I winsorize the variables to limit the influence of outliers. This means that extreme outliers are replaced by less extreme values (R Documentation, 2024). In line with related literature (e.g., Cicchiello et al., 2023, p. 1124; Fiechter et al., 2022, p. 1549), I replace the lower and upper 1% of the data (i.e., the values outside the 1st and 99th percentiles) of each variable. Appendix 5 presents histograms and box plots of the variables after data cleaning. The largest outliers have been winsorized, resulting in more symmetric and potentially more normal distributions of the variables.

Table 2 shows the means and standard deviations after data cleaning for the full sample and for the treatment and control groups separately, both for the entire observation period and separately for the pre- and post-directive periods. For the entire period (2011 to 2022), the average ESG score for the full sample is 60%, while the average score for the treatment (control) group is 61% (56%). Table 2 also shows that the average ESG score for the full sample increases from 55% to 65% from the pre-directive period (2011 to 2016) to the post-directive period (2017 to 2022). For the EU (US) companies, the average ESG score increases from 56% (52%) to 67% (61%) from the pre- to the post-NFRD period. This is a first indication that EU firms have a higher increase in ESG scores than US firms, which is later statistically tested.

In the full sample, firms have on average an ROA of 0.05, a firm size of 16.34 and a leverage of 0.65. The scores and firm characteristics are also consistent with related studies examining the impact of the NFRD on ESG performance (Cuomo et al., 2022, p. 7; Fiechter et al., 2022, pp. 1508–1509). Appendix 6 also presents the more detailed parametric measures of location and dispersion before and after data

⁴⁰ For a detailed description of their sample selection process, refer to Fiechter et al. (2022, p. 1507)

⁴¹ The International Securities Identification Number is an international standard to uniquely identify securities.

⁴² Greece implemented NFRD disclosure requirements for companies in 2017, one year ahead of other EU states (CSR Europe and GRI, 2017, p. 33, end note i). Although Cuomo et al. (2022, p. 6) exclude Greek firms for this reason, I include them to align with the matched sample of Fiechter et al. (2022). Moreover, Greek firms account for only 1.2% of my total sample.

⁴³ Fiechter et al. (2022) base the propensity score matching on several variables, including ESG activities and reporting, industry classification, firm size, leverage, and return on assets, among others. For a detailed description, refer to Fiechter et al. (2022, p. 1506).

⁴⁴ As part of the matching procedure, Fiechter et al. (2022, p. 1506, footnote 8) have allowed for replacement in their control group. This means the same firm may be included in the control group multiple times. However, since R cannot deal with double entries, I reduce my control group to include each firm only once.

⁴⁵ Percentages refer to the entire sample.

⁴⁶ All variables are defined in Appendix 3.

Table 1: Sample distribution across countries and industries (source: own representation)

Panel A. Country distribution		
	n obs.	% obs.
Austria	132	1.6
Belgium	192	2.3
Czech Republic	36	0.4
Denmark	216	2.6
Finland	264	3.2
France	828	10.1
Germany	708	8.6
Greece	96	1.2
Hungary	36	0.4
Ireland	192	2.3
Italy	312	3.8
Luxembourg	48	0.6
Netherlands	288	3.5
Poland	192	2.3
Portugal	60	0.7
Spain	372	4.5
Sweden	336	4.1
United Kingdom	2028	24.7
United States	1884	22.9
<i>TOTAL</i>	<i>8220</i>	<i>100.0</i>

This table presents the country distribution of the entire sample. Country of incorporation is derived from the LSEG *COINN* variable. All control group firms are incorporated in the US.

Panel B. Industry distribution				
	EU Firms		US Firms	
	n obs.	% obs.	n obs.	% obs.
Academic & Educational Services	0	0.0	24	1.3
Basic Materials	708	11.2	180	9.6
Consumer Cyclicals	1044	16.5	300	15.9
Consumer Non-Cyclicals	456	7.2	96	5.1
Energy	276	4.4	60	3.2
Financials	1032	16.3	384	20.4
Healthcare	336	5.3	108	5.7
Industrials	1416	22.3	348	18.5
Real Estate	84	1.3	84	4.5
Technology	648	10.2	252	13.4
Utilities	336	5.3	48	2.5
<i>TOTAL</i>	<i>6336</i>	<i>100.0</i>	<i>1884</i>	<i>100.0</i>

This table presents the industry distribution of the treatment and the control group. Industry classifications is derived from the LSEG *TR1N* variable to cluster companies by business sector.

Table 2: Summary statistics clustered by period and group (source: own representation)

	EU Firms		US Firms		Full sample	
	Mean	SD	Mean	SD	Mean	SD
<i>Entire period</i>						
ESG Score	61.36	17.86	56.17	18.65	60.19	18.17
Env. Pillar Score	60.93	24.15	50.67	26.99	58.61	25.19
Social Pillar Score	64.07	21.19	58.03	21.47	62.70	21.40
ROA	0.04	0.06	0.05	0.07	0.05	0.06
Firm Size	16.30	2.01	16.47	1.55	16.34	1.91
Leverage	0.65	0.21	0.66	0.21	0.65	0.21
<i>PRE period</i>						
ESG Score	56.41	18.64	52.16	19.18	55.43	18.85
Env. Pillar Score	57.69	25.37	47.81	27.44	55.43	26.19
Social Pillar Score	58.02	22.29	54.02	21.95	57.11	22.28
ROA	0.04	0.06	0.05	0.06	0.05	0.06
Firm Size	16.15	2.02	16.29	1.55	16.19	1.92
Leverage	0.64	0.21	0.65	0.22	0.65	0.21
<i>POST period</i>						
ESG Score	66.63	15.33	60.60	16.99	65.29	15.91
Env. Pillar Score	64.37	22.28	53.82	26.14	62.02	23.60
Social Pillar Score	70.49	17.85	62.45	20.03	68.70	18.65
ROA	0.04	0.06	0.05	0.07	0.04	0.06
Firm Size	16.44	1.98	16.65	1.53	16.49	1.89
Leverage	0.65	0.21	0.67	0.20	0.66	0.21

This table reports means and standard deviations for EU treatment firms, US control firms, and the full sample. Information is provided for the entire sample period (2011 to 2022), the pre-directive period (2011 to 2016), and the post-directive period (2017 to 2022). All variables are defined in Appendix 3.

cleaning, and Appendix 7 shows the corresponding tables for the non-parametric measures. Again, the tables indicate that the data cleaning process has effectively corrected for extreme outliers and skewness, making the dataset more robust for further analysis.

In addition to examining each variable individually as described above, I also analyze them in relation to each other as part of exploratory statistics. The correlation heatmaps provide a first indication of the relationships between the metric variables (see Appendix 8, Panel A). First, the visualization of the correlations between the variables shows that there is multicollinearity between the accounting variables, which may limit the reliability of the results. However, the pairwise correlations between ROA, firm size, and leverage range from -0.35 to 0.37, indicating rather weak relationships (Schober et al., 2018, p. 1765). This level of correlation does not raise significant multicollinearity concerns, suggesting that these variables may be included in the estimation models. All pairwise correlations are significant at $p < .05$. I also use bivariate scatterplots to visualize the relationship between firm

characteristics and ESG scores (see Appendix 8, Panel B). The plots suggest that firm size and leverage are positively correlated with ESG scores, while ROA has a weak negative relationship. However, the data points are widely scattered around the line, indicating rather weak relationships.

4.2.3. Research design

Before running the regression model, I further test whether the assumption of normal distribution is violated. The Jarque Bera test provides evidence of non-normal distribution for all variables. Visual inspection using quantile-quantile (QQ) plots shows that while the data mostly aligns with the expected normal line in the central quantiles, there are notable deviations, especially in the tails (see Appendix 9). This deviation from the normal distribution could affect the robustness of the regression results, which is discussed in the limitations in Section 4.6.

Model description: I use a difference-in-difference (DID) analysis to test my hypothesis. The DID is a quasi-experimental approach commonly used to evaluate the impact of an ex-

ogenous shock, such as the introduction of a new regulation (e.g., Cuomo et al., 2022; Fiechter et al., 2022; Ioannou and Serafeim, 2017; Ottenstein et al., 2022; Tomar, 2023). The methodology compares changes in the dependent variable before and after the implementation of a regulation between the treatment group and the control group of unaffected companies. The difference in the change in the outcome variable between the two groups is the DID estimate of the average effect of the regulation. (Greene, 2012, pp. 195–197) I control for industry membership, country of incorporation, and other observable firm characteristics.

To test my hypothesis, I first use a pooled Ordinary Least Squares (OLS) regression model as a baseline model (Greene, 2012, pp. 389–390) to estimate the following DID equation:

$$\begin{aligned} ESG\ Score_{it} = & \beta_0 + \beta_1 (Post * Treatment)_{it} \\ & + \beta_2 Post_t + \beta_3 Treatment_i + \beta_4 ROA_{it} \\ & + \beta_5 Leverage_{it} + \beta_6 Firm\ Size_{it} \\ & + \beta_7 Industry_i + \beta_8 Country_i + \varepsilon_{it} \end{aligned}$$

Variable description: The subscript i denotes the individual company and the subscript t denotes the year, meaning that $ESG\ Score_{it}$ is the outcome variable for company i in year t . I choose LSEG's ESG score, which is a comprehensive measure of a company's ESG performance, commitment, and effectiveness (LSEG, 2022, p. 8).⁴⁷ I choose this broad measure as my dependent variable for two reasons: first, a comprehensive measure is more appropriate given my diverse set of companies, which represents the wide range of companies affected by the NFRD (Fiechter et al., 2022, pp. 1512–1513). Second, LSEG's ESG score has been widely used in relevant related literature (e.g., Cicchiello et al., 2023, p. 1125; Cuomo et al., 2022, p. 6).

The binary variable *Post* indicates the observation period and equals 1 for all firm-year observation after the directive's coming into force, i.e. from 2017 to 2022. The binary variable *Treatment* is 1 if the company belongs to the EU treatment group, and 0 if it belongs to the US control group. The interaction term *Post * Treatment* is equal to 1 if entity i is affected by the NFRD in year t (i.e. for EU companies in the post-directive period), and 0 otherwise. The coefficient estimator of interest is β_1 , which captures the incremental effect of the disclosure regulation on treated firms' ESG performance, relative to the control group. In line with related literature (Cicchiello et al., 2023; Cuomo et al., 2022; Fiechter et al., 2022; Jackson et al., 2020; Krueger et al., 2023), I control for the following firm-level characteristics that are likely

to influence ESG Scores: firm profitability (*ROA*) as the net income scaled by total assets, *Leverage* as the total liabilities to total assets ratio, and *Firm Size* as the natural logarithm of total assets.⁴⁸ High profitability and large company size are likely to have a positive impact on ESG performance due to the availability of resources to invest in ESG activities, while high leverage implies greater financial constraints, which could have a negative impact on ESG scores (e.g., Cicchiello et al., 2023, p. 1125; Jackson et al., 2020, p. 330). I also include *Industry* and *Country* dummies to control for industry- and country-specific differences that potentially influence ESG performance. ε is the unobserved error term. All variables are defined in Appendix 3.

4.3. Results: Positive impact on ESG performance

Appendix 10 presents the results of the pooled OLS regression analysis. The interaction term *Post * Treatment*, which captures the differential effect of the NFRD for the treatment group, has a significantly positive coefficient estimate of 2.36 (p -value < .01). This implies that affected EU companies improve their ESG scores on average by an additional 2.36 percentage points relative to the US control group, which rejects the null hypothesis H_0 . The estimate translates into a 4.2% increase in ESG scores relative to the mean pre-directive ESG score of treatment firms.⁴⁹ These results are aligned with Fiechter et al. (2022, p. 1514), who report a 5.5% increase in ESG scores in 2018 relative to their baseline year of 2013. *Post* has a significantly positive coefficient of 6.08 (p -value < .001), indicating that ESG scores increase on average after the regulation for both the treatment and the control group. *Treatment* also has a significantly positive coefficient of 7.33 (p -value < .001), indicating that the treatment group has higher ESG scores on average than the control group. As for the control variables, *ROA* and *Firm Size* have significantly positive coefficients of 11.77 (p -value < .001) and 6.25 (p -value < .001), respectively. This suggests that more profitable companies and larger companies tend to have higher ESG scores. While *Leverage* has a positive coefficient of 1.66, its statistical significance is only at the 10% level. This provides only weak evidence for the relationship between leverage and ESG scores.

The coefficients for each country represent the average difference in ESG scores for companies in that country compared to the reference country, which is the US in my case. For example, a negative coefficient of 5.42 (p -value < .001) for Austria indicates a lower average ESG score for companies in Austria compared to the US. The coefficients for each industry represent the average difference in ESG scores for

⁴⁷ LSEG's ESG score is constructed from over 630 firm-level data points, of which the 186 most relevant are selected for each industry. Based on these measures, ten category scores are calculated, which contribute to the assessment of the environmental, social and governance pillar scores and ultimately to the company's overall ESG score. The ESG score ranges from 0 to 100, with 100 being the maximum score. A detailed description of the scoring process is available at LSEG (2022).

⁴⁸ I limit the number of control variables to the most commonly used ones, in contrast to the more comprehensive analyses in the aforementioned studies.

⁴⁹ $4.2\% = 2.36/56.41$, where 2.36 is the regression coefficient β_1 for the interaction term *Post * Treatment* in column (1) of Appendix 10, and 56.41 is the mean ESG Score for treatment firms in the pre-directive period in Table 2.

companies in that industry compared to the reference industry, Academic & Educational Services. For example, companies in the Real Estate sector have on average higher ESG scores, with a positive coefficient of 9.98 (p -value < .01).

In terms of model fit, the R-squared value of 0.426 indicates that the model explains 42.6% of the variance in the ESG scores. The F-statistic indicates that the overall model is highly significant with $F(33, 7913) = 177.83$, $p < .001$.

I perform several diagnostic tests to assess the reliability of the results by analyzing the residual errors for normal distribution, heteroskedasticity, and serial correlation (see Appendix 11). To test whether the residuals are normally distributed, I use the Anderson-Darling normality test. The small p -value (< .001) indicates that the residuals are not normally distributed. I also use a QQ plot as a graphical tool to inspect the distribution of the residuals in my dataset: while most of the points lie along the line, there are some deviations in the tails (see Appendix 11, Panel A). Next, the Breusch-Godfrey test suggests the presence of serial correlation (p -value < .001) (see Appendix 11, Panel B). Finally, the studentized Breusch-Pagan test suggests the presence of heteroskedasticity (p -value < .001). The residuals plot supports this finding graphically (see Appendix 11, Panel C).

To address the issues of heteroskedasticity and serial correlation in the pooled OLS regression model, I compute robust standard errors to enhance the reliability of the estimates (Greene, 2012, pp. 390–392). The results from the Sandwich Estimator are presented in column (3) of Appendix 10. Importantly, the positive coefficient of the interaction term ($Post * Treatment$) remains statistically significant (p -value < .01). Overall, the application of the *SandwichEstimator* provides additional evidence for the main finding of my pooled OLS model, namely that the NFRD has a positive impact on ESG performance of affected EU companies, relative to the US control group.

4.4. Robustness checks and alternative analyses

Robustness checks: To test the robustness of the results, I rerun my analysis using an individual fixed effect model⁵⁰, which controls for individual entity-specific fixed effects:

$$ESG\ Score_{it} = \alpha_i + \beta_1 (Post * Treatment)_{it} + \beta_2 Post_t + \beta_4 ROA_{it} + \beta_5 Leverage_{it} + \beta_6 Firm\ Size_{it} + \varepsilon_{it}$$

Where α_i captures all the individual fixed effects, thereby controlling for time-invariant unobservable differences in company characteristics. Therefore, the time-invariant variables *Industry*, *Country*, and *Treatment* from the baseline pooling model are not specifically included in the equation. Although the fixed effect model reduces omitted variable

bias, it cannot estimate the coefficients of the time-invariant variables. (Greene, 2012, pp. 399–400)

I run the same diagnostic test as for the pooled OLS model above. To address the issue of heteroskedasticity and serial correlation, I again use the Sandwich Estimator to compute robust standard errors. As tabulated in Appendix 12, the coefficient on the interaction term $Post * Treatment$ remains positive and statistically significant, with a robust estimate of 2.26 (p -value < .01). This supports the previous finding that the NFRD has a positive impact on the ESG performance of affected companies in the post-regulation period. *Post* is also significantly positive with an estimate of 6.38 (p -value < .001), indicating that all sample companies, on average, increase their ESG performance after the directive comes into effect, relative to the pre-directive period. Among the control variables, only *Firm Size* is significantly positive, again suggesting that larger companies have higher ESG scores on average. *ROA* and *Leverage* have positive but insignificant coefficients.

Alternative analyses: In line with related literature (Cuomo et al., 2022, p. 6; Fiechter et al., 2022, p. 1513), I conduct additional analyses using alternative dependent variables, namely LSEG's Environmental Pillar Score and the Social Pillar Score. As presented in Appendix 13, the results of the pooled OLS model indicate that the coefficient of the interaction term for the Environmental Pillar Score is positive, but insignificant. Appendix 14 shows that the coefficient of the Social Pillar Score is significantly positive at 4.65 (p -value < .001).

4.5. Discussion of empirical results

My analysis provides evidence against the null hypothesis H_0 by showing that the NFRD encourages companies to adopt more sustainable behavior. Affected EU companies have a higher increase in ESG scores following the NFRD relative to unregulated firms. This finding is also consistent with previous research (Cicchello et al., 2023; Cuomo et al., 2022; Fiechter et al., 2022). The improvement seems to be mainly driven by better social performance, which is consistent with Fiechter et al. (2022, p. 1513), but differs from Cuomo et al. (2022, p. 14), who observed significant improvements in both social and environmental aspects. Among the control variables, only *Firm Size* has a significantly positive estimate in both models, suggesting that larger companies have higher ESG scores on average. As discussed above, this is reasonable because these companies are likely to have more resources to invest in ESG-related activities (e.g., Cicchiello et al., 2023, p. 1125; Jackson et al., 2020, p. 330).

Two primary mechanisms, stakeholder pressure and peer benchmarking, are likely to drive the observed ESG improvements following NFRD implementation. First, stakeholders may respond to the newly disclosed information by pressuring reporting firms to improve their ESG performance, which may lead to the adoption of more sustainable corporate behavior (e.g., Y.-C. Chen et al., 2018, p. 171; Downar et al., 2021, p. 1170; Jouvenot and Krueger, 2019, p. 32). Second,

⁵⁰ In line with Ernstberger et al. (2021, p. 17), I use the Hausman test to decide whether the use of a fixed effect or a random effect model is more appropriate for my data (Greene, 2012, pp. 419-420). The untabulated results support the use of a fixed effects model (p -value < .05).

the increased transparency and availability of ESG information allows companies to benchmark their own ESG performance against their peers. The potential to learn from them and the desire to outperform competitors can lead to better ESG performance (e.g., Jouvenot and Krueger, 2019, p. 32; Tomar, 2023, p. 454). In addition, the relative ease of implementing social initiatives compared to more complex environmental initiatives could be a possible reason for the more significant increase in social activities observed (Fiechter et al., 2022, p. 1521).

My study contributes to the understanding of the real effects of ESG disclosure regulation. Previous studies have largely focused on targeted ESG regulations, such as the US GHG Reporting Program (Bauckloh et al., 2023; Tomar, 2023). These regulations are often specifically designed to encourage a particular corporate behavior, such as reducing GHG emissions. In contrast, there is limited research on broader ESG regulations, such as the NFRD, that apply across industries and countries. Previous research on the NFRD tends to focus on anticipatory or short-term effects (Cuomo et al., 2022; Fiechter et al., 2022). My findings contribute to the debate on the effectiveness of such comprehensive regulations by demonstrating positive long-term effects on ESG performance over six years post-regulation.

My findings also have practical implications by informing policymakers and companies (potentially) subject to reporting requirements about the effectiveness of comprehensive ESG disclosure mandates. The success of the NFRD in encouraging ESG activity under a comply-or-explain approach is relevant beyond the EU, particularly for countries considering similar ESG disclosure requirements. In light of the forthcoming CSRD, which affects approximately 50,000 companies across Europe, my research also supports the EU's move towards stricter regulation and its commitment to an enhanced ESG regulatory framework.

4.6. Limitations of empirical analysis and suggestions for future research

My empirical analysis is subject to several limitations.

Differences in national legislation: While the NFRD is a supranational law, member states have some leeway in their national transposition. This results, for example, in different assurance requirements, penalties, disclosure formats, and scope of companies affected across countries (CSR Europe and GRI, 2017, p. 10). To fully understand the impact of the NFRD, future studies could investigate how these regulatory differences affect ESG performance.

Influence of the institutional environment and cultural aspects: I do not specifically explore the implications of differences in countries' institutional environments on ESG performance. However, the strength of the legal environment and enforcement mechanisms, as well as cross-cultural differences across EU member states, are likely to influence the effectiveness of the regulation (Krueger et al., 2023, pp. 44–45; Mittelbach-Hörmanseder et al., 2021, p. 335). Future research could further explore this topic.

Statistical limitations: The non-normal distribution of the variables and the residuals may limit the reliability of the results. Although the results remain significant when running different models and using robust standard errors, further robustness checks could include alternative control groups (Ioannou & Serafeim, 2017, pp. 25–26), alternative standard error clustering techniques (Fiechter et al., 2022, p. 1509) or alternative fixed effects (Ernstberger et al., 2021, p. 23).

