EUROPEAN CENTRAL BANK

EUROSYSTEM

Working Paper Series

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Gender diversity in bank boardrooms and green lending: evidence from euro area credit register data

No 2741 / October 2022

Abstract

Do female directors on banks' boards influence lending decisions toward less polluting firms? By using granular credit register data matched with information on firm-level greenhouse gas (GHG) emission intensities, we isolate credit supply shifts and find that banks with more gender-diverse boards provide less credit to browner companies. This evidence is robust when we differentiate among types of GHG emissions and control for endogeneity concerns. In addition, we also show that female director-specific characteristics matter for lending behavior to polluting firms as better-educated directors grant lower credit volumes to more polluting firms. Finally, we document that the "greening" effect of the female members in banks' boardrooms is stronger in countries with more female climate-oriented politicians.

JEL classification: G01; G21; G30; Q50

Keywords: GHG emissions; Gender; Board diversity; Credit registry; Bank lending

Non-technical summary

Climate change is a serious issue and achieving carbon neutrality is the world's most urgent priority. Since banks play a pivotal role in modern financial systems, they can significantly contribute to a faster transition to a carbon-neutral economy with sustainable lending decisions. A bank's climate strategy and related decisions depend on the trajectory defined by the board, which in turn depends on the diversity of the board. The presence of women in banks' boardrooms can add value along several dimensions, as explained by sociological and physiological theories, as well as empirical evidence. In addition, according to previous studies, female corporate directors and women in general are more likely to care about long-term societal issues, including climate change.

In light of the increasing relevance of climate change and the global effort in combating this phenomenon, in this paper we investigate whether and to what extent a greater female representation in banks' boardrooms influences banks' capability in "greening" the economy via lending decisions. We do this by employing loan-level fixed-effects regressions that allow us to effectively disentangle credit supply from credit demand and determine whether banks' lending choices are really driven by firms' pollution intensity. To do this, we construct a highly granular dataset by matching loan-level data from the euro area credit register (AnaCredit) with bank-level and firm-level data from various sources, including banks' corporate governance variables and firms' greenhouse gas emissions. Given the likely effect of the Covid-19 pandemic on banks' lending patterns in 2020, we focus on the year 2019.

We find that banks with more gender-diverse boards provide more credit to greener companies. Banks with a relatively high share of female directors (i.e. above 37%) display about 10% lower lending volumes towards firms with relatively high pollution intensity (i.e. last quartile of the distribution) compared to the other group of banks. This inverse relationship between banks' lending volumes and firms' pollution intensity for boards with more female directors is confirmed also when we differentiate among different types of emissions (i.e. direct emissions caused by a firm's activities and indirect emissions arising from a firm's energy consumption versus other indirect emissions). In addition, we also show that female director-specific characteristics matter for lending behaviour to more/less polluting firms as better-educated directors grant lower credit volumes to more polluting firms. Finally, we document that the "greening" effect of the female members in banks' boardrooms is stronger in countries with more female climate-oriented politicians.

Our findings hold important implications for both regulators and policymakers. We underline the crucial role played by banks in potentially driving the transition towards a greener economy. Furthermore, we identify a central contribution of female presence on boards in shaping banks' lending strategies in support of less polluting firms/sectors, thereