Sustainable governance and climate-change disclosure in European banking: the role of the corporate social responsibility committee

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Abstract

Purpose - The purposes of this paper are: first, to assess the disclosure related to climate change by major European banks to understand if the banks have grasped the most substantive aspects of the Task Force on Climate-related Financial Disclosures (TCFD) recommendations; second, to evaluate the contribution of a non-traditional committee (i.e., corporate social responsibility committee) to TCFD-compliant disclosure.

Method - Using content analysis and OLS regressions on a sample of 101 European banks, this study sought to investigate completeness, tone and forward-looking orientation of climate change disclosure and explore the relationships between CSR committee and previous disclosure aspects.

Findings – The study shows that European banks have been able to reach an intermediate level of adequacy of compliance in terms of completeness of information but forward-looking orientation seems to be the aspect that needs the most improvement. The existence of a CSR committee dedicated to sustainability issues seems to constitute the difference between the banks in terms of disclosure. Our results highlight vulnerabilities in disclosure and board characteristics relevant for improving climate change (CC) disclosure.

Practical Implications - Firms interested in strengthening stakeholder engagement and capturing strategic opportunities involved in CC should be encouraged to establish a CSR committee and appoint female directors in financial companies. The paper should be of interest to policymakers, governance bodies and boards of directors considering the initiative of corporate sustainable governance complementary to Directive 2014/95/EU on non-financial reporting by the European Commission

Originality -To the best of our knowledge, no prior study has investigated the relationship between the CSR committee and the application of the TCFD's recommendations in the European banking industry.

Keywords: Climate Change, Sustainability disclosure and reporting, Environmental governance and regulation, Corporate sustainability, Corporate social responsibility

1. Introduction

Climate change related risks (hereinafter CCRRs) are at the top of many initiatives by several actors (e.g. World Economic Forum, leaders around the world, organizations). Thus, initiatives to deal with climate change (hereinafter CC) in all sectors (e.g., Global Reporting Initiative, Climate Disclosure Standards Board, Global Compact, Carbon Disclosure Project, and Greenhouse Gas Protocol) and specifically in the financial sector emerged. Among the targeted-needs in the field of climate-change risks (Kouloukoui *et al.*, 2019), the European Central Bank Banking Supervision published a set of expectations related to disclosure, also integrating the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) based on: i) governance (disclosure on the organization's governance around climate-related risks and opportunities), ii) strategy (disclosure on the actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning where such information is material), iii) risk management (disclosure on how the organization identifies, assesses, and manages climate-related risks) and iv) environmental metrics (disclosure on the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material).

The climate change-related risks disclosure (CCRRD) according to TCFD recommendations is done on a voluntary basis and is therefore at the board's discretion. Further, greater disclosure of non-financial information is required by Directive 95/2014 /EU, which stresses the board's responsibility in this matter (Muserra *et al.*, 2020). Prior research focused on several aspects of the relationship between the board and sustainability/ environmental disclosure, with few studies based on the impact of corporate governance on the disclosure of climate-related information (Ben-Amar *et al.*, 2017; Liao *et al.*, 2015). Furthermore, financial institutions are generally excluded from research samples on the issue of environmental and climate risk for methodological reasons. However, banks can run considerable risks from CC (Kılıç and Kuzey, 2019a; Sakhel, 2017). Owing to their financing/investing activities, CCRRs can indirectly have negative repercussions because of credit exposures (Central Bank, 2020). Additionally, a voluntary body "CSR committee" is created (García-Sánchez *et al.*, 2019b) to develop programmes and objectives related to sustainability, as well as guaranteeing an effective integration of these issues in corporate strategies.

We aim to fill gaps in literature addressing the relationship between board characteristics and CCRRD within the banking industry. Focusing on the characteristics of the board, literature on the relationship between board and sustainability disclosure has focused on the impact of the board's size, independence and gender diversity, even if there is a need to consider the degree to which less traditional committees influence a firm's outcomes. Therefore, we answer to the call by Kolev et al. (2019) trying to understand the role of the corporate social responsibility (CSR) committee in CCRRD, considering that in European banks there is the mandatory risk committee analysing and proposing improvements to the risk framework and strategy.

We aim to assess disclosure related to CC by the bigger European banks (those that are required to publish the non-financial statement according to Directive 95/2014/EU), to understand whether banks, traditionally characterized by a risk-oriented culture, have been able to grasp the most innovative aspects of the TCFD recommendations in terms of both the risks and opportunities of CC and a forward-looking perspective in the management of this issue. We focus on the European context because, more than others, it represents a context with stringent regulation in terms of emissions and attention to climate change issues (Diener and Habisch, 2021; Schiemann and Sakhel, 2019). Europe has placed environmental sustainability at the heart of its strategy by proposing several reforms aimed at achieving climate goals by 2050 (Zhang, 2021). Consequently, the ECB was also among the first central banks to intervene on these issues (European Central Bank, 2020).

We also aim to evaluate the contribution of the CSR committee to TCFD-compliant disclosure, in relation to above mentioned innovative aspects. We adopted the legitimacy theory to study the determinants of socio-environmental disclosure (Dowling and Pfeffer, 1975). Our study extends the investigation of TCFD-compliant disclosure to a Europe-wide scope, assessing aspects of completeness of the disclosure concerning the four previous elements (governance, strategy, risk management and environmental metrics) and evaluating the consistency of the tone and orientation of the disclosure with the recommendations

We adopted the content analysis and the literature on risk disclosure (Beretta & Bozzolan, 2004; Linsley & Shrives, 2006) to investigate three aspects of the disclosure identified by the task force: completeness of the disclosure, "tone" of disclosure (risks versus opportunities) and forward-looking orientation. We used the ordinary least squares (OLS) regression, testing the relationship between the CSR committee and CCRRD. To the best of our knowledge, no prior study has investigated the relationship between the CSR committee and the application of the TCFD's recommendations in the European banking industry. Our results mainly show the existence of a CSR committee dedicated to sustainability issues as lever of difference between the banks in terms of disclosure. Our results also highlight vulnerabilities in disclosure and board characteristics relevant for elevating the importance of CC-related disclosure. Furthermore, this paper should be of interest to corporate governance bodies and policymakers, especially as they consider the initiative of corporate sustainable governance complementary to Directive 2014/95/EU on non-financial reporting by the European Commission (European Commision, 2020). Encouraging the establishment of CSR committees could be a fundamental action to ensure the effectiveness of the strategies advanced by the European Commission and the achievement of the sustainable development goals that the European Union is aiming for.

The next section reviews and discusses the literature. Section 3 describes the sample and method, while results are presented in Section 4. In Section 5, we discuss findings, contributions, and implications. The final section contains some concluding remarks and possible avenues for future research.

2. Theoretical background and hypothesis

2.1. Preliminary issues in the climate change-related risks

Climate change-related risks (hereinafter CCRRs) are at the top both of the World Economic Forum's risks ranking with greatest impact on companies (World Economic Forum, 2020) as well as of the agenda for leaders around the world (Cordova *et al.*, 2020). Europe has placed environmental sustainability at the centre of its internal debates (Delbard, 2008; Schiemann and Sakhel, 2019). Within the 2030 Agenda for the Sustainable Development Goals (SDGs), Europe has signed up to a commitment to reduce greenhouse gas emissions in the next decade. Europe's leading role in the implementation of the SDGs is reflected in the full integration of these goals into the European Commission's strategies and priorities. In December 2019, the European Green Deal was announced (European Commission, 2019a; Mukhi and Quental, 2019) fostering that Europe becomes the first climate-neutral continent by 2050.

Additionally, many organizations have undertaken initiatives to deal with climate change (hereinafter CC) in all sectors (e.g., Global Reporting Initiative, Climate Disclosure Standards Board, Global Compact, Carbon Disclosure Project, and Greenhouse Gas Protocol) and specifically in the financial sector (e.g., Principles for Responsible Banking, Principles for Sustainable Banking, Banking Environment Initiative). The European Commission (2018) has assigned to the financial sector the leadership in promoting low-carbon economies and sustainable development. On September 12th, 2019, European regulators (Joint Committee, 2019) published a report suggesting that financial companies need to incorporate environmental social governance (ESG) risks and, in particular, climate-change risks, into their risk governance framework. Recently, the European Central Bank (ECB) published a guide on climate and environmental risks (European Central Bank, 2020) asking boards of financial companies to include climate and environmental risks in corporate strategy, business objectives and risk management systems, and to monitor these risks more effectively.

Interestingly, a sharp focus on CCRRs disclosure bolsters the ability of market participants and financial institutions to carry out an appropriate risk assessment (Kouloukoui *et al.*, 2019). In its "Guide on climate-related and environmental risks", the European Central Bank Banking Supervision published a set of expectations related to disclosure, also integrating the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD). These recommendations were issued by the Financial Stability Board (FSB) in 2017 to improve non-financial reporting about the risks and opportunities of CC to better satisfy stakeholders' needs and make company information clearer and more comparable.

Thus, the recommendations include better explanations of how companies integrate climate risks and opportunities in four core areas: i) governance (disclosure on the organization's governance around climate-related risks and opportunities), ii) strategy (disclosure on the actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning where such information is material), iii) risk management (disclosure on how the organization identifies, assesses, and manages climate-related risks) and iv) environmental metrics (disclosure on the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material). This document includes a classification of the risks (physical and transition) and the opportunities deriving from climate change (CC). Additionally, this document stresses the relevance of medium–long-term-oriented information, since the consequences of CC will not be immediately obvious. By identifying the opportunities as well as the risks generated by CC and adopting a forward-looking approach, the TCFD aims to promote a strategic approach to CC, which involves requiring companies to demonstrate how their strategy and operations will be resilient in different scenarios of future global warming, thereby raising the awareness of executives and improving such strategies.

For assuring a better disclosure of CCRRs, the task force states that the issue must be relevant at all levels of the company, starting from the top tier of governance (TCFD, 2017). On the other hands, investors, regulators and other stakeholders are also challenging companies to demonstrate an integrated, strategic approach to addressing climate risks and opportunities. The board is ultimately accountable to shareholders for the long-term stewardship of the company. The climate change-related risks disclosure (CCRRD) according to TCFD recommendations is done on a voluntary basis and is therefore at the board's discretion. Further, Directive 95/2014 /EU requires greater disclosure of non-financial information and stresses the board's responsibility in this matter (Muserra *et al.*, 2020).

Many studies have also investigated the relationship between the board and sustainability/ environmental disclosure, but few researchers have focused on the impact of corporate governance on the disclosure of climate-related information (Bui et al., 2020; Kılıç & Kuzey, 2019). Financial institutions are generally considered a non-environmentally-sensitive industry and are excluded from research samples on the issue of environmental and climate risk. However, although this sector is in the category of low greenhouse gas (GHG) sectors, banks can run considerable risks from CC (Kılıç and Kuzey 2019a; Sakhel 2017) owing to their financing/investing activities (Central Bank, 2020).

Focusing on the characteristics of the board, literature have investigated the relationship between board and sustainability disclosure and, specifically, has focused on the impact of the board's size, independence and gender diversity. However, there is a need to consider the degree to which less traditional committees influence a firm's outcomes. Thus, the call by Kolev et al. (2019) aims to understand the role of the corporate social responsibility (CSR) committee in CCRRD, considering that in European banks there is the mandatory risk committee analysing and proposing improvements to the risk framework and strategy. "CSR committee" is a voluntarily created body to which delegation and responsibility in matters of sustainability are transferred (García-Sánchez *et al.*, 2019b). Though known by different names in various banks (Eberhardt-Toth, 2017), the committee helps to develop programmes and objectives related to sustainability, as well as guaranteeing an effective integration of these issues in corporate strategies. This body can represent a necessary governance tool for banks to integrate the recommendations into their business model as well as into their risk management and help change the "risk cultures" in these institutions (O'Dwyer and Unerman, 2020).

2.2 Banks and CCRRD

To achieve the energy transition toward a zero-emission economy, there needs to be a push from the public and private banks (European Central Bank, 2020). Because of the low impact of banking companies' GHG emissions on the environment, many ESG reports have omitted banks from the list of companies analysed (Bui *et al.*, 2020). However, albeit their direct emissions are small, banks have considerable indirect impacts on the environment (Kılıç & Kuzey, 2019; Venturelli et al., 2018). Banks can play a proactive role in the fight against CC through their investment policies, giving priority to green initiatives and denying loans to projects of high environmental impact (Furrer *et al.*, 2012). The policies oriented towards green investments, in addition to procuring positive effects for the system, can bring advantages for the banks themselves in terms of reputation and image (Campra *et al.*, 2020). By the same token, by granting loans to companies with direct exposure to the risks of CC, banks assume part of the risks, as well as suffering eventual economic damage (TCFD, 2017). Due to global warming, banking firms could see their credit risks increase. These companies are obliged to communicate the risks to which they are exposed (Lock and Seele, 2015). The ECB hopes that, among the risk categories communicated by the banks, those relating to CC are prominent (European Central Bank, 2020).

To date, CC disclosure is still insufficient in terms of content. Recent research highlights that the disclosures of European banks explicitly exclude emissions related to financial assets from that measure and that information on carbon emissions related to investment portfolios is only partial and inconsistent. The ECB President, Christine Lagarde, said in a speech at the launch of the COP 26 Private Finance Agenda in 2020, "Disclosures by financial institutions themselves suggest that there is some way to go."

Previous studies of CC disclosure have often focused on non-financial companies (Caby *et al.*, 2020), and few have evaluated CC disclosure among banking companies (Kılıç & Kuzey, 2019). The majority of the studies evaluated the voluntary carbon disclosure of banks using data taken from the questionnaires of the Carbon Disclosure Project (CDP), thus focusing on GHG disclosure (Crawford and Williams, 2010; Liu and Yang, 2018). Recently, the CDP organization has changed its scoring methodology by aligning the questionnaires with the TCFD recommendations. In some cases, the CDP score was used (Caby *et al.*, 2020), in others, assessment was confined to whether the company voluntarily responded to the questionnaire (Ben-Amar et al., 2017; Kılıç & Kuzey, 2019).

A recent study on 117 global banks assessed the impact at country level and of some characteristics of banks on the quality of voluntary carbon disclosure (Caby *et al.*, 2020). The authors found evidence that banks' size and financial performance increase the likelihood of achieving a better CDP score. Only a minority of scholars used different scores (Kılıç & Kuzey, 2019; Kouloukoui et al., 2019), often taking Haque and Deegan (2010) as a reference. These studies also highlighted the positive relationships between the size and financial performance of banks and voluntary climate change disclosure.

The lack of more quantitative information in reports about the CCRRD of banks is widely acknowledged (Kılıç & Kuzey, 2019). Research on Turkish banks, in addition to highlighting the presence of annual reports without data on CC, found that bank size, profitability, age and listing on the stock exchange positively influenced the disclosure of CC information (Kılıç & Kuzey, 2019). Some studies report an increased awareness of the phenomenon. A study of Canadian companies reported that they integrate CC into the analysis of loans (Weber, 2012). Demaria & Rigot (2020) assessed the level of environmental and climate information reported by French firms in several sectors according to the recommendations of the TCFD. Therefore, the amount of climate information was increasing over the period studied, but firms were less compliant with TCFD recommendations regarding the valuation of financial impacts or the consideration of the 2°C scenario and the resilience of the firms. Although the results are valuable and of interest in terms of the implementation of CCD practices compliant with TCFD recommendations, the study was limited to a small sample of firms in a single country. The authors called for a wider investigation on a larger panel of firms on a European scale.

2.3 Tone and orientation of CCRRD

The task force on TCFD defines CCRRs and mentions CC-related opportunities (TCFD, 2017): companies can consider the financial impacts on their assets and liabilities only after a careful assessment of the climate-related issues and determination of the responses they intend to implement. Few studies have analysed the risks and opportunities relating to CC disclosure (Kouloukoui *et al.*, 2019). If risks are "negative" information and opportunities are "positive" information, the literature on tone of the disclosure is introduced. Indeed some studies on environmental disclosure have focused on the tone of the disclosure, defined as the use of optimistic rather than pessimistic language (Arena *et al.*, 2015). Various pieces of evidence have highlighted how companies tend to communicate more optimistic information than pessimistic information and that negative information carries more weight for investors than positive information (Linsley and Shrives, 2006). For fear of negative repercussions in terms of reputation or penalties, directors pay more attention to the disclosure of negative information (Beretta & Bozzolan, 2004). A study of Spanish companies has shown how businesses, regardless of their performance, tend to emphasize good news and play down bad news (Guillamon-Saorin *et al.*, 2012). The study shows that the amount of positive information is more extensive than negative information. On the other hand, some scholars have pointed out that directors are very attentive to the tone of disclosure: a study on banking companies highlights that negative information can be used as a tool to increase barriers to entry (Burks *et al.*, 2018).

Finally, some scholars have highlighted how companies with a large board of directors would be well advised to include more positive information in their annual reports (Melloni *et al.*, 2016).

The need to disclose forward-looking information is taken up by several international frameworks, such as IR (IIRC, 2013) and TCFD (2017), and European bodies (Technical Expert Group on Sustainable Finance, 2019). Since the impacts relating to CC will not be felt in the short term, the information must conform to the nature of the phenomenon (TCFD, 2017). In an increasingly complex and dynamic environment, historical information are no longer sufficient for stakeholders (Leopizzi *et al.*, 2019). The European Commission has also specified that, for adequate communication of these issues, companies must adopt a longer-term perspective than the one they adopt for financial information (European Commission, 2019b). Therefore, companies are required to represent the different potential scenarios, also making use of more qualitative information in the absence of data and methodologies that make quantitative representation difficult.

Investors, for example, are very interested in the future impacts of risks on corporate performance (Mio *et al.*, 2020), information that enables them to improve their decision-making process. Indeed, volunteered forward-looking information improves investors' anticipation of the share price of future earnings (Agyei-Mensah, 2017). Also, forward-looking information can encourage stakeholder confidence in the company (Mio *et al.*, 2020). Disclosing clear information to future prospects highlights the strategic focus of the company and the determination to pursue its aims (IIRC, 2013).

Although the importance of this information is now consolidated, in practice companies have a greater propensity to disclose backward-looking information rather than expose themselves to forecasts (Zhang *et al.*, 2020) and the lack of such information arises for strategic reasons. The reputational reason could explain why the limited information about the future is characterized by a positive or generic content (Mio *et al.*, 2020). Directors are reluctant to disclose forward-looking information also for fear of disclosing data that are inherently uncertain (Linsley and Shrives, 2006).

Few studies pointed out as corporate governance influences the forward-looking voluntary disclosure of companies (Agyei-Mensah, 2017). The CEO duality and the composition and size of the board positively influence forward-looking disclosure. Another study found a positive relationship between gender diversity and the voluntary disclosure of forward-looking information in integrated reports (Kılıç & Kuzey, 2018).

2.4. Corporate governance, CSR committee and CCRRD

The relationship between corporate governance and ESG disclosure is not a new topic among accounting scholars (Aladwey *et al.*, 2021; Khan *et al.*, 2019). Recent studies have focused on the relationship between corporate governance and CC or carbon disclosure (Chithambo and Tauringana, 2017; Velte *et al.*, 2020). For stakeholders, corporate governance is a fundamental element for evaluating the company's approach to climate issues. The full involvement of the board of directors is an important index of the company's degree of awareness (European Commission, 2019b). Consistent with legitimacy theory, board directors try to satisfy the information needs of stakeholders on issues related to CC (Comyns, 2016). The board of directors can use the disclosure to ensure access to important resources (Bui *et al.*, 2020). Some governance characteristics are therefore used by companies to obtain approval for their decisions (Elmaghrabi, 2021).

The literature on CC disclosure has specifically highlighted the impact of some governance features, including the proactive role of women directors.(Tingbani *et al.*, 2020)

Gender diversity on the board is a factor that is deemed to increase the likelihood of disclosing voluntary information on CC (Ben-Amar *et al.*, 2017), as there is evidence that women tend to be more sensitive to environmental issues than men (Tingbani *et al.*, 2020).

Scholars do not fully agree on the relevance to CC disclosure of the number of board members and the number of independent directors.

The evidence on board size is contradictory(Ben-Amar *et al.*, 2017). A very large board may be less efficient and therefore more prone to delay critical decisions (Hossain *et al.*, 2017).Based on their characteristics, independent directors tend to have a positive influence on CC disclosure (Liao et al., 2015). The independent directors, representing the interests of shareholders and other stakeholders and having a supervisory role in management, can ensure a greater degree of transparency (Jaggi *et al.*, 2018). However, some studies have found that the presence of independent directors has no impact on CC or carbon disclosure (Bui *et al.*, 2020).

Finally, the presence of board committees report conflicting conclusions (Velte *et al.*, 2020): the environmental committee seems to be associated mainly with a positive impact on CC disclosure, while the risk management committee and the combined audit and risk committee seem to have, respectively, no effect and a negative effect on the quality of carbon disclosure. Consistent with the legitimacy theory, the establishment of Environmental committee is a good corporate governance mechanism through which firms keep legitimacy. This theory is based on the idea that there is a social contract between business and society. Companies therefore voluntarily disclose environmental information to legitimize their existence and behaviour to stakeholders (Arif *et al.*, 2020; Deegan *et al.*, 2002).

The CSR committee represents a modern introduction in traditional governance structures. It is a governance body that is receiving increasing attention from scholars owing to the progressive decline in effectiveness of traditional governance systems (Elmaghrabi, 2021; Tingbani *et al.*, 2020). Its creation is voluntary. With the growing importance of ESG factors and the inherent issues related to CC, its introduction in governance schemes is beginning to represent good practice. There is a greater tendency among boards of directors to delegate some of their functions in the field of social responsibility (Cordova *et al.*, 2020).

Various studies agree that the presence of a body specialized in ESG issues has a positive influence on environmental disclosure (García-Sánchez et al., 2019a; Helfaya & Moussa, 2017). About issues of CC, the presence of a CSR committee is reportedly one of the factors that improve CCD and GHG disclosure (Kılıç & Kuzey, 2019; Liao et al., 2015).

Such a committee would encourage managers to disclose more information regarding climate change (Jaggi *et al.*, 2018). Thus we expect that the presence of the CSR committee in banking companies can have a significant influence on the disclosure of CC issues (García-Sánchez *et al.*, 2019a). Therefore, we test the following hypothesis:

HP1: The CSR committee positively influences the completeness of CCRRD.

We also hypothesize that the presence of a CSR committee can positively influence both the disclosure of risks and that of opportunities. According to several scholars, CSR committee is an element at the basis of the transparency of CSR and, especially, GHG disclosure (Arena et al., 2015; Liao & Lien, 2015). This committee can promote greater and better CSR communication (Elmaghrabi, 2021). Given that some studies show that companies are more likely to disclose neutral information (Beretta and Bozzolan, 2008; Leopizzi *et al.*, 2019) or that some may use impression management strategies (Elijido-Ten *et al.*, 2019), the presence of this body could stimulate a more transparent disclosure of the topic by giving equal weight to negative and positive information. Consultation by the CSR committee can sharpen the strategic direction of the company and transparency in respect of ESG issues, thanks to its orientation not only to risks, which have previously been their focus, but also to opportunities (Peters and Romi, 2014). Thus, we hypothesize that:

HP2: The CSR committee positively influences CC risks-related disclosure.
HP3: The CSR committee positively influences CC opportunity-related disclosure.

Finally, we assume that the CSR committee also has a positive impact on the forward-looking disclosure of CCRRD information. Forward-looking information is fundamental and necessary for investors and various stakeholders (Mio *et al.*, 2020). The establishment of the CSR committee is a signal by companies of their earnest concern for ESG issues to the market and the stakeholders (Eberhardt-Toth, 2017). As previously emphasized, it is certainly an element that meets the needs of the stakeholders (Liao et al., 2015; Mallin & Michelon, 2011). Furthermore some authors suggest that it may be the expression of a proactive and long-term corporate governance strategy (Tingbani *et al.*, 2020). Since we believe that this governance body has more of a substantial role than a symbolic one, we formulate the following hypothesis:

HP4: The CSR committee positively influences the forward-looking orientation of CCRRD.

Figure 1 illustrates our conceptual framework: we assume that the presence of a CSR committee in banks is associated with disclosure on climate change aligned to the spirit of the recommendations of the task force. We also consider the possible effects of the most common governance-specific and firm-specific variables that could affect disclosure, drawing on previous studies.

PLEASE INSERT Figure 1

3. Materials and Methods

We adopted a quali-quantitative methodology through both the content analysis and statistical analysis in answering our RQs and HPs. Using a quali-quantitative method, the good research is fostered as "the result of a careful, thoughtful, knowledgeable approach…Indeed, we advocate using both qualitative and quantitative approaches in the same research in many instances because each has its role, and sometimes both are used in the same research project" (Hair Jr et al., 2003, p. 275). The research consists of two main steps. First, we assessed CC completeness, CC risks, CC opportunities and CC forward-looking orientation of disclosure by using content analysis. Second, we performed an OLS regression to test our hypotheses. The following section presents the methodological framework of our study, including the research design, the methods and a description of the dependent and independent variables.

3.1 Research design and sample

The sample was composed of European banking firms that had drafted a Non-Financial Statement (NFS) according to Directive 2014/95/EU on the Disclosure of Non-Financial Information. The list of banks was extracted from Orbis. Listed and non-listed companies from each EU country falling within the scope of this Directive were selected (Global Reporting Initiative, 2017). Banks that did not publish a non-financial disclosure in English were excluded from the sample. Thus, the final sample consisted of 101 European banks. 2018 is the first year following the publication of the TCFD recommendations. Our analysis was conducted on the 2018 consolidated non-financial statements published by banks on their websites. Table 1 shows the number of banks by country.

PLEASE INSERT TABLE 1

We used content analysis as technique widely adopted to analyse non-financial reports in codifying texts (Krippendorff, 2018; Milne and Adler, 1999). Sentences were used as recording units (Beretta and Bozzolan, 2004; Elshandidy *et al.*, 2021; Kouloukoui *et al.*, 2019). The choice of the sentence as a unit of analysis was dictated by the fact that the information required by the areas of the recommendations could not be extracted if only the words were considered, without their context. The content analysis was performed by two coders manually (Milne and Adler, 1999). The coders previously underwent training and, to obtain greater data reliability, carried out tests on a sample. According to Michelon (2015), at the end of the pilot test, the authors discussed and defined the classification rules to be integrated into coding guidelines. To avoid inter-coder reliability problems, one coder performed the whole coding process.

The keywords used to encode non-financial statements were based on a recent study (Kouloukoui *et al.*, 2019): CC, Floods, Carbon, Climate risk, Natural disasters, Greenhouse gas, Climate Opportunity, Emissions, GHG, Physical risk, CO2, Pollution, Transition risk, Reputation/reputational risk, Climate bond, Legal risk. Only sentences in which information was found in the 11 areas identified by the TCFD document and those relating to the risks and opportunities deriving from CC were considered, according to the document prepared by the task force (A1–A2). This technique was applied to the non-financial statements of 2018, the year following the publication of the recommendations of the task force on CC.

3.3 Dependent, independent and control variables

We used the OLS regression model to test the hypotheses formulated in Section 2. The underlying assumptions of multiple regression were tested before finalising the proposed statistical model. Firstly, we tested four different dependent variables related to disclosure: "CC completeness", "CC risk", "CC opportunity" and "CC forward-looking orientation".

To assess the completeness of CC disclosure, we constructed a score based on the TCFD document. The TCFD document indicated 11 areas relating to the topic that companies should make public (TCFD, 2017). Each area represents an item (Appendix 1.). For each item, a score of 1 was assigned if the bank disclosed information on core elements, 0 if not. No weight was assigned to any item. This indicator does not represent a simple record of information on the risks associated with CC because it considers also the different content of the information (Helfaya and Whittington, 2019). This index is therefore equal to:

$$CCScore = \frac{\sum_{i=0}^{n} c_i}{n}$$

where $c_i = 0$ if disclosure has not occurred, 1 if it has occurred; n = maximum number of items disclosed (11). If the bank reports all 11 TCFD recommendations it would get a score of 1.

To analyse disclosure on CC risk, opportunities and forward-looking orientation, we used as a variable the total number of related sentences in the reports (Allini *et al.*, 2016). To classify information on risks and opportunities, reference was made to the classification devised by the task force. The first category included information about the transition and physical risks that give rise to negative financial impacts. The second category included information on resource efficiency, energy sources, products and services, market, resilience, etc., which might deliver positive financial consequences.

To classify CC forward-looking-oriented sentences, the coders needed to apply interpretation to the text, considering not only the verb tense of the sentences but also analysing the content of the information. For example, these might be sentences in which banking companies have made explicit plans or future objectives, rather than some short- or medium–long-term forecasts. Table 2 shows some examples.

PLEASE INSERT TABLE 2

The presence of a CSR committee was measured as a binary variable. We coded as '1' if the CSR committee was established and '0' otherwise. To isolate the effect of the CSR committee on disclosure, we controlled for several governance factors. Some governance variables were selected following the methodological approach used in previous works (Ben-Amar et al., 2017; Bui et al., 2020; Fuente et al., 2017). We considered the governance variables that seemed to exert an effect on voluntary disclosure on CC, including the number of directors (Cordova *et al.*, 2020), defined as the BoD; the percentage of independent directors within the board (Ind); the percentage of female directors (Wom) (García-Sánchez et al., 2019b; Liao et al., 2015; Tingbani et al., 2020); and other control variables such as firm size, measured by the number of employees (Emp) (Barako & Brown, 2008; Liao et al., 2015) and the firm's profitability, measured by return of equity (Hassan and Lahyani, 2020; Kılıç and Kuzey, 2019b).

Furthermore, since we deal with companies from different countries, we have also included some country-level variables in the model (Yu *et al.*, 2020). Following previous studies, we used four variables from Word Bank (Rule of Law, Voice of Accountability, Government Effectiveness, Regulatory Quality), the Enviroment Performance index of Yale Law School and Press Freedom Index (De Villiers and Marques, 2016).

The data were collected manually from the annual reports of companies. The independent and control variables are shown in Table 3.

PLEASE INSERT TABLE 3

4. Results

This section presents results of our analysis. Firstly, to analyze the state of the CCRRD of the large European banks, the descriptive results are summarized. The results of the OLS regressions are then reported.

4.1 CC disclosure and European banks

Table 4 shows the descriptive statistics of the disclosure of banks on CC. European banks have not fully taken up the challenge. In total, 1,632 sentences were recorded on the topic by the banks, about 15 sentences per bank but with high variability (standard deviation 10.32). Banks also reported hardly more sentences on opportunities than risks. Although the mean for both categories was not very different (4.70 for risks, 5.14 for opportunities), the standard deviation was higher for risks rather than for opportunities (6.33 and 4.41), indicating that variability is higher in relation to the risks. The forward-looking orientation sentences, however, were found to be fewer in number. On average, banks reported less than two sentences (1.42 on average) in their reports, just over 9% of the total sentences.

PLEASE INSERT TABLE 4

Table 5 shows the average of sentences by country. The best results were obtained from eastern and northern European countries, Estonia, Finland and Sweden. The results are in line with previous studies that have shown that the countries of northern Europe are among the most sensitive to sustainable issues (De Villiers and Marques, 2016). Strategic and risk management were the areas most communicated by banking companies, respectively 62% and 60% of companies. On average, 57% of firms disclosed information about metrics. Only 27% disclosed information about governance. The worst results average was obtained from Hungary and Portugal. As regards the risks, on average, France (11) and Finland (10) divulged more information about the transition and physical risks. These two countries also disclosed more information on the CC-related opportunities (9.5 and 8 sentences on average, respectively), second only to Sweden, which had nearly 10.5 sentences. Also, regarding the forward-looking orientation, the countries of northern Europe produced a higher average of sentences. Indeed, the Netherlands (with an average of 2.8 sentences) and Estonia and Norway (with an average of 2.5 sentences) were the nations that disclosed the most forward-looking information. However, it should be noted that there were some countries in which the banks did not communicate any prospective information, including Portugal and Hungary.

PLEASE INSERT TABLE 5

4.2 The CSR committee and CC disclosure

Preliminarily to the regressions, we performed a correlation analysis that shows the absence of strong relationships between the identified variables and allows us to exclude the presence of multicollinearity.

PLEASE INSERT TABLE 6

Table 7 shows the results of multiple linear regression for the dependent variable "CC score". The results support Hypothesis 1. The existence of a CSR committee ($\beta = 0.187$, $p < 0.001$) positively influenced the completeness of CC disclosure. Unlike some recent studies in which the presence of the CSR committee was not significant for disclosure of information relating to the climate (Tingbani *et al.*, 2020), a strong positive influence was found (Ben-Amar *et al.*, 2017). The result of the control variables, female directors and employees, confirmed the goodness of results. Consistent with previous studies (Hossain *et al.*, 2017; Tingbani *et al.*, 2020), women were found to positively influence environmental information and specific information on CC ($\beta = 0.45$, $p < 0.001$). Firm size was significant and positively influenced the dependent variable. Large banks were found more likely to disclose this information, thanks to their greater visibility (Kılıç & Kuzey, 2019); in fact, larger banks disclosed environmental information more conveniently and with less expense than smaller companies (da Silva Monteiro and Aibar-Guzmán, 2010). The board size and the independent directors appeared to have no impact.

PLEASE INSERT TABLE 7

Table 8 shows the values of the regressions using the CC risk and CC opportunity dependent variables. The results of the two models support Hypotheses 2 and 3. The CSR committee is a variable that influences the disclosure of both CC-related risks and CC-related opportunities. These results, therefore, demonstrate the importance of this committee as a guarantor of greater external disclosure transparency (Mallin and Michelon, 2011; Tingbani *et al.*, 2020). In model 1, the CSR committee ($\beta = 3.598$, $p < 0.05$) positively influenced the dependent variable. Similarly, the control variable firm size positively influenced the CCRRD ($\beta = 0.00005$, $p < 0.001$). The other control variables, however, were not significant. In model 2, the CSR committee ($\beta = 2.288$, $p < 0.1$) was significant and positively influenced the CC opportunity variable.

PLEASE INSERT TABLE 8

Table 9 shows the results relating to the regression performed for the forward-looking orientation variable. The CSR committee ($\beta = 0.955$, $p < 0.05$) was found to be significant, positively influencing the dependent variable. Banks with an internally established CSR committee disclose more forward-looking information on climate risks and opportunities. The results confirm the orientation of the CSR committee to the stakeholders. The control variables ROE ($\beta = 0.00005$, $p < 0.05$) and independent directors ($\beta = 0.043$, $p < 0.1$), were also significant. Unlike in some studies, the other governance control variables were not found to be significant.

PLEASE INSERT TABLE 9

Finally, we performed a t-test to support our analyses. Table 10 shows that the banks establishing a CSR committee (Group 2) performed, on average, better on all four dependent variables. These results appear to prove our hypotheses.

PLEASE INSERT TABLE 10

5. Discussion

In the year following the issuing of recommendations by the TCFD, banks still exhibit immature and non-homogeneous disclosure relating to CC, as shown by the average level of the score relating to the completeness of information on core elements (CC score) and the high level of variability. The analysis identifies in the governance and metrics areas, respectively, the core elements on which banks provide less information in the context of CC, suggesting that banks have begun to assess the impacts on the business and the risks associated with CC but have not yet completed the upstream and downstream process in terms of roles and responsibilities inherent in them and the measurement of these risks. This finding is consistent with other evidence on the topic (Central Bank, 2020; TCFD, 2020). The countries of northern Europe have confirmed their leadership position in the field of disclosure and accordingly their attention to the information needs of stakeholders and to the transparency and effectiveness of market mechanisms (De Villiers and Marques, 2016).

An unexpected result was that there were banks that did not provide information on the CC, depriving stakeholders of the opportunity to evaluate the impact of CC and the perspective of the bank in question. Stakeholders are therefore not able to evaluate whether institutions had appropriate processes in place for managing the risks and responding to them in a timely fashion. Another unexpected result was the balanced tone that is a substantial parity between information about risks and opportunities. Given that banks have long experience in risk management and a mandatory committee dedicated to that purpose, more marked disparity was expected with a greater emphasis on risks. Instead, the findings show that the information disclosed was balanced between risks and opportunities. Good risk management skills probably enabled the banks to understand the high value of communication to stakeholders inherent in the contextual opportunities created by CC (Kılıç & Kuzey, 2018). However, less attention was paid to a future orientation of disclosure, as found similarly in previous studies on non-financial disclosure (Beretta & Bozzolan, 2008; Mio et al., 2020).

For a better CCRRD, consistent with TCFD recommendations, the presence of a CSR committee in a banking company may be relevant. This body positively influences CC disclosure in the aspects of completeness, balanced tone and forward-looking orientation. In accordance with the legitimacy theory, the CSR committee would represent a useful governance mechanism through which companies seek to obtain legitimacy for their CSR orientation (Elmaghrabi, 2021; Jaggi *et al.*, 2018). The presence of this body would encourage banks to voluntarily disclose CSR information and consequently climate change information. The results strongly show that this governance mechanism is not just a symbolic function (Helfaya and Moussa, 2017). On the contrary, the data show a determined contribution to the CCRRD in all its crucial aspects, emphasizing the substantial role of this body. The present study agrees with the studies which argue that this body increases the company transparency concerning sustainability (Fuente *et al.*, 2017). The CSR committee coordinates and advises directors on ESG strategies.

In this sense, the results are in line with studies based on stakeholder theory (Fuente *et al.*, 2017). According to these scholars, the body can be an effective tool for responding to the demands of stakeholders and ensuring an adequate level of disclosure quality (Gallego-Álvarez and Pucheta-Martínez, 2020). This aspect is also confirmed by the attention to issues that may impact the company in the medium-long term. It is also useful for the better handling of non-financial risks and for a greater orientation towards stakeholder engagement (Helfaya & Moussa, 2017). The CSR committee generally acknowledges the dual impact of CC, which can be a generator not only of severe risks but also of new business opportunities, especially in banks with a strongly risk-oriented approach and culture. The presence of a CSR committee could be an incentive to taking a more constructive and strategic approach to risk and to reconciling the typical logic of planning with that of risk management, an integrated approach that the ECB has been trying for some time to encourage through the provision of a Supervisory Review and Evaluation Process (SREP), in which the business model analysis constitutes a risk assessment element on a par with capital and liquidity adequacy.

Despite the mandatory presence of a risk committee also dedicated to the management of environmental risk and the formulation of strategies that take into account the defined risk appetite and forward-looking risk policies, our findings prove how CSR committee generally guarantees greater transparency (Liao et al., 2015), supporting the readers' information needs. The positive influence of the CSR committee on the forward-looking orientation is a result that confirms an orientation towards stakeholders and its role in directing the company towards "sustainable success". The presence of experts in ESG issues seems to encourage better disclosure on environmental issues (Peters and Romi, 2014), meaning that the CSR committee could facilitate substantial and not just formal compliance with regulations and international standards in regard to CC issues. The only governance control variable that proved significant in CCscore and had a positive influence on disclosure was the number of women on the board. This result is consistent with recent studies, according to which gender diversity among the board has a positive influence on the quality of reporting on GHG emissions and the risks of CC (Ben-Amar et al., 2017). According to such studies, females are more focused on stakeholders than males and more inclined to combine the interests of the various parties with those of the stakeholders (Aladwey *et al.*, 2021; Jouber, 2021). Gender diversity can therefore, it is argued, guarantee a greater sensitivity to ethical issues (Tingbani *et al.*, 2020). As in previous studies (Liao et al., 2015), firm size showed a positive relation with almost all aspects of disclosure assessed, the larger banks being associated with better disclosure on non-financial aspects, in line with legitimacy theory. More resources to measure CC risks (Tingbani *et al.*, 2020) and more media attention in comparison with smaller companies (Stanny and Ely, 2008) are incentives to engage in good CCRRD practices.

6. Conclusions, limitations and future research

In this work, using qualitative and quantitative techniques, we examine the relationship between the CSR committee and the CCRRD in banking industries. We provide new contributions on the role of this voluntary body in large European banks by evaluating the impact it produces on the CC disclosure (Kolev *et al.*, 2019). Previous studies have specifically investigated the relationship between the CSR committee and GHG disclosure in non-financial firms (Peters and Romi, 2014; Tingbani *et al.*, 2020). They argue the presence of a body with specific skills in sustainability represents an external guarantee to the stakeholders of greater sensitivity regarding ESG issues (Fuente et al., 2017; Tingbani et al., 2020). In this sense, the evidence underlines the importance of the presence of this body for a better and complete CC disclosure.

The present work contributes to the literature by providing new contributions based on the legitimacy theory (Jaggi *et al.*, 2018). By highlighting a positive influence on the different levels on CC disclosure, the paper emphasizes the substantial role of this governance mechanism. Our result, in fact, support our research hypothesis. The analyses confirm a positive influence of the presence of a CSR committee on the completeness of the CCRRD (measured by the CCScore). This body appears to be crucial for aligning the disclosure with the TCFD recommendations, as also validated by the additional analyses. Since the CCRRD by the main European banks is not yet fit for purpose, the CSR committee can represent a lever to speed up the integration process of the TCFD guidelines.

The relationship between the CSR committee and the two dependent variables, CC- related risks and CC-related opportunity, appears to be positive and significant. The positive effects on both risks and opportunities provide evidence that this body increases the transparency about climate change information by reducing impression management phenomena (Liao et al., 2015). Especially in banking enterprises, which are by definition risk-oriented institutions, the attention paid to opportunities, a positive component, could help banks to take the occasions that will derive from the ecological transition of the economy.

Furthermore, we observed that this voluntary committee positively influences the disclosure of forward-looking information.. This result suggest that the expertise of this body may be useful for scenario analysis, which is essential on the one hand for concrete mitigation of climate change-related risks and opportunities and, on the other hand, to provide complete information to investors (TCFD, 2020).

This paper also supplements the few prior studies on CC disclosure in the banking industry. Banks will play a central role in helping businesses towards a zero-emission green transition (TCFD, 2020). However, in the literature on corporate environmental disclosures, there are only a few articles devoted specifically to the climate (Giannarakis *et al.*, 2017; Kouloukoui *et al.*, 2019) and only one that deals with the implementation of the TCFD recommendations in French companies (Demaria and Rigot, 2020). This study is therefore the first on the application of the TCFD's recommendations in European banks.

Our study has also several practical contributions. It may be useful for managers and governance bodies because it provides some insights into the vulnerabilities of CC disclosure and therefore indicates the aspects to monitor. It also may help to improve the design and constitution of the board, in that the establishment of a CSR committee can positively influence CC disclosure, even in the presence of a mandatory risk committee. The implications are that firms interested in strengthening stakeholder engagement and capturing strategic opportunities involved in CC should be encouraged to establish a CSR committee and appoint female directors in financial companies. These actions would enhance stakeholders' perception of the company's commitment to greater disclosure of CC risks and to a strong environmental agenda.

Furthermore, our findings may be useful for policymakers in two ways. First, in light of initiatives that are likely to be launched by the European Commission on corporate governance (European Commision, 2020), they could encourage the institution of bodies dedicated to ESG issues in order to pursue good management practices and work towards the mitigation of CC. Moreover, in a highly changing regulatory context, such as the European one, the CSR committee could represent a crucial support for managers in managing the ecological transition towards a zero-emission economy in the best possible way. Second, since the paper highlights the state of CC reporting in European banks, the European Commission, in terms of updating the Directive 95/2014/EU, could take into account our results to intervene in order to improve the level of reporting on the issue. For example, given the low level of adherence to the TCFD, the Commission could include some principles of the recommendations within the new version of the Directive (as it appears to be doing). Or following the example of New Zealand it could decide to require mandatory reporting of TCFD recommendations.

This study has some limitations. The results of the study are based on a sample of large European banks. Future research might compare disclosure on CC between large and small banks and between different geographical areas. The present results are limited to the European context but different policy approaches and regulatory outreach choices may affect businesses.

Further, the short duration of the study period meant that we were unable to observe how changes in the design and constitution of the board of banks lead to changes in CC disclosure. Future studies using longer sample periods could observe annual changes. Another limitation of the study is that we test associations between the existence of a CSR committee and CC disclosure, but this does not capture causation. Future studies could overcome this limitation. Building on this work, scholars may in the future study the relationship between governance and CC by analyzing other correlations or links that can improve the composition of the board.

Lastly, the investigation of the composition of the CSR committee, seems a relevant issue, for example, whether the cultural characteristics of the members can bring greater benefits to its proactive vigour (Velte et al. 2020). Building on this work, future studies could also study the relationship between governance and CC by analyzing other correlations or links that can improve the composition of the board. The TCFD recommendations had the merit of identifying the different facets of the impacts resulting from CC. The incorporation of the task force document into the disclosure dynamics of companies represents a research opportunity for scholars (O'Dwyer and Unerman, 2020). The challenges and opportunities to be addressed include alignment of the recommendations with existing frameworks and the determination of climate-related materiality.

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TABLES

Table 1 Country-bank distribution

Country	N°	Country	N°	Country	N°
Austria	4	Germany	6	Holland	5
Belgium	4	Greece	5	Hungarian	1
Denmark	2	Ireland	2	Portugal	5
Estonia	2	Italy	14	Spain	11
Finland	1	Luxembourg	1	Sweden	5
France	10	Norway	4	UK	18
Total number					**101**

Table 2 Examples of sentences analysed

Level	Category	Example
Core elements	Governance	The Board of Directors, with the support of the Risk Committee, approves the annual Consolidated Non-financial Statement, monitoring the Group's performance in sustainability, including in terms of combating CC
	Strategy	To better serve our clients' sustainable finance needs and build on the significant experience we have gained to date including about CC, in October 2018 we created a Sustainable Finance team.
	Risk Management	The impact of natural disasters and the resulting costs and revenue losses from physical damage also feed into other operational risk management processes, including operational stress testing design.
	Metric and Target	During 2018, we developed Science Based Targets for our Scope 1and 2 emissions.
Risk	Physics	More frequent climate events with economic losses arising. HSBC will assess the impact of these climatic events on our customers and our assets.
	Transition	HSBC may be exposed to such risk in numerous ways, not only from direct lending and market dealing but also from a reputational perspective through the financing of a CO2 intensive business.
Opportunity	Energy Source	We continue to use new technologies to reduce the environmental footprint, costs, and emissions of our operations.
	Products and Services	The carbon credits purchased in 2018 reveal investments in a diversified product portfolio supporting CC mitigation and economic development in Africa, Latin America, and Asia.
Orientation	Forward-looking	The CC Action Plan, Intesa Sanpaolo's Multi-Year Environmental Sustainability Plan, envisages a reduction of 37% in CO2 emissions in the 2012-2022 period.
		First, a commitment to finance sustainable development, mobilizing €100 billion through 2025 to combat CC, facilitating the transition to a low-carbon economy, and promoting sustainable infrastructure, financial inclusion and entrepreneurship.

Table 3 Independent and control variables

Full name	***Abb.***	***Measurement***	***Mean***	***Min.***	***Max.***
CSR Committee	CsrC	Presence of a CSR committee (coded as 1 if a firm has one, otherwise 0)	*0.38*	*0*	*1*
Size of board	BoD	Number of board directors	*12,5*	*6*	*22*
Women	Wom	Percentage of woman directors	*28%*	*0%*	*55%*
Independents	Ind	Percentage of independent directors	*52%*	*10%*	*93%*
Employees	Emp	Number of employees	*34434*	*504*	*235000*
ROE	ROE	Return of Equity	*8,29 %*	*-18.87 %*	*26.1%*
Environmental Performance Index	*EPI*	(Yale University, 2018)	*78,035*	*64,31*	*83,95*
Press Freedom Index	*Free*	(Source: https://rsf.org/en/ranking/2018)	*18,70*	*7,63*	*29,19*
Rule of Law	*RoF*	(Source: World Bank – http://info.worldbank.org/governance/wgi/)	*1,28*	*0,15*	*2,05*
Voice of Accountability	*Voa*	(Source: World Bank – http://info.worldbank.org/governance/wgi/)	*1,28*	*0,32*	*1,73*
Government Effectiveness	*G/E*	(Source: World Bank – http://info.worldbank.org/governance/wgi/)	*1,23*	*0,34*	*1,94*
Regulatory Quality	*Reg*	(Source: World Bank – http://info.worldbank.org/governance/wgi/)	*1,33*	*0,41*	*2,02*

Table 4 Descriptive statistics of sentences

	n	Min	Max	Media	Standard
Sentences	1632	0	46	14,97	10,32
CCScore	105	0	1	0,54	0,28
CC Risk	513	0	29	4,71	6,34
CC Opportunities	561	0	19	5,15	4,42
CC Forward-looking orientation	155	0	8	1,42	1,71

Table 5 Average number of sentences by country

Country	Governance	Strategic	Risk management	Metrics	Risk	Opportunity	Forward looking
Austria	0,50	8,00	6,75	2,75	3,75	6,00	1,25
Belgium	0,00	4,50	2,75	1,50	1,50	3,50	1,00
Denmark	0,50	5,00	4,00	2,00	3,00	4,50	2,00
Eston	2,00	6,00	4,00	5,00	3,00	7,00	2,50
Finland	1,00	11,00	9,00	3,00	10	8,00	1,00
France	0,40	5,40	11,90	3,50	11	9,50	1,90
Germany	1,33	5,33	6,67	2,17	6,67	5,50	0,50
Greel	0,00	4,00	3,80	2,60	3,80	5,00	0,80
Ireland	0,00	5,00	5,00	2,00	3,50	7,50	1,00
Italy	0,21	3,50	4,79	3,07	3,35	5,50	1,43
Luxembourg	0,00	4,50	1,50	0,50	0,50	3,00	0,00
Norway	1,75	5,75	5,75	2,00	3,50	4,25	2,50
Holland	1,00	6,00	5,80	4,00	4,60	6,80	2,80
Hungarian	0,00	0,00	3,00	0,00	2,00	1,00	0,00
Portugal	0,00	1,00	0,40	0,80	0,40	1,20	0,00
Spain	0,64	4,82	3,91	2,55	3,09	4,18	1,18
Sweden	2,80	8,40	11,00	2,80	7,80	10,6	2,60
UK	1,50	3,72	4,50	2,17	5,30	3,48	1,35
Mean	**0,76**	**5,11**	**5,251**	**2,36**	**4,26**	**5,36**	**1,32**
Total	**0,82**	**4,72**	**5,51**	**1,71**	**4,71**	**5,27**	**1,40**

Table 6
Correlation analysis

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) CCscore	1.000															
(2) Risk	0.547	1.000														
(3) Opportunity	0.537	0.458	1.000													
(4) Forward-looking	0.544	0.456	0.351	1.000												
(5) CsrC	0.551	0.412	0.352	0.401	1.000											
(6) BoD	0.093	0.220	0.061	-0.005	0.006	1.000										
(7) Wom	0.541	0.223	0.328	0.276	0.282	0.159	1.000									
(8) Ind	0.248	0.093	0.039	0.109	0.215	0.023	0.387	1.000								
(9) ROE	0.253	0.033	0.183	0.270	0.296	-0.167	0.214	0.187	1.000							
(10) Emp	0.457	0.507	0.251	0.242	0.291	0.345	0.123	0.189	0.015	1.000						
(11) EPI	0.206	0.291	0.190	0.119	0.189	0.115	0.196	0.156	0.135	0.254	1.000					
(12) Free	-0.221	0.014	-0.171	-0.104	-0.027	0.241	-0.262	-0.076	-0.175	0.169	0.047	1.000				
(13) RoF	0.271	0.137	0.079	0.149	0.163	-0.300	0.153	0.181	0.374	0.032	0.383	-0.670	1.000			
(14) Voa	0.306	0.058	0.075	0.189	0.136	-0.296	0.309	0.232	0.258	-0.102	0.320	-0.769	0.857	1.000		
(15) G/E	0.281	0.164	0.144	0.156	0.152	-0.269	0.204	0.120	0.334	0.021	0.372	-0.752	0.966	0.861	1.000	
(16) Reg	0.311	0.100	0.047	0.191	0.164	-0.336	0.233	0.262	0.378	-0.020	0.293	-0.594	0.914	0.889	0.865	1.000

Table 7
Regression result by using "CCScore"
Linear regression

CCscore	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
CsrC	0.187	0.043	4.39	0.000	0.102	0.271	***
BoD	-0.001	0.006	-0.21	0.833	-0.014	0.011	
Wom	0.756	0.183	4.13	0.000	0.392	1.121	***
Ind	-0.121	0.092	-1.31	0.192	-0.304	0.062	
ROE	0.001	0.003	0.38	0.702	-0.005	0.007	
Emp	0.000	0.000	4.77	0.000	0.000	0.000	***
EPI	0.000	0.008	0.03	0.978	-0.016	0.016	
Free	-0.008	0.008	-1.02	0.312	-0.025	0.008	
RoF	-0.018	0.171	-0.10	0.919	-0.358	0.323	
Voa	0.045	0.268	0.17	0.866	-0.486	0.577	
G/E	-0.131	0.194	-0.68	0.500	-0.517	0.254	
Reg	0.159	0.146	1.09	0.278	-0.131	0.450	
Constant	0.318	0.446	0.71	0.478	-0.569	1.205	

Mean dependent var	0.551	SD dependent var	0.274
R-squared	0.603	Number of obs	101.000
F-test	11.118	Prob > F	0.000
Akaike crit. (AIC)	-43.172	Bayesian crit. (BIC)	-9.175

Table 8
Regression result by using "CC Risk" and "CC Opportunities"

	(1) Risk	(2) Opportunity
CsrC	3.598**	2.288*
	(1.158)	(0.908)
BoD	0.128	-0.115
	(0.173)	(0.136)
Wom	4.291	6.278
	(4.989)	(3.912)
Ind	-1.460	-2.009
	(2.504)	(1.963)
ROE	-0.0966	0.0570
	(0.0807)	(0.0633)
Emp	0.0000460***	0.0000184
	(0.0000132)	(0.0000104)
EPI	0.187	0.417*
	(0.219)	(0.172)
Free	0.0155	-0.459*
	(0.225)	(0.177)
RoF	-4.465	-5.627
	(4.661)	(3.654)
Voa	-6.503	-11.06
	(7.285)	(5.711)
G/E	7.094	2.949
	(5.277)	(4.137)
Reg	2.911	3.679
	(3.975)	(3.116)
_cons	-12.93	-7.113
	(12.15)	(9.522)
N	101	101
adj. R^2	0.318	0.243

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 9
Regression result by using "Forward-looking"
Linear regression

Forward-looking	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Committee	0.955	0.370	2.58	0.012	0.219	1.691	**
CsrC	-0.022	0.055	-0.40	0.693	-0.132	0.088	
BoD	1.546	1.596	0.97	0.335	-1.626	4.718	
Wom	-0.764	0.801	-0.95	0.343	-2.356	0.828	
Ind	0.043	0.026	1.67	0.098	-0.008	0.095	*
ROE	0.000	0.000	2.05	0.043	0.000	0.000	**
Emp	-0.009	0.070	-0.13	0.900	-0.148	0.130	
EPI	0.003	0.072	0.05	0.963	-0.140	0.147	
Free	-1.143	1.491	-0.77	0.445	-4.106	1.820	
RoF	2.033	2.330	0.87	0.385	-2.598	6.664	
Voa	0.196	1.688	0.12	0.908	-3.159	3.551	
G/E	0.483	1.272	0.38	0.705	-2.044	3.009	
Reg	-0.701	3.885	-0.18	0.857	-8.423	7.020	

Mean dependent var	1.465	SD dependent var	1.747
R-squared	0.259	Number of obs	101.000
F-test	2.568	Prob > F	0.006
Akaike crit. (AIC)	393.964	Bayesian crit. (BIC)	427.960

*** *p<0.01,* ** *p<0.05,* * *p<0.1*

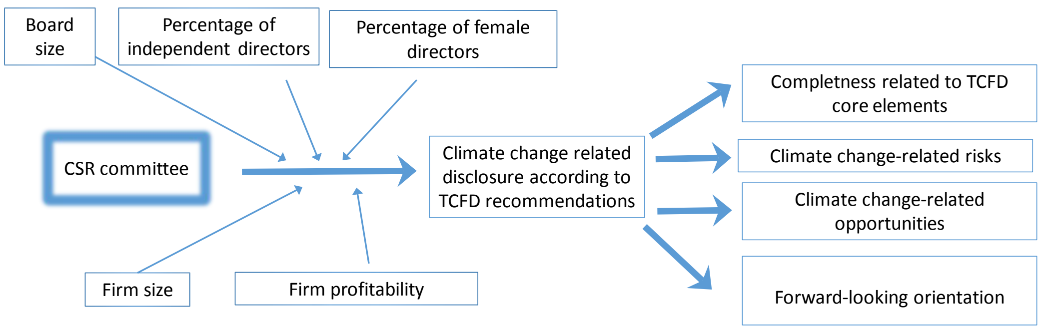
Table 10: Robustness analysis
Two-sample t-test with unequal variances

	Group 1	Group 2	Mean 1	Mean 2	dif	St_Err	t_value	p_value
CC Score	61	40	0.429	0.737	-.307	.047	-6.55	0.000
CC Risk	61	40	2.59	7.675	-5.085	1.13	-4.5	0.000
CC Opportunities	61	40	3.967	7.2	-3.233	.864	-3.75	0.001
CC forward-looking orientation	61	40	0.901	2.325	-1.424	.328	-4.35	0.001

Appendix 1.

