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# Climate Change Risk Disclosure in Europe: The Role of Cultural-Cognitive, Regulative, and Normative Factors

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**ABSTRACT** Climate change is a key issue faced by the contemporary world. Through the lens of neoinstitutionalism and the normativity concept, this study examines whether cultural, regulative, and normative dimensions affect the quality of climate change risk disclosures. This paper uses a sample of 653 European companies and measures the quality of their disclosures based on Carbon Disclosure Project (CDP) ratings. The results show that the quality of such disclosures is associated with cultural and normative dimensions, but substantive legitimacy is found to be influenced by all the examined institutional factors. The interactions between the examined cultural and normative dimensions are shown to be (not) important for firms that operated in weaker (stronger) regulative contexts prior to Directive 2014/95/EU. This study provides a better understanding of the challenges related to climate change reporting and the role of institutional differences in the process of achieving normativity in cross-national contexts such as that of the European Union.

*Keywords:* climate change; nonfinancial disclosure; CDP; Directive 2014/95/EU; neoinstitutional theory

## 1. Introduction

Climate change risk is an environmental risk resulting from the effects of global warming, such as extreme weather events, glacier retreating, and sea-level rise. A recent study by JP Morgan economists confirmed that climate crises will impact the world economy, human health, water stress, migration and the survival of other species on Earth (The Guardian, 2020). According to a JP Morgan report on the economic risks of human-caused global warming, the world will face irreversible consequences if climate policies do not change. Moreover, according to the Global Risks Report 2020 by the World Economic Forum (2020), 'the failure of governments and businesses to enforce or enact effective measures to mitigate climate change, protect populations and help businesses impacted by climate change to adapt' ranks first among the top 5 global risks in terms of impact and second in terms of likelihood over the next 10 years. In this paper, we focus on the European Union (EU) as our setting because it is seen as a champion of environmental policies in the international context (Braun, 2013). Its evolutionary green transition started in 1972 and has

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recently been fostered by the announcement of the European Green Deal (2019), which aims to achieve the common goal of a climate-neutral economy (Sikora, 2021).

Prior studies (Al Farooque et al., 2014; Ben-Amar et al., 2017; Berthelot & Robert, 2011; Dawkins & Fraas, 2011; Faisal et al., 2018; Gallego-Álvarez, 2012; Kouloukoui et al., 2019; Sakhel, 2017) have investigated the drivers of climate change-related disclosures (mainly at the firm level of analysis). Furthermore, certain literature has already recognized that the EU represents ‘a multitude of countries with different institutional backgrounds’ (Mittelbach-Hörmanseder et al., 2021, p. 310), which may lead to differences in the way sustainability issues are addressed in various countries due to institutional pressures (Tran & Beddewela, 2020). However, to the best of the authors’ knowledge, no environmental accounting research has focused on the impacts of institutional factors on EU companies’ climate change risk disclosure quality.

The neoinstitutional theory that we use as a theoretical underpinning differentiates between three dimensions that underlie institutional order: the cultural-cognitive, regulative and normative dimensions (Scott, 1995). A better understanding of the national peculiarities that influence climate change risk disclosure quality and their consequences can be useful in comprehending how normativity – ‘the degree to which rules and practices become accepted and standardized’ (Chauvey et al., 2015, p. 791) – in relation to climate change can be achieved in a cross-national context.

Therefore, the aim of the current study is to examine, through the lens of neoinstitutionalism and the normativity concept, whether cultural, regulative, and normative dimensions affect the quality of the voluntary climate change risk disclosures of EU-based companies. This paper also provides insights into how actors come to view rules (formal and/or informal norms) as binding in the context of corporate climate change risk reporting practices. Indeed, corporate reporting is increasingly required not only to disclose firms’ nonfinancial performance but also to communicate how sustainability is embedded within their corporate visions and governance, informs their business strategies and sustains their financial performance (Lai & Stacchez-zini, 2021, p. 406). The period of investigation is 2018, as this was the first year after mandatory sustainability disclosure requirements, including those related to climate change risk, were imposed on EU-based large public interest entities (PIEs)<sup>1</sup> as a result of Directive 2014/95/EU (EU, 2014). This period is adopted to investigate, in a mandatory reporting context, additional voluntary disclosures on climate change risk that are not provided in firms’ annual reports or via separate nonfinancial disclosure statements.

The current study uses a sample of 653 EU-based companies. The sample companies provide voluntary climate change risk disclosures by participating in the Carbon Disclosure Project (CDP) and obtain ratings that range from A to D-. On this basis, a scoring system is developed to serve as a proxy for the quality of climate change-related disclosures. To measure cultural influences, we rely on Hofstede’s (1980) framework and its focus on cultural dimensions related to individualism (IDV), uncertainty avoidance (UA), and long-term orientation (LTO). The regulative aspect is captured by the presence of regulatory-driven sustainability reporting prior to the EU Directive on nonfinancial information (i.e. Directive 2014/95/EU), while the normative dimension is captured by the environmental sensitivity of the industry in which each company operates.

With the use of ordinal probit regressions, the influence of the cultural-cognitive, regulative, and normative aspects on climate change risk disclosures and the importance of company size and profitability in this context are investigated. The findings suggest that the quality of climate change risk disclosures in countries where regulative influences are low depends on interactions between a combination of cultural and normative factors. On the other hand, in countries where regulative influences are high, the quality of climate change disclosures is not affected by interactions between institutional factors; rather, this quality is affected exclusively by the level of UA and firm characteristics. Our results support a neoinstitutional legitimacy interpretation. However, while legitimation efforts can be substantive and/or symbolic (Ashforth

& Gibbs, 1990), only a handful of studies have attempted to distinguish between substantive and symbolic communications (Chelli et al., 2018, p. 290). To answer the call of Chelli et al. (2018) regarding ‘substantive legitimacy’, the sample is further divided into two subsets, namely, best and worst reporters, using CDP rating methodology.

The current paper contributes to the literature on climate change (e.g. Andrew & Cortese, 2011; Haque & Deegan, 2010; Kolk et al., 2008) and extends the literature on normativity, which relates to the ways actors perceive rules as binding (Bebbington et al., 2012; Chauvey et al., 2015), and neoinstitutional theory (Chelli et al., 2018). First, evidence is provided showing that climate change disclosure quality is impacted by institutional context. Second, the research findings support and extend neoinstitutional theory, highlighting the different ways in which normativity can be achieved in cross-national contexts.

This paper is organized as follows. The second section presents the institutional context of corporate climate change risk disclosure in the EU. The third section offers a review of the relevant literature. The fourth section provides the theoretical background of the study and develops research hypotheses. The empirical research design is presented in the fifth section. Subsequently, the research findings are discussed. The last section offers concluding remarks, information on the limitations of the study, and an indication of future research possibilities.

## 2. Institutional Context

Organizations are increasingly giving attention to the fight against climate change (González-González et al., 2015). Due to stakeholder pressures and the introduction of regulatory requirements, they have also begun to disclose information on climate change risk. In 2017, the Task Force on Climate-related Financial Disclosures (TCFD) published global-level recommendations to encourage companies to disclose information on climate-related risks and opportunities. A number of governments and financial regulators around the world, including the European Union member states (EC, 2019), have expressed support for TCFD recommendations and have begun integrating them into their guidance and policy frameworks. In the EU, important institutional changes regarding corporate reporting, including some related to climate change disclosures, have been introduced with the implementation of Directive 2014/95/EU, which has been referred to as a ‘regulation-driven shock to CSR [corporate social responsibility] disclosure’ (Mittelbach-Hörmanseder et al., 2021, p. 310). Article 1 of the Directive states that the companies concerned shall disclose nonfinancial information related to, at a minimum, environmental, social and employee matters; their respect for human rights; and anti-corruption and bribery matters. Moreover, they should do this to the extent necessary to enable an understanding of the undertaking’s development, performance, position and impact. Despite its aim to enhance the comparability of provided information, the Directive gave member states some discretion regarding its implementation (Mio et al., 2021) and provided companies with significant disclosure flexibility (Mio et al., 2020; Zarzycka & Krasodomska, 2022). It should be noted that prior to the implementation of Directive 2014/95/EU, only a few countries had decided to apply their own mandatory regulations on sustainability reporting practices (Camilleri, 2015).<sup>2</sup>

In June 2019, the European Commission (EC) issued guidelines on reporting climate-related information (EC, 2019). According to the EC (2019), good-quality climate-related disclosures can benefit reporting entities, as they lead to, e.g. an increased awareness and understanding of climate-related risks and opportunities and improved risk management. Moreover, the provision of information on climate change risk may lead to a more diverse investor base and a potentially lower cost of capital, more constructive dialogues with stakeholders and better corporate reputation and maintenance of social licences to operate (EC, 2019).

Despite the fact that, according to the EU Directive, the reason for the introduction of these changes was to ‘enhance the consistency and comparability of non-financial information disclosed throughout the Union’ (EU, 2014, par. 6), the guidelines stress that ‘the content of climate-related disclosures may vary between companies according to a number of factors, including the sector of activity, geographical location and the nature and scale of climate-related risks and opportunities’ (EC, 2019, par. 2.1). Additionally, companies are encouraged to keep up with new developments in climate-related reporting initiatives and practices, which evolve quickly. Decisions regarding which disclosures to provide and how to do so still depend on companies’ own choices to a large extent.

### 3. Literature Review

The literature related to corporate environmental discourse is extensive (Andrew & Cortese, 2011); however, few studies focus specifically on climate change risk. According to previous research results, climate change risk disclosures vary across companies (Gallego-Álvarez, 2012), and they depend on firm-specific characteristics, such as a firm’s size and country of operation (e.g. Faisal et al., 2018; Gallego-Álvarez, 2012; Kouloukoui et al., 2019), corporate governance mechanisms (e.g. Ben-Amar et al., 2017; Berthelot & Robert, 2011) or sector (e.g. Al Farooque et al., 2014; Faisal et al., 2018; Sakhel, 2017). The volume of climate-related information disclosed by a company is also influenced by its level of environmental consciousness (Gallego-Álvarez et al., 2011) and environmental performance (Dawkins & Fraas, 2011).

Corporate disclosures regarding climate change risk are demanded by stakeholders (Haque & Deegan, 2010), and such disclosures affect their reactions (Dawkins & Fraas, 2011). According to Maaloul (2018), creditors incorporate firms’ impacts on climate change into their lending decisions and penalize polluting firms. Furthermore, climate change risk-related disclosures seem to be negatively perceived by investors (Alsaifi et al., 2020), who mainly associate them with costs (Lee et al., 2015). The more climate-harmful the industry in which a company operates is, the more negative investors’ reactions are (Alsaifi et al., 2020).

Moreover, studies have found that the level of climate change risk-related disclosures is low and insufficiently standardized (e.g. Amran et al., 2014; Doda et al., 2016; Haque et al., 2016; Kouloukoui et al., 2019). This is because stakeholders are not proactively engaged in climate change disclosures and are still focused on financial performance (Haque et al., 2016). Investors’ interest in disclosures is also limited because they cannot make meaningful comparisons between companies (Sullivan & Gouldson, 2012). Therefore, Sullivan and Gouldson (2012) propose the introduction of a combination of voluntary and mandatory reporting that is underpinned by active investor interest in the data being reported as a solution that offers the greatest potential for progress regarding climate change-related disclosure quality. This proposal for stricter regulations is supported by research results showing that environmental regulations and legal origin are relevant explanatory factors of corporate climate change disclosure (Grauel & Gotthard, 2016; Mateo-Márquez et al., 2019).

In the European setting, the significant role that regulation plays in spurring corporate action on climate change is stressed by Sakhel (2017). Though all the EU member states are under the same regulatory regime, they are not homogenous. The EU consists of different institutional environments with divergent levels of economic development, legal environments, population sizes, religious affiliations, cultural backgrounds, languages and ethical frameworks. The differences between the member states’ approaches to sustainability issues and related disclosures were the main driver of the introduction of the cited EU Directive (EU, 2014). Despite the aforementioned efforts undertaken by the EU to establish a ‘level playing field’ regarding sustainability reporting, the flexibility of the EU’s minimum harmonization approach has not contributed to

the creation of such a setting (Aureli et al., 2019; Szabó & Sørensen, 2015). As La Torre et al. (2018) argue, to make nonfinancial disclosures consistent and comparable across the EU, the adoption of standardized accounting and reporting standards has to be regulation-based. However, relying solely on regulation in a cross-country cultural context such as that of the EU might be insufficient. Due to the differences in the sustainability reporting practices of various member states, an understanding of the relevant national cultures and local environments is necessary for regulating this issue (La Torre et al., 2018).

## 4. Theoretical Background and Hypothesis Development

### 4.1. Neoinstitutional Theory and Normativity Concept

Neoinstitutional theory (Scott, 1995) provides a helpful theoretical perspective for understanding and comparing corporate sustainability-related strategies within their national, cultural and institutional contexts (Matten & Moon, 2008). Neoinstitutional theory focuses on the relationships between companies and their broader societal contexts (Tran & Beddewela, 2020). Scott (1995) examines and elaborates upon DiMaggio and Powell's (1983) concept of institutional isomorphism and identifies three pillars of institutional order: the cultural-cognitive (referred to mimetic isomorphism), regulative (related to coercive isomorphism) and normative (linked to normative isomorphism) pillars.

Pressures stemming from national culture constitute the cultural-cognitive pillar. This dimension stresses the roles of shared beliefs, common knowledge, and the generally accepted assumptions made by the people in a country. It also highlights the important role that culture plays as a factor that influences the pressures put on companies to implement particular nonfinancial strategies and disclosure policies (Scott, 2004; Tran & Beddewela, 2020).

The regulative pillar is connected with the pressures stemming from country-level legal systems and regulations (Tran & Beddewela, 2020). It stresses the roles of rule-setting, monitoring, and activity sanctioning (Scott, 2008). Legal environments are created by laws, regulations and formal, legally sanctioned rules enforced by governments and states.

The normative pillar highlights the importance of pressures imposed by business associations and industrial peers on company behaviour. Informal (soft) laws, norms, values, and beliefs, which are shared among the members of a society, influence not only these members' actions but also expectations regarding how one should behave (Scott, 2013). Moreover, normative elements stress the importance of moral or ethical criteria (Shnayder et al., 2016) and the role of professional networks (Scott, 2013).

As Brammer et al. (2012) note, the problem of nonfinancial voluntary disclosure is caught between two forces: the liberal notion of voluntary engagement and the implication of socially binding responsibilities. In line with Chelli et al. (2018), this study combines neoinstitutional theory with the concept of normativity. Normativity can arise from laws or from less formal systems of rules (Bebbington et al., 2012). Prior studies on normativity focus on processes (how actors come to see rules as binding) or on end results (how actors actually abide by rules). Based on its assumption that companies voluntarily disclose climate change risk information while participating in a CDP project, this study belongs to the first theoretical stream.

### 4.2. Hypothesis Development

#### 4.2.1. Cultural-cognitive dimension

Culture is considered to be a powerful factor that affects firms' legitimacy management strategies, including their approaches to disclosure and transparency (García-Sánchez et al., 2013;

Smith et al., 2005). That is, cultural factors may help explain how rules and practices become accepted and standardized in specific contexts. Therefore, the cultural-cognitive dimension fits well with our theoretical framework that combines the normativity concept with neoinstitutional theory.

The cultural framework of Hofstede was introduced to the accounting literature by Gray (1988) and is most widely used in accounting research. Hofstede's framework decomposes cultures into component parts (called dimensions, such as power distance, individualism (versus collectivism), masculinity (versus femininity), uncertainty avoidance, long-term orientation and indulgence) and provides country-level quantitative measures of these dimensions (Hofstede, 2020).

Climate change is seen as a collective problem; however, it also seems that to succeed, cooperation on a disaggregated level is needed (Esty & Moffa, 2012). Therefore, this study views individualism (IDV) as a relevant dimension. Moreover, climate change risk is a future-oriented phenomenon that is subject to a high level of uncertainty. These aspects are covered by uncertainty avoidance (UA) and long-term orientation (LTO) measures. Following this reasoning and prior studies, which are referred to below, the focus of this study's analysis is on IDV, UA and LTO (see the definitions in Table 1).

García-Sánchez et al. (2016) argue that IDV has a negative influence on corporate disclosures. According to these authors, firms are likely to reflect the societies in which they operate, and stakeholders in societies with high IDV scores are more self-centred and less responsive to objectives other than their own. Thus, in such societies firms' management may demonstrate less concern about the broader impact of business on society and focus more on maximizing their own compensation and investors' returns (Ringov & Zollo, 2007). Managers who operate in

**Table 1.** Selected Hofstede dimensions of national culture.

Dimension	Description
Individualism (IDV)	The IDV dimension can be defined as a preference for a loosely knit social framework in which individuals are expected to take care of only themselves and their immediate families. Its opposite, collectivism, represents a preference for a tightly knit societal framework in which individuals can expect their relatives or members of a particular in-group to look after them in exchange for unquestioning loyalty. A society's position on this dimension is reflected in whether a person's self-image is defined in terms of 'I' or 'we'.
Uncertainty Avoidance (UA)	The UA dimension expresses the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity. The fundamental issue here is how society deals with the fact that the future can never be known: should they try to control the future or just let it happen? Countries that exhibit strong UA maintain rigid codes of belief and behaviour and are intolerant of unorthodox behaviour and ideas. Weak UA societies maintain a more relaxed attitude in which practice is more important than principles.
Long-Term Orientation (LTO)	The LTO dimension describes how every society has to maintain certain links with its own past while dealing with the challenges of the present and future, and societies prioritize these two existential goals differently. Societies, which score low on this dimension (called normative), prefer to maintain time-honoured traditions and norms while viewing societal change with suspicion. Those with a culture that scores high, on the other hand, adopt a more pragmatic approach: they encourage thriftiness and modern education efforts as ways to prepare for the future.

Source: Hofstede (2020).



countries with high IDV scores easily distance themselves from stakeholder groups and their needs, and they devote little effort to supporting sustainability initiatives (Khlif et al., 2015). Caring for society and the environment is more in line with the ‘we’ (collectivistic) than the ‘I’ (individualistic) approach (García-Sánchez et al., 2016). As a result, firms in countries where the cultural setting is individualistic care less about transparency. Mittelbach-Hörmanseeder et al. (2021) also identify a negative association between IDV and environmental disclosure, and they focus on European companies’ CSR disclosures prior to the implementation of Directive 2014/95/EU. However, Orij (2010) documents that IDV is positively associated with social disclosure. Orij (2010) also indicates that Scandinavian countries rank high in terms of IDV<sup>3</sup> and that they exhibit advanced sustainability practices and disclosures. Furthermore, Hope et al. (2008) argue that ‘individualistic societies are expected to be less secretive than collectivist societies, where people share common beliefs and possibly information’ (Hope et al., 2008, p. 359). The findings provided in the literature are mixed, but this study proposes that climate change risk is a ‘global-scale collective action problem with implications that require carefully managed policy coordination and multi-level governance’ (Esty & Moffa, 2012, p. 777). Therefore, it is expected that firms in countries with high IDV scores are less focused on providing high-quality disclosures on this topic. Thus, the following hypothesis is proposed:

**H1:** Firms based in countries with higher IDV scores are expected to provide lower-quality climate change risk disclosures.

UA has been investigated with mixed results in several studies on the impact of culture on non-financial disclosure. According to Gray (1988), UA relates positively to secrecy (and negatively to transparency) because a low level of information provision supports the approach of individuals who wish ‘to avoid conflict and competition and to preserve security’ (p. 12). García-Sánchez et al.’s (2016) findings show that societies with high UA tend to impose more rules and standards on individuals. Therefore, stakeholders in such societies have lower expectations about nonfinancial practices than those in countries with low UA scores, where nonfinancial practices are not motivated through legislation. The authors argue that high UA implies that companies do not increase their transparency to inform interest groups about their behaviour due to a lack of stakeholder pressure. Vachon (2010) finds that the higher UA is in a society, the lower the level of corporate engagement in sustainable development practices is. However, the findings of Adelopo et al.’s (2013) study support a positive relationship between UA and social disclosure based on the argument that firms from countries with high UA scores are more likely to report sustainability information to reduce uncertainties according to society’s expectations. Similar results are obtained by Tran and Beddewela (2020), who find that firms operating in such countries engage in more nonfinancial disclosure. The positive association between UA and environmental disclosure is also observed by Mittelbach-Hörmanseeder et al. (2021). For the purpose of this study, the second perspective is adopted, and the following hypothesis is proposed:

**H2:** Firms based in countries with higher UA scores are expected to provide higher-quality climate change risk disclosures.

The LTO dimension refers to a forward-looking perspective rather than a historical perspective. Following Bradley et al. (1999) and Orij (2010), it is expected that LTO is related to a stakeholder or social perspective. Therefore, a firm operating in a country with a high LTO score is expected to provide climate-change-related disclosures because it needs to be in line with norms to preserve its reputation among stakeholders and build long-term and strategic competitive advantages. According to García-Sánchez et al. (2016), LTO countries are more likely to



demand more extensive CSR practices and expect that companies will provide sustainability reports to inform stakeholders about their social and environmental behaviour and impacts on the common future. Climate risk is seen as a long-term oriented concept. Therefore, the following hypothesis is posited:

**H3:** Firms based in countries with higher LTO scores are expected to provide higher-quality climate change risk disclosures.

#### *4.2.2. Regulative dimension*

Szabó and Sørensen (2015) note that before the adoption of Directive 2014/95/EU, there was very little focus on the disclosure of nonfinancial information in the EU. The adoption of the Accounts Modernization Directive in 2003 was the EU's first attempt to regulate the CSR activities of the companies operating in its member states. This directive obliged companies to report on relevant nonfinancial key performance indicators (KPIs), such as those related to environmental and employee matters, in their management commentaries. In practice, this requirement remained conditional and rather vague, and companies did not care much about providing such disclosures (Szabó & Sørensen, 2015). This was because in many EU countries, especially those in Central and Eastern Europe, CSR was in an early development stage during this time, and the Directive was not followed by binding reporting standards or even by nonbinding guidelines. Some member states were satisfied with merely transposing the provisions of the Accounts Modernization Directive, while others went further and required disclosures of sustainability information that went beyond the stipulations of the directive.

According to Dye (1986), mandatory disclosure leads to an increase in managerial incentives to disclose voluntary information for value maximization. Based on this assumption and this study's theoretical framework on normativity, the existence of prior sustainability disclosure requirements would enhance managers' incentives to voluntarily disclose additional and/or higher quality information to distinguish their companies from others and thus enhance their market value to increase wealth. Therefore, it is expected that in countries where sustainability reporting was mandatory before Directive 2014/95/EU, higher-quality voluntary disclosures on climate change risk exist. This assumption is also reinforced by the fact that the experience gained from past mandatory reporting practices (routine) should result in higher-quality voluntarily provided disclosures (Ruhnke & Gabriel, 2013). In such cases, distinctive reporting structures are established, monitoring processes are adapted and contact persons in the company are designated. Conversely, companies that have not previously prepared such reports presumably find themselves in an early stage of development. According to the findings of Cormier et al.'s (2005) study, companies' reporting routines determine the level of their environmental disclosures. Given the above, the following hypothesis is proposed:

**H4:** Firms based in countries with more strongly regulated reporting contexts prior to the introduction of the Directive 2014/95/EU are expected to provide higher-quality climate change risk disclosures.

#### *4.2.3. Normative dimension*

According to this study's theoretical framework, normativity may not only be achievable through mandatory disclosure regimes but also be affected by more informal regimes. The impact of industrial peers may represent a form of normative isomorphism, i.e. the idea that environmental information disclosure could disseminate through social networks among the managers within an industry (Zheng et al., 2012, p. 312). According to the literature, companies that operate in industries with negative impacts on the environment generally provide more environment-related

disclosures than companies in other sectors (Fernandez-Feijoo et al., 2014; Zheng et al., 2012). Society tends pressure these companies to be more transparent with regard to their environment-related operations. This is because concerns expressed by community stakeholders (such as ecological activists) and customers influence corporate decisions to integrate environmental issues into their strategies (Banerjee et al., 2003). For example, companies that are pressured by ecological groups have been found to disclose more environmental information than those that are not exposed to such influences (Gamerschlag et al., 2011). Therefore, in the context of non-binding rules on environmental disclosure (e.g. TCFD recommendations or CDP participation), where stakeholders' concerns translate into normative pressures imposed by peers, companies should be obliged to respond to these pressures and to meet ethical criteria that satisfy society's informational needs concerning environmental protection. Thus, considering that the normative dimension manifests itself in the fact that firms' industrial backgrounds and memberships in associations make those that operate in the same field similar to one another (Dumitru et al., 2017), the following hypothesis is proposed:

**H5:** Firms belonging to environmentally sensitive industries are expected to provide higher-quality climate change risk disclosures.

## 5. Research Design

### 5.1. Sample Selection

The focus of this study is on the European setting. The initial population of the utilised sample consisted of 1915 companies for which CDP ratings on climate change for the year 2018 were publicly available on the CDP website on the day of the data collection (20 March 2020). A data set was manually constructed. Any companies that had not provided the minimum level of information necessary to be assessed were excluded from the sample. Specifically, a company that obtains a CDP rating of F 'indicates a failure to provide sufficient information to CDP to be evaluated for this purpose' (CDP, 2020). Among the examined companies, 711 European companies had obtained a CDP score indicating that their disclosure quality could be identified. To test the hypotheses, the following data were then collected: data on cultural dimension factors from the Hofstede website database; information on the regulative dimension proxy from the LSE database on the 'climate change laws of the world' (Grantham Research Institute on Climate Change and the Environment, 2020); and information on the normative factor proxy (i.e. industry) and financial data from the Orbis database. Due to missing financial data, the final sample used in the regressions consisted of 653 companies belonging to 20 European countries. The most represented EU countries were the UK<sup>4</sup> (31.85%), France (13%), and Germany (11.48%). The countries that were shown to provide the highest quality climate change risk disclosures were Portugal (66.67% of the country sample), France (45.88%), and Spain (30%). Conversely, the examined companies in Poland (100% of the country sample), Hungary (50%), and the Czech Republic (50%) were shown to provide the lowest quality climate change risk disclosures. In terms of industry, service providers (12.10%), financial companies (10.11%), heavy equipment producers (9.49%), and pharmaceutical and chemical producers (6.43%) were shown to be the most willing to provide voluntary climate change risk disclosures with more than 40 observations each.

### 5.2. Variable Measurement

#### 5.2.1. Dependent variable

The global CDP is an international nonprofit organization that supports companies in disclosing their environmental impacts. Companies that are willing to voluntarily participate in the project

are evaluated via a questionnaire on the basis of which a rating is obtained. The CPD rating is an alphabetical, composite public score that indicates the level of a company's reporting on (i) climate change, (ii) forest and (iii) water security initiatives (CDP, 2020). CDP ratings have been used in several studies to investigate convergence in environmental reporting (Matisoff et al., 2013), the impact of institutional investor activism on shareholder value (Kim & Lyon, 2011), carbon emissions and disclosures (Kolk et al., 2008; Matsumura et al., 2014; Saka & Oshika, 2014), and the factors influencing voluntary environmental or climate change-related disclosures (Charumanthi & Rahman, 2019; Kumar & Firoz, 2019; Lewis et al., 2014). To address the aim of this study and to test the research hypotheses, this study specifically focuses on companies' climate change CDP ratings as a proxy for the quality of their voluntary disclosures regarding climate change risk.

It should be noted that CDP ratings measure companies' disclosure quality by scoring them on a scale ranging from D- to A in terms of the following four dimensions: their (i) disclosure comprehensiveness, (ii) company awareness, (iii) environmental risk management, and finally, (iv) best practices associated with environmental leadership, such as setting ambitious and meaningful targets. To receive a high score, a company must first fulfil the conditions associated with the lower scores. For instance, if a company receives a B score, it has met all the conditions needed to receive a D or C score.

In line with the legend provided by the CDP, the examined companies' climate change score ratings were transformed into categorical variables ranging from 1 to 5 (see Table 2), and each of the four levels of comprehensiveness were distinguished. Each represented a combination of two slightly different ratings that are used by the CDP to distinguish between companies that obtain full ratings (A, B, C, or D) and those that are very close but do not fully meet the criteria (these are rated A-, B-, C-, or D-). Thus, for instance, A and A- were placed together in one comprehensiveness category, namely, 'leadership level'; however, to maintain data granularity, 0.20 was deducted from the full scores of companies that did not fully meet the criteria. CDP\_CC\_SCORE was used as the dependent variable in the main regression model (Model 1) and robustness analysis (Model 2).

Given that there are no strict regulations that companies must follow when providing climate risk-related disclosures, it was assumed that dividing the sample into two subsamples according to the companies' levels of comprehensiveness may provide some further insights into the factors that influence their reporting decisions. In addition, considering how the CDP computes the utilised ratings, dividing the full sample into two subsamples may provide an answer to the call of Chelli et al. (2018) on 'substantive legitimacy'. In line with Hummel and Schlick (2016) and Lee (2017), additional analyses were performed using the two subsamples based on the companies' disclosure quality levels: TOP\_CDP (i.e. group A: composed of companies with the two highest

**Table 2.** CDP climate change ratings and disclosure scores.

Climate change CDP rating	Level of comprehensiveness	CDP_CC_SCORE
A	Leadership Level	5
A-		4.8
B	Management Level	4
B-		3.8
C	Awareness Level	3
C-		2.8
D	Disclosure Level	2
D-		1.8
F	Failure to provide sufficient information for evaluation	1

ratings) and WORST\_CDP (i.e. group B: composed of companies with the two lowest levels). Two additional regressions were run using TOP\_CDP and WORST\_CDP as dependent variables (Model 3, Panel A and Panel B, respectively) (Table 3).

### 5.2.2. Independent and control variables

The focus of the independent variables was to serve as a proxy for the institutional dimensions. Data on the cultural dimension (IDV, UA, LTO) were collected from the Hofstede database,<sup>5</sup> which identifies these cultural dimensions and quantitatively measures such factors according to a range from 0 to 100.

The regulatory dimension proxy is represented by a dummy variable equal to 1 if the focal company belongs to a country in which broad sustainability reporting was mandatory before EU Directive 95/2014 (i.e. Denmark, France, Sweden) and equal to 0 otherwise.

The normative dimension proxy is represented by a dummy variable equal to 1 for companies belonging to environmentally sensitive industries (in line with Brammer & Pavelin, 2008; and Reverte, 2009) and equal to 0 otherwise.

Regarding the control variables, financial data from the Orbis database were collected regarding each firm's size (ln total assets) and profitability in terms of return on assets (ROA). Industry and country controls were also included. The utilised independent and control variables are presented in Table 4.

### 5.3. Regression Models

To test the research hypotheses, an ordinal probit model was performed on the categorical dependent variable CDP\_CC\_SCORE (Model 1) as follows:

$$\begin{aligned} \text{CDP\_CC\_SCORE} = & \beta_0 + \beta_1 \text{IDV} + \beta_2 \text{UA} + \beta_3 \text{LTO} \\ & + \beta_4 \text{Regulative} + \beta_5 \text{Normative} \\ & + \beta_6 \text{Size} + \beta_7 \text{ROA} + \beta_8 \text{CDP\_Industry} \\ & + \beta_9 \text{Country} + \varepsilon \end{aligned} \quad (1)$$

As a robustness test, the effects of the interactions between all the institutional dimensions on the quality of climate change risk disclosure were considered. To do so, two additional ordinal probit regressions were run that included interactions between the cultural and normative

**Table 3.** Dependent variables' names, definitions and source.

Variable	Variable name	Definition	Source
The quality of the disclosures about climate change risk provided by the sample companies	CDP_CC_SCORE	Categorical variable ranging from 1 (low quality) to 5 (high quality) similar to the 2018 CDP ratings.	CDP database
The quality of the disclosures about climate change risk provided by the companies in Subsample A	TOP_CDP	CDP_CC_SCORE ranging from 3.8 (low quality) to 5 (high quality).	CDP database
The quality of the disclosures about climate change risk provided by companies in Subsample B	WORST_CDP	CDP_CC_SCORE ranging from 1.8 (low quality) to 3 (high quality).	CDP database

dimensions depending on the overarching regulative context in which each firm was operating (Model 2):

$$\begin{aligned}
 \text{CDP\_CC\_SCORE} = & \beta_0 + \beta_1\text{IDV} + \beta_2\text{UA} + \beta_3\text{LTO} \\
 & + \beta_4\text{Normative} + \beta_5\text{IDV}*\text{Normative} \\
 & + \beta_6\text{UA}*\text{Normative} + \beta_7\text{LTO}*\text{Normative} \\
 & + \beta_8\text{Size} + \beta_9\text{ROA} + \beta_{10}\text{CDP\_Industry} \\
 & + \beta_{11}\text{Country} + \varepsilon
 \end{aligned}
 \tag{2}$$

As a further analysis, the main ordinal probit model was performed on the categorical variables TOP\_CDP and WORST\_CDP to investigate the potential differences between best and worst reporters (Model 3 – Panels A and B, respectively).

## 6. Empirical Results and Discussion

### 6.1. Descriptive Statistics

The findings of this study indicate that there is diversity in the quality of the climate change risk disclosures provided by the sample companies. Table 5 shows that the largest number of sample companies (32.77%) received a score of 4, which means that they have ‘management-level’ comprehensiveness according to the CDP climate change rating. The second-largest group comprises

**Table 4.** Independent and control variables’ names, definitions and sources.

Variable	Variable name	Definition	Source
Cultural dimension	IDV	An individualism index ranging from 0 to 100.	Hofstede’s database
Cultural dimension	UA	An uncertainty avoidance index ranging from 0 to 100.	Hofstede’s database
Cultural dimension	LTO	A long-term orientation index ranging from 0 to 100.	Hofstede’s database
Regulative dimension	Regulative	A dummy variable equal to 1 if the focal company belongs to a country in which sustainability reporting was mandatory (i.e. Denmark, France, and Sweden) prior to EU Directive 95/2014 and 0 otherwise.	LSE database on climate change laws of the world
Normative dimension	Normative	A dummy variable equal to 1 if the focal company belongs to an environmentally sensitive industry <sup>a</sup> and 0 otherwise.	CDP database
Size	Size	Natural logarithm of company’s total assets for the year 2018.	Orbis database
Return on Asset	ROA	The ratio of net income to total assets for the year 2018 (winsorized).	Orbis database
Industry	Industry	Industry transformed into a categorical number based on alphabetical order.	Orbis database
Country	Country	Country transformed into a categorical number based on alphabetical order.	CDP database

<sup>a</sup>Following Brammer and Pavelin (2008) and Reverte (2009) and relying on the Orbis industry classification, we designate the following industries as environmentally sensitive industries: chemical, metallurgy, utilities, tobacco, mineral and extraction activities, oil and gas, wood, and heavy equipment production.

**Table 5.** The companies' CDP\_CC\_SCORE distribution by country.

Country	CDP_CC_SCORE								Total
	Disclosure level		Awareness level	Management level		Leadership level			
	1.8	2		3	3.8	4	4.8	5	
Austria	0	1	4	0	3	0	4	12	
Belgium	0	3	2	0	6	0	2	13	
Czech Republic	0	1	1	0	0	0	0	2	
Denmark	0	5	7	0	4	0	3	19	
Finland	0	9	11	0	11	0	10	41	
France	0	11	21	0	12	2	39	85	
Germany	2	16	16	0	27	0	14	75	
Greece	0	1	0	0	3	0	0	4	
Hungary	0	1	1	0	0	0	0	2	
Ireland	0	2	5	0	8	0	4	19	
Italy	0	3	5	0	18	0	9	35	
Luxembourg	0	1	0	0	2	0	0	3	
Malta	0	0	1	0	0	0	0	1	
The Netherlands	0	7	8	0	11	0	6	32	
Poland	0	2	0	0	0	0	0	2	
Portugal	0	0	2	0	1	0	6	9	
Spain	0	4	8	0	16	0	12	40	
Sweden	0	14	15	0	16	0	6	51	
The UK	0	37	68	1	75	0	27	208	
Total	2	118	175	1	213	2	142	653	

companies that obtained a score of 3 (26.80%). These companies have ‘awareness-level’ comprehension. Slightly fewer companies (22.05%) received the highest-level CDP rating, which indicates that they have ‘leadership-level’ climate change initiatives. Finally, the least-represented group (18.37%) consists of companies that voluntarily disclose climate change risk information at the mere ‘disclosure level’.

Table 5 also shows the distribution of the companies’ climate change risk disclosure quality by country. Most of the companies that voluntarily disclose climate change risk information are based in the UK (208 companies). These companies are followed by others based in France (85), Germany (75), and Sweden (51). The least-represented countries are Luxembourg (3); the Czech Republic, Hungary, and Poland (2 each); and Malta (1). Table 6 indicates that the industry with the greatest willingness to make additional climate change disclosures is the services industry, particularly service providers (79 companies) and financial companies (66 companies). This industry is followed by the heavy equipment production (62) and pharmaceutical and chemical production (42) industries. Among the least represented industries in the sample are those composed of biotechnology and waste management companies (1 observation each).

Table 7 presents descriptive statistics indicating that the average CDP\_CC\_SCORE obtained by the examined European reporting companies is 3.58 out of 5. Therefore, it can be claimed that on average, EU companies are still at an ‘awareness level’ regarding voluntary climate change risk disclosure.

**Table 6.** Industry distribution.

INDUSTRY	Number of Observations	%
Services to companies	79	12.10%
Financial services	66	10.11%
Heavy equipment production	62	9.49%
Pharmaceutical and chemical products	42	6.43%
Construction	35	5.36%
Transportation	35	5.36%
Real estate	34	5.21%
Utilities	34	5.21%
Communications	32	4.90%
Mineral and extraction activities	28	4.29%
Food, beverage and tobacco	27	4.13%
Means of transport production	24	3.68%
Metallurgy	23	3.52%
Retail	22	3.37%
Hospitality and entertainment	20	3.06%
Wholesale	20	3.06%
Wood	15	2.30%
Publishing	11	1.68%
Leather products	10	1.53%
Textiles	7	1.07%
Media and telecommunications	6	0.92%
Public sector	6	0.92%
Computer software	5	0.77%
Agriculture and livestock	2	0.31%
Computer hardware	2	0.31%
Oil and gas	2	0.31%
Other manufacturing activities	2	0.31%
Biotechnologies	1	0.15%
Waste management	1	0.15%
<b>TOTAL</b>	<b>653</b>	<b>100%</b>



**Table 7.** Descriptive statistics.

Variable	Obs.	Mean	Std. Dev.	Min	Max
CDP_CC_SCORE	653	3.5835	1.0263	1.800	5
IDV	653	74.1577	13.0771	27	89
UA	653	55.7167	22.9104	23	100
LTO	653	55.9847	14.1620	24	83
Regulative	653	0.2374	0.4258	0	1
Normative	653	0.2098	0.4075	0	1
Size	653	15.5928	2.0012	9.1891	21.5271
ROA	653	4.5105	4.5431	-3.092	14.995

The cultural-cognitive dimension proxies indicate that the EU presents a low level of variability in terms of the cultural dimension in relation to population means, as the coefficient of variation (i.e. the ratio of the standard deviation to the mean) for all Hofstede's indices is lower than 50%. Specifically, IDV has a coefficient of variation equal to 17.63%; for UA, this coefficient is equal to 41.11%, and for LTO, it is equal to 25.30%. Therefore, the results indicate that the examined cultural context is quite homogenous, and UA is the most diversified cultural variable across the EU countries (the highest level of UA is exhibited by Greece (100), and the lowest level is found in Denmark (23)). The regulative dimension proxy shows that 23.74% of the companies come from countries where sustainability reporting was mandatory before the Directive (i.e. Denmark, France, and Sweden). Regarding the normative dimension, in the sample, 21% of the companies belong to industries with potentially high environmental impacts.

Regarding company size, the mean of the companies' total assets equals € 5,897,269, with a minimum of € 19,930 and a maximum of € 2,240,578,660. Regarding the financial measures, average profitability as measured by ROA equals 4.51%.

Spearman correlations were used to test the correlations between the set of independent variables. The results are presented in Table 8. Two out of the three proxies for the cultural dimension exhibit significant correlations ( $p < 0.05$ ) with CDP\_CC\_SCORE. Specifically, IDV presents a negative correlation, and UA presents a positive correlation. Furthermore, the normative dimension presents a significant correlation with the dependent variable. Among the control variables, both size and country are significantly correlated with CDP\_CC\_SCORE. Overall, this suggests potential associations in the regression analysis. Many other correlations among the independent variables were also found. However, a test of multicollinearity suggested that our data do not have such an issue.<sup>6</sup>

## 6.2. Main Model Results

Table 9 presents the findings of Model 1. Taken together, the results highlight that the institutional contexts in which different companies are based may explain the differences in climate change disclosure quality across the EU.<sup>7</sup> Indeed, the findings show that informal institutional dimensions, i.e. cultural and normative factors, seem to lead to higher levels of normativity than a stronger regulative dimension in the EU context.

More specifically, regarding the cultural dimension, in contrast to our expectations, the quality of climate risk disclosures does not appear to be affected by the cultural dimension as represented by the IDV score. Therefore, H1, according to which firms based in countries with higher IDV scores provide lower-quality climate change risk disclosures, is not supported. This finding prevents us from supporting either the assumption on the positive relation between IDV and

**Table 8.** Spearman correlations.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
CDP_CC_SCORE (1)	1.0000									
IDV (2)	-0.0928*	1.0000								
UA (3)	0.1885*	-0.5599*	1.0000							
LTO (4)	0.0210	-0.0503	0.3424*	1.0000						
Regulative (5)	0.0392	-0.1241*	-0.0084	0.1978*	1.0000					
Normative (6)	0.1248*	-0.0806*	0.0799*	0.0520	-0.0576	1.0000				
Size (7)	0.3013*	-0.1648*	0.2669*	0.1791*	0.0725	0.1499*	1.0000			
ROA (8)	-0.0018	0.0668	-0.1931*	-0.0572	-0.0101	0.0065	-0.2836*	1.0000		
Industry (9)	0.0427	-0.0445	0.0564	0.0159	0.0111	0.0165	0.1201*	-0.0913*	1.0000	
Country (10)	-0.0928*	0.6884*	-0.5651*	-0.2810*	-0.3408*	-0.0931*	-0.1954*	0.0836*	0.0031	1.0000

Note: \* ( $p < 0.05$ ).

**Table 9.** CDP climate change disclosure quality score regression (Model 1).

CDP_CC_SCORE	Coef.	Std. Err.	z	P >  z	[95% Conf.	Interval]
IDV	0.0058	0.0049	1.19	0.223	-0.0037	0.0154
UA	0.0122***	0.0031	3.98	0.000	0.0062	0.0182
LTO	-0.0107***	0.0036	-2.99	0.003	-0.0178	-0.0037
Regulative	0.1064	0.1040	1.02	0.306	-0.0975	0.3102
Normative	0.2672**	0.1058	2.53	0.012	0.0599	0.4745
Size	0.1604***	0.0231	6.95	0.000	0.1151	0.2056
ROA	0.0256***	0.0097	2.63	0.008	0.0065	0.0446
Industry	0.003	0.0092	0.06	0.949	-0.0103	0.0110
Country	0.0086	0.0092	0.94	0.347	-0.0094	0.0266
N. Obs	653					
Prob > chi2	0.0000					
Pseudo-R2	0.0486					

Note: \*\*\*( $p < 0.01$ ), \*\* ( $p < 0.05$ ), and \* ( $p < 0.1$ ).

disclosure (Hope et al., 2008; Orij, 2010) or the assumption regarding the lack of it (as indicated by García-Sánchez et al., 2016; Khlif et al., 2015; Mittelbach-Hörmanseder et al., 2021; Ringov & Zollo, 2007). Conceivably, despite expectations, climate change risk is not seen as a collective phenomenon in European societies; rather, it may be seen as such, but this view does not result in an increase in the pressure exerted on companies by stakeholders to disclose additional related information.

Additionally, the UA dimension presents a strongly positive, significant association with CDP\_CC\_SCORE ( $p < 0.01$ ) with a coefficient equal to 0.0122. This means that companies established in countries with higher levels of uncertainty avoidance tend to provide climate change risk disclosures of a higher quality. H2 is therefore supported. These results are in line with those of Adelopo et al. (2013) and extend the more recent results obtained by Tran and Bedewela (2020) and Mittelbach-Hörmanseder et al. (2021).

Despite being highly significant ( $p < 0.01$ ) with a coefficient of 0.0107, contrary to expectations, LTO is found to have a negative association with disclosure quality. Thus, H3 cannot be supported. In line with EC (2019), it was assumed that companies consider longer-term time horizons when reporting on climate-related risks. In contrast, the results show that companies located in countries with low LTO perceive climate change as a current phenomenon. The countries with the lowest LTO levels are, in descending order, Ireland, Portugal, Denmark, Finland and Poland. An investigation of the climate change policies of these countries indicates that Ireland has had its Climate Action and Low Carbon Development Act in place since 2015 and that Portugal, Denmark, and other countries (i.e. France, Germany, Spain, Sweden, and The Netherlands) participate as EU member state stakeholders in the EU consultation on a 'Clean Planet for all' (2018); moreover, Denmark has recently adopted (at the end of 2019) a national climate act, and Finland's national climate policy is represented by the Climate Change Act, that entered into force on 1 June 2015. Poland seems to stand out in this group. Considering the various efforts made by the Polish government to block more ambitious EU climate policies, which have mainly been driven by Poland's reliance on coal (Marcinkiewicz & Tosun, 2015), in this country, 'reactive adaptation to climate change is preferred over anticipatory adaptation' (Kundzewicz & Matczak, 2012, p. 297). Overall, this indicates that the countries with the lowest LTO scores have already implemented climate change actions and therefore do not perceive climate change as a long-term horizon issue. In other words, these member states, with the exception of Poland, appear to proactively tackle climate change issues.

Overall, the findings on the cultural-cognitive variables suggest that in a context of ‘interaction between mandatory and voluntary risk disclosure’ (Cordazzo et al., 2017, p. 682) on climate change, a higher or lower level of normativity may be reached depending on the different cultural-cognitive dimensions of a specific context.

Regarding the regulative dimension, the fact that certain companies have been operating in stronger regulative contexts for a longer period does not affect their CDP\_CC\_SCORE at all. H4 is therefore not supported. It does not appear that the laws and regulations that were already implemented in some countries with regard to sustainability reporting have led to higher voluntary disclosure quality on climate change risk. Such results suggest that in the context of climate change risk disclosure, normativity may not necessarily be achieved through mandatory regimes; rather, other kinds of informal pressures may influence it. Another interpretation is that companies that are forced to practise sustainability reporting by law become experienced in this area, and with time, it becomes just a routine rather than a factor that improves the quality of their disclosures. For this reason, to better understand the role of the regulative dimension, a further investigation related to the potential interactions of this dimension with the other institutional dimensions was undertaken (see §7.1).

Finally, Model 1 shows that the normative dimension is positively associated ( $p < 0.01$ ) with the quality of climate change disclosure (coefficient equal to 0.2672). Therefore, H5, according to which firms that operate in environmentally sensitive industries provide higher-quality climate change risk disclosures, is supported. Furthermore, the coefficients indicate that the size of the institutional dimension effect mainly depends on normative dimensions (0.2672). Environmentally sensitive industries are subject to the informal norms, guidelines and recommendations issued by various organizations and industry associations. Moreover, environmental protection is an important part of the ethical values and norms shared by societies. Companies find themselves obliged to follow soft laws, moral standards and peer behaviours; thus, they provide better voluntary climate change risk-related disclosures. Thus, extending the results of Zheng et al. (2012) and Fernandez-Feijoo et al. (2014), we can state that companies that operate in industries with negative impacts on the environment not only provide more environment-related disclosures than companies in other sectors but also provide disclosures of higher quality.

Among the control variables, company size and profitability (coefficients equal to 0.1604 and 0.0256, respectively) are factors that strongly and positively affect CDP\_CC\_SCORE ( $p < 0.01$ ). These findings are in line with the (neoinstitutional) legitimacy interpretation. Larger firms are more visible, and they attract greater political and regulatory pressures from external interests (Brammer & Pavelin, 2008; Patten, 2002). Moreover, they fall under greater scrutiny since they receive more media attention (Stanny & Ely, 2008). Therefore, they have more incentives to behave ethically and follow soft laws and best practices than smaller firms. Additionally, they are more able to bear the costs associated with disclosures (Déjean & Martinez, 2009).