Limitations of LSEG's ESG Score: While useful to capture the impact of the NFRD on the broad set of companies affected, LSEG's ESG score has its own limitations. I cannot rule out whether the methodological approach for calculating the score has changed during my sample period, which could affect ESG scores and hence the results. In addition, the score is based on public reporting, so improvements in ESG scores may reflect changes in reporting rather than actual changes in ESG activity. For example, companies may have adopted ESG-related activities prior to regulation, but only start disclosing the information after being subject to mandatory reporting requirements (Jackson et al., 2020, p. 330). Future research could explore more objective measures, such as GHG emissions. However, these measures may lack comparability across the different types of companies covered by the NFRD.

Isolating the effects of regulation: It is difficult to disentangle the effects of the NFRD from broader ESG trends or other regulatory changes. For example, ESG-related incidents, other market-wide shocks, or the introduction of related regulation affecting EU firms differently than US firms may explain the relative improvement in ESG performance, rather than the shift from voluntary to mandatory disclosure. (H. B. Christensen et al., 2021, p. 1213; Fiechter et al., 2022, p. 1542; Krueger et al., 2023, p. 32) Although these problems with causal inference are inherent in studies of regulatory change (Leuz & Wysocki, 2016, pp. 535–538), future research could focus on isolating firm responses to ESG disclosure regulation from other confounding effects.

Underlying mechanisms and drivers: While I argue that stakeholder pressure and peer benchmarking likely influence the positive impact of the NFRD on ESG performance, I do not specifically examine how these mechanisms influence the observed effect. Further studies could examine their role in detail. In addition, it may be interesting to further investigate why the improvements in ESG scores seem to be driven by better social performance, as opposed to better environmental performance.

5. Conclusion

This thesis advances the understanding of the impact of mandatory ESG disclosure regulations on companies by employing a threefold approach: a global analysis of ESG disclosure regulations, a literature review of their impact on reporting companies, and an empirical analysis of the effectiveness of the EU NFRD in promoting sustainable corporate behavior.

First, I find that disclosure requirements differ substantially across countries with respect to several dimensions (see

Chapter 2). These include the type of issuer (government versus stock exchange), the scope of content requirements and firms covered, and the basis of reporting. However, regulators around the world have recognized the need for standardization. While this may lead to greater convergence of reporting requirements, institutional and cultural differences between countries are likely to influence the effectiveness of regulations.

Second, the literature review in Chapter 3 suggests that ESG disclosure regulation has a positive impact on firms' disclosure practices (as measured by increased disclosure quantity and quality), although other studies provide no supporting evidence. Results on the financial effects of ESG disclosure regulation, including capital market and firm profitability effects, are also mixed. ESG mandates seem to lead to better ESG performance of companies, although many of these studies focus on targeted regulation. The heterogeneity of results may be due to differences in reporting requirements and institutional contexts, as identified in Chapter 2 of the thesis. Future research needs to account for these variations in order to draw precise implications from empirical results on the consequences of ESG disclosure mandates.

Third, I provide empirical evidence that the EU's NFRD, a comprehensive and widespread ESG disclosure mandate, has a positive impact on sustainable corporate behavior (see Chapter 4). In particular, the results from the DID analysis suggest that affected companies improve their ESG performance following the coming into force of the directive, relative to a matched sample of unregulated US companies. This effect seems to be driven by improvements in the social dimension. My analysis differs from most research that focuses on early effects, as I observe changes that materialize in the six years after companies have to comply with the reporting requirements. The results are of particular interest to regulators seeking to understand the effectiveness of disclosure mandates, as they suggest that the shift from voluntary to mandatory ESG disclosure is having the desired positive real effects.

Future studies could build on these findings by examining the impact of the recently adopted CSRD, particularly its extension to listed SMEs. Given that these firms often face knowledge and resource constraints (European Commission, 2022a, p. 81), it is important to understand how SMEs navigate the extensive ESG disclosure requirements. Although the CSRD affects a wider range of companies, its overall impact is still relatively limited. As of 2022, there are approximately 24 million active SMEs in the EU, accounting for more than 99% of businesses (European Commission, 2023b, p. 6, 2024) and responsible for over 60% of industrial CO₂ and GHG emissions in the EU (European Commission, 2022a, p. 16). With a total of approximately 50,000 EU firms subject to the CSRD, mandatory ESG disclosure requirements still affect only a fraction of companies. While most existing research focuses on the firm-level effects of these requirements, the broader, economy-wide implications of ESG disclosure (if any) remain an important but largely unexplored area for future research.

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