Code	Indicator	Measure
1	**Describe the board's oversight of climate-related risks and Opportunities**	**0,1**
2	**Describe management's role in assessing and managing climate-related risks and opportunities**	**0,1**
3	**Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term**	**0,1**
4	**Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.**	**0,1**
5	**Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario**	**0,1**
6	**Describe the organization's processes for identifying and assessing climate-related risks**	**0,1**
7	**Describe the organization's processes for managing climate-related risks**	**0,1**
8	**Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management**	**0,1**
9	**Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process**	**0,1**
10	**Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks**	**0,1**
11	**Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets**	**0,1**

Figure 1
Conceptual framework



Dear Reviewer 1

we thank you for your valuable inputs, which we found helpful to improve our work. We present our responses to your comments.

Reviewer 1

Introduction

The authors need to add to background about European banks and why selected European banks not other banks.

We have clarified this part. Now is: "*We focus on the European context because, more than others, it represents a context with stringent regulation in terms of emissions and attention to climate change issues (Schiemann & Sakhel, 2019). Europe has placed environmental sustainability at the heart of its strategy by proposing several reforms aimed at achieving climate goals by 2050 (Zhang, 2021). Consequently, the ECB was also among the first central banks to intervene on these issues (European Central Bank, 2020).*"

In 3.1 we explain sampling criteria: " The sample was composed of European banking firms that had drafted a Non-Financial Statement (NFS) according to Directive 2014/95/EU on the Disclosure of Non-Financial Information. The list of banks was extracted from Orbis. Listed and non-listed companies from each EU country falling within the scope of this Directive were selected (Global Reporting Initiative, 2017). Banks that did not publish a non-financial disclosure in English were excluded from the sample. Thus, the final sample consisted of 101 European banks".

In page 2 para three, you mentioned that you selected bigger European banks. Based on what criteria you said bigger.

We have clarified this part, by adding: " banks that are required obliged to publish the non-financial statement according to Directive 95/2014/EU"

Some paragraphs are not clear and didn't discuss a coherent idea. For example in page 5 line 58 to page 6 line4. This paragraph consist 4 sentences and each sentence discuss deferent idea. Even some sentences are not clear. For example the following sentence:" This trend is mitigated by the presence of investors who expect positive information". The investors are exist in all banks. What you mean by the presence of investors? where and how?.

Thank you for your suggestion. We have removed the sentences that you have indicated.

In page 6 lines 10-11, the following sentence not completed " In an increasingly complex and dynamic environment, historical information are no longer sufficient for (Leopizzi et al., 2019)."

Thanks, we have completed the sentence.

The hypotheses development section preferable to be separated and support each hypothesis development.

Thank you for your suggestion. We have dealt with the hypotheses separately as you have suggested.

Methodology

The authors stated that the final sample are 101 European banks, while, the consolidated non-financial statements are 256. How is that? Despite the banks are 101 and the selection year is only one year 2018. Furthermore, the author/s selected the consolidated statement, which means that the reports should be 101 reports based on the number of the banks. So, please clarify this point in the methodology section. Additionally, you need to provide justification why you select the year 2018, and why only one year.

Thank you for your suggestion. We have analyzed the 101 consolidated non-financial statements since according to the Directive corporate groups are only required to publish the consolidated non-financial statement. Instead, 2018 was chosen as it is the first year after the publication of the TCFD recommendations. We clarified this point in the text. Furthermore, only one year was analyzed since the recent publication of the recommendations does not yet allow the use of panel methodologies. This aspect has in fact been included in future lines of research.

In the CC score, you mentioned that there are 11 areas of CC disclosure, but you didn't mentioned how many items in the index and what are the maximum items that that company can disclose. Please clarify this information in the methodology section. You need also in the methodology section to clarify from where you select the disclosure index and put the link of the guidance in the references list.

Thank you for your suggestion. We have clarified this point as you suggested. Items are 11 like the areas identified by the TCFD. We have included in the appendix the table with the items that make up the first index.

Results and discussion:

You have to add the correlation table for all independent and dependent variables in the listed tables.

Thank you for your suggestion. We have added the correlation table.

You need to discuss further the relevant theories to the results and how the results are supported or contradicted with the theories.

We have extended the part as you suggested: "*In accordance with the legitimacy theory, the CSR committee would represent a useful governance mechanism through which companies seek to obtain legitimacy for their CSR orientation (Elmaghrabi, 2021; Jaggi et al., 2018). The presence of this body would encourage banks to voluntarily disclose CSR information and consequently climate change information. The results strongly show that this governance mechanism is not just a symbolic function (Helfaya and Moussa, 2017). On the contrary, the data show a determined contribution to the CCRRD in all its crucial aspects, emphasizing the substantial role of this body. The present study agrees with the studies which argue that this body increases the company transparency concerning sustainability (Fuente et al., 2017). The CSR committee coordinates and advises directors on ESG strategies. In this sense, the results are in line with studies based on stakeholder theory (Fuente et al., 2017). According to these scholars, the body can be an effective tool for responding to the demands of stakeholders and* *ensuring an adequate level of disclosure quality (Gallego-Álvarez and Pucheta-Martínez, 2020). This aspect is also confirmed by the attention to issues that may impact the company in the medium-long term."*

Conclusion:

The authors need to discuss further the contribution of the study and what are the implication of the results.

Thank you for your suggestion. We have extended paragraph 6.

Reviewer 2

Dear Reviewer 2

we thank you for your valuable inputs, which we found helpful to improve our work. We present our responses to your comments.

Page 1 line 3 - Please introduced the main terminology Climate Change and then insert (CC) in a bracket.

Thank you for your suggestion. We intervened on the text.

Page 2 line 5 -7 refers to prior research. However, the material referred to is Bui et al 2020 and Kiliç 2019. It will be appropriate to refer to earlier studies

Thank you for your suggestion. We made other references.

The word "Thus" appears multiple time in the paper. Please this should be reduced.

Thank you for your suggestion. We have reduced the use of this adverb.

Page 2 line 25 - is there an indication of what is meant by the 'bigger European Banks'?

Thank you for your suggestion. We have clarified that we focus on companies that fall within the limits set by the Directive 95/2014/EU.

Page 2, line 50 - 51 - Instead of saying 'This paper could improve' it is more appropriate to be clearer about what the paper does or suggests.

Thank you for your suggestion. We have clarified this aspect.

Page 4, line 13 -15 provides that 'or because the financial sector is a non-environmentally-sensitive industry'. This appears like a categorical statement without reference. If this is the opinion of the author it should be indicated. In any event, i think the indirect impact of bank activities ought to be highlighted.

Thank you for your suggestion. We talked more about indirect impacts in the paragraph 2.2 :"*However, albeit their direct emissions are small, banks have considerable indirect impacts on the environment (Kılıç & Kuzey, 2019; Venturelli et al., 2018). Banks can play a proactive role in the fight against CC through their investment policies, giving priority to green initiatives and denying loans to projects of high environmental impact (Furrer et al., 2012). The policies oriented towards green investments, in addition to procuring positive effects for the system, can bring advantages for the banks themselves in terms of reputation and image (Campra et al., 2020). By the same token, by granting loans to companies with direct exposure to the risks of CC, banks assume part of the risks, as well as suffering eventual economic damage (TCFD, 2017). Due to global warming, banking firms could see their credit risks increase.*"

Page 13, line 49 - 50 - requires clarity. It is not clear what the term '...where their focus...' means. Whose focus is the author pointing to?

Thank you for your suggestion. Now is :" *Second, since the paper highlights the state of CC reporting in European banks, the European regulator, in terms of updating the Directive 95/2014/EU, could take into account our results to intervene in order to improve the level of reporting on the issue. For example, given the low level of adherence to the TCFD, the Commission could include some principles of the recommendations within the new version of the Directive (as it appears to be doing). Or following the example of New Zealand it could decide to require mandatory reporting of TCFD recommendations.*