## 7. Further Analyses

### 7.1. Robustness Analysis

Given the Model 1 results and the many correlations between the institutional dimensions, we ran a robustness analysis to verify the hypotheses. Table 10 displays the results of the models testing the existence of a relationship between the CDP\_CC\_SCORE and (i) the cultural dimensions, (ii) regulative dimension, (iii) normative dimension, (iv) interaction term between (i) and (iii) depending on the overarching context of (ii), and (v) other controls. The main variable of interest is the interaction term (iv), which signals the increasing (if positive), decreasing (if negative), or stable (if nonsignificant) additional relevance of interactions between the institutional

**Table 10.** CDP climate change disclosure quality score regression including interactions between institutional dimensions (Model 2).

CDP_CC_SCORE	Stronger regulative dimension	Weaker regulative dimension
	Coeff. (Std. Err)	Coeff. (Std. Err)
IDV	-0.0559 (0.1171)	0.0060 (0.0092)
UA	0.0102 *** (0.0039)	0.0096 (0.0066)
LTO	0 + (omitted)	-0.0143*** (0.0049)
Normative	-0.5253 (17.3198)	2.6833* (1.4827)
Normative *IDV	0.0049 (0.2387)	-0.0321** (0.0149)
*UA	0.0108 (0.0096)	-0.0187* (0.0112)
*LTO	0 + (omitted)	0.0178** (0.0087)
Size	0.1458 *** (0.0502)	0.1749*** (0.0267)
ROA	0.0595 ** (0.0240)	0.0189* (0.0108)
Industry	-0.0006 (0.0120)	0.0019 (0.0063)
Country	0 + (omitted)	0.0064 (0.0114)
N. Obs	155	498
Prob > chi2	0.0001	0.0000
Pseudo -R2	0.0732	0.0521

Note: \*\*\*( $p < 0.01$ ), \*\* ( $p < 0.05$ ), and \* ( $p < 0.1$ ); + data have been omitted from the regression due to collinearity.

dimensions to the quality of climate change risk disclosure. In other words, Model 2 combines the interactions between all the institutional dimensions. Specifically, it distinguishes the effect of the interaction between the cultural and normative dimensions depending on the overarching regulative contexts in which companies operated before the implementation of Directive 2014/95/EU.

The first column in Table 10 shows that in the context of a relatively strong regulative dimension, only the cultural dimension matters. In particular, only UA (coefficient equal to 0.0102) presents a strong and positive significant relationship with CDP\_CC\_SCORE ( $p < 0.01$ ). However, none of the interaction terms between the normative and cultural dimensions affect the quality of climate change disclosure. This suggests that the CDP\_CC\_SCORE of a company based in a country where a strong regulative regime has been in place for a long period is mainly affected by the cultural-cognitive dimension captured by UA. Among the control variables, both size and profitability are positively related to climate change risk disclosure quality in such a context (coefficients of 0.1458 and 0.059, respectively).

In contrast, the second column in Table 10 shows that for companies established in countries with relatively weak regulative dimensions, CDP\_CC\_SCORE is negatively and significantly affected by LTO (coefficient  $-0.0143$  at  $p < 0.01$ ). In addition, in such institutional contexts, the normative dimension positively affects the quality of disclosures (coefficient equal to

2.6833 at  $p < 0.1$ ). Most importantly, all the interactions between the cultural-cognitive and normative dimensions are significant. Specifically, the interaction terms between the normative dimension and both IDV ( $p < 0.05$ ) and UA ( $p < 0.1$ ) are found to reduce the quality of climate change disclosure, while the interaction between the normative dimension and LTO ( $p < 0.05$ ) is found to improve disclosure quality. In the weaker regulative context, the effects of the control variables are similar to those in the stronger regulative context, and size (0.1749) and ROA (0.0189) are positively associated with CDP\_CC\_SCORE ( $p < 0.01$  and  $p < 0.1$ , respectively).

In summary, the quality of the climate change risk disclosures provided by companies located in countries with relatively weak regulative institutional dimensions is found to be affected if these firms operate in environmentally sensitive industries and if the following cultural factors apply:

- (a) If they are established in countries with high IDV scores, the quality of their disclosures on climate change risk deteriorates.
- (b) If they are established in countries with high UA scores, the quality of their disclosures on climate change risk deteriorates.
- (c) If they are established in countries with high LTO scores, the quality of their disclosures on climate change improves.

The results of the robustness analysis confirm the findings presented in Model 1. However, a distinction by regulative context and an analysis of the interaction between cultural and normative dimensions within that context allow for the findings to be extended. Taken together, Model 2's results allow us to support all the hypotheses stated while considering distinct regulative contexts and taking into account interactions between the institutional dimensions. These results may also allow us to address the mixed results of prior literature.

Indeed, the findings indicate that institutional factors affect the quality of climate change disclosures depending on the combinations of the aforementioned three pillars in a specific context. In particular, the findings in [Table 10](#) suggest that in the case of a strong regulative institutional context, just one cultural aspect – specifically, UA – has an influence on the quality of climate change risk disclosures (supporting H2), whereas interactions between the institutional dimensions do not affect these disclosures at all. In contrast, in weaker regulatory institutional contexts, the quality of climate change disclosure is affected not only by LTO (though a negative significant coefficient does not allow us to support H3) and normative dimensions<sup>8</sup> (supporting H5) but also by the interactions among all the cultural-cognitive and normative dimensions, which allow us to additionally support H1 and H3.

From a normativity and institutional theory perspective, these findings indicate that in a context of formal laws (i.e. stronger regulative dimension) and informal institutions, only a single informal (cultural) factor affects the degree to which rules and practices become accepted and standardized. However, in the context of mostly informal institutions (i.e. weaker regulative dimension), normativity arises, as it is driven not only by multiple informal factors in a country (cultural-cognitive and normative dimensions) but also by the effects of their interactions.

## 7.2. A Substantive Legitimacy Analysis

Although both laws and less formal institutions can lead to more extensive environmental disclosure, it remains unclear whether these factors actually lead to substantive environmental outcomes (Unerman & Chapman, 2014). As climate change disclosure is a subset of broader environmental disclosure, considering the CDP rating method, it is possible to obtain further

insights into ‘substantive legitimacy’ (Chelli et al., 2018). Model 3 provides insights into the institutional dimensions affecting the quality of climate change disclosure (Table 11) by comparing the best and worst reporters. The sample was split into two subsamples: group A includes the companies that received the highest ratings related to climate risk initiatives, and group B comprises the companies that received the two lowest ratings in terms of comprehensiveness. Specifically, while substantive legitimacy may be ascribed to group A (‘management’ and ‘leadership’ levels in climate change initiatives), ‘symbolic legitimacy’ may be attributed to group B (mere ‘disclosure’ and ‘awareness’ levels).

Table 11 (Panel A) shows that the climate change disclosures of group A (TOP\_CDP) are significantly affected by all the institutional dimensions. TOP\_CDP is indeed affected by the cultural dimension; it is positively affected by UA (0.0129) and negatively affected by LTO (−0.0140), and  $p < 0.05$  for both effects. Moreover, in contrast to Model 1, these companies’ levels of disclosure appear to be strongly and positively affected by the regulative dimension (0.5892 at  $p < 0.01$ ). Furthermore, the group A companies are positively affected by the normative dimension (0.3317 at  $p < 0.05$ ). In particular, the coefficients indicate that the institutional effect mainly depends on a company’s regulative context, which is followed by the normative dimension; the coefficients of these factors are 0.5892 and 0.3317, respectively. Regarding the cultural dimensions, the significant coefficients are all less than 0.10. The firm-level control variables such as size (0.1875 at  $p < 0.01$ ) and profitability (0.0314 at  $p < 0.1$ ) are shown to positively affect the quality of disclosure for this subsample of companies. In contrast, the quality of the climate change disclosures provided by the companies included in group B is found to be negatively affected by just LTO (−0.0158 at  $p < 0.05$ ). In the second subsample, size continues to be positively associated with

**Table 11.** Group A and Group B disclosure quality score regressions (Model 3).

	TOP_CDP (Group A)	WORST_CDP (Group B)
	Coeff. (Std. Err)	Coeff. (Std. Err)
IDV	0.0047 (0.0079)	0.0104 (0.0090)
UA	0.0129 ** (0.0051)	0.0061 (0.0054)
LTO	−0.0140 ** (0.0061)	−0.0158 ** (0.0063)
Regulative	0.5892 *** (0.1754)	0.0115 (0.1803)
Normative	0.3317** (0.1788)	−0.1700 (0.2035)
Size	0.1875 *** (0.0399)	0.1723 *** (0.0169)
ROA	0.0314 * (0.0171)	0.0260 (0.0169)
Industry	−0.0036 (0.090)	0.0072 (0.0100)
Country	−0.0132 (0.0150)	0.0110 (0.0166)
N. Obs	358	295
Prob > chi2	0.0000	0.0030
Pseudo-R2	0.1297	0.0597

Note: \*\*\*( $p < 0.01$ ), \*\* ( $p < 0.05$ ), and \* ( $p < 0.1$ ).



the quality of climate change disclosure (0.1723 at  $p < 0.01$ ). Therefore, the results show that ‘substantive legitimacy’ (referring to the best reporters) is influenced by both formal and informal institutional dimensions (i.e. the cultural-cognitive, regulative, and normative dimensions). Conversely, ‘symbolic legitimacy’ (referring to the worst reporters) is influenced by only informal norms (i.e. the normative dimension and just one cultural-cognitive factor).

## 8. Conclusions

The current paper analyses the effect of institutional dimensions on the quality of corporate disclosures regarding climate change risks and provides insights into how normativity can be achieved in the EU in relation to this issue. The findings indicate that on average, the quality of the voluntary climate change risk disclosures provided in the CDP reports of companies is moderately high. Many of them (214 companies out of 653 investigated) indeed provide climate change-related disclosures of good quality (‘management level’ comprehensiveness as captured by the CDP rating).

Despite the EU’s harmonization efforts, cross-national differences in climate change risk disclosures remain. Disclosure quality was found to be influenced by two of the three examined institutional forces: the cultural-cognitive and normative dimensions. These findings highlight how, throughout the European context, normativity can be achieved in relation to climate change risk disclosure by taking into account informal institutions. Specifically, it is found that the quality of climate change risk disclosure is positively affected by UA. This finding indicates that increased transparency might be driven by a need to reduce uncertainty about the future. It is also found that informal norms (such as belonging to environmentally sensitive industries) are an important factor that shapes the quality of climate change-related information. The norms and beliefs shared by societies and peers regarding environmental protection, as well as their guidelines and moral compasses, influence corporate decisions, which in turn lead to the provision of higher-quality climate change risk disclosures.

Overall, the findings provide new insights into the national and cross-national peculiarities of corporate climate change risk disclosure and their consequences. In particular, they extend neoinstitutional theory by integrating the normativity concept and providing evidence showing that nonlaw regimes can act in conjunction with regulations to improve the quality of climate change risk disclosure. This means that to achieve normativity in Europe, not only country-level institutional dimensions but also the interactions between the institutional factors that influence corporate nonfinancial disclosures must be taken into account.

Relying on Chelli et al. (2018), we find that it is possible to extend the stream of theory on normativity started by Bebbington et al. (2012) on how actors come to see rules as binding. We also extend the contribution of Chauvey et al. (2015) by showing how companies not only provide higher-quality voluntary climate change risk disclosures to legitimize their behaviour but also base the quality of such disclosures on the normativity context in which they are established. Furthermore, we extend prior studies by investigating an increased number of institutional contexts (20 countries within the cross-national EU context) and overcoming the critiques of prior literature regarding the investigation of only one dimension (Tran & Beddewela, 2020) in each of these contexts.

The practical contribution of this study stems from its provision of empirical evidence of the persistent difference between the EU member states regarding the impact of specific institutional factors on climate change risk information. Additionally, the study shows how institutional factors interact with each other and, depending on the strength of a company’s regulative context, how the interactions between cultural-cognitive and normative dimensions affect the quality of disclosures. Moreover, companies with greater ‘substantive legitimacy’ are found to

be affected by mandatory regulation, while those with ‘symbolic legitimacy’ are not. This theoretically supports La Torre et al.’s (2018) conclusions, according to which the adoption of standardized accounting and reporting standards must be regulatory-based to make nonfinancial disclosures consistent and comparable across the EU. However, from a practical perspective, this study also suggests that normativity is not achieved with mere regulation but that other informal institutions (such as cultural-cognitive and normative factors) must be taken into consideration to improve transparency and disclosure quality in specific contexts.

These results can be extended to nonfinancial disclosure, and the findings empirically support the choice of the EU to require the implementation of the Directive 2014/95/EU and the broadening of the regulative dimension as suggested by the 21<sup>st</sup> April 2021 EU Commission proposal for a Corporate Sustainability Reporting Directive (EC, 2021) to increase the quality and comparability of nonfinancial information; however, they indicate that a reflection on national and cross-national specificities should be undertaken to truly achieve normativity across Europe.

This study is not free from limitations. First, due to a lack of CDP data, it was not possible to cover all EU countries. Second, the sample companies voluntarily decided to participate in the CDP project, which may have led to self-selection bias. However, the adoption of a score determined by an independent entity that assessed the quality of the information provided together with the variety of the results obtained, which did not exhibit heteroskedasticity issues, confirmed the robustness of the results. Using other frameworks to measure cultural influences, e.g. GLOBE cultural dimensions, may support our exploratory findings. Finally, other research methods, such as interviews with EU CDP company managers, could shed more light on the factors that, in the current context of interactions between mandatory and voluntary climate change disclosure, lead to higher disclosure quality. Considering, for instance, how national governments could interfere in corporate sustainability matters (Lai et al., 2019), future studies may investigate such interference in relation to climate change disclosure. Overall, this would help identify the best policies to effectively achieve normativity throughout Europe.

Finally, the COVID-19 pandemic provides a new research perspective on climate change risk studies. None of the earth-shaking events throughout the twentieth century has had a more dramatic impact on CO<sub>2</sub> emissions than COVID-19 has had over just a few short months (McGrath, 2020). The way world leaders plan their economic responses to COVID-19 and the extent to which they take into account climate change-related issues while doing so will determine the trajectory of climate change risk management and related disclosures (Le Quéré et al., 2020). As Carnegie et al. (2021) conclude, accounting has the potential to contribute to solve problems such as climate change and COVID-19, but such accounting has yet to appear.

## Notes

<sup>1</sup>According to the Directive, large PIEs should disclose, among other nonfinancial information, their principal risks related to environmental, social, and employee matters in their annual reports or in separate nonfinancial disclosure statements. These provisions were to be applied by entities within the financial year commencing on 1 January 2017 or during the calendar year 2017.

<sup>2</sup>France has a long tradition of social and environmental reporting, as the first law requiring such disclosures dates back to 2002 (*The Nouvelles Régulations Economiques* (NRE)); in Sweden, state-owned companies have been required to publish annual sustainability reports in accordance with Global Reporting Initiative guidelines since the financial year starting on 1 January 2008 (*Guidelines for external reporting by state-owned companies* issued by the Ministry of Enterprise, Energy and Communications in 2007); and since 2009, the largest companies in Denmark have been required to provide environmental, social and governance disclosures (*Danish Financial Statements Act* adopted in 2008).

<sup>3</sup>E.g. Denmark 70/100, the Netherlands 68/100, and Sweden 78/100 (Hofstede, 2020).

<sup>4</sup>The UK is included in our sample because in 2018 (the year of analysis), it was still an EU member state under the influence of the EU.

<sup>5</sup>The database is available on-line at [www.hofstede-insights.com](http://www.hofstede-insights.com). This website allows individuals to select countries and values of cultural dimensions and view cross-country comparisons.

<sup>6</sup>Multicollinearity was evaluated with a variance inflation factor (VIF) test. The mean VIF value of 1.51 excluded a multicollinearity issue.

<sup>7</sup>Given that the sample is made up of only CDP reporters, heteroskedasticity was evaluated with a Breusch-Pagan/Cook-Weisberg test. This test evaluates the null hypothesis that the error variances are all equal versus the alternative, namely, that the error variances are a multiplicative function of one or more variables. If the chi-squared value is significant with a  $p$ -value below the appropriate threshold (e.g.  $p < 0.05$ ), then the null hypothesis of homoskedasticity is rejected and heteroskedasticity is assumed. In this study's case, the probability is not significant (with a  $p$ -value of 0.4913), which indicates that heteroskedasticity is not an issue in the model.

<sup>8</sup>Once again, the size of this effect is led by the normative coefficient, which is 2.6833, rather than the LTO coefficient, which is equal to  $-0.0143$ .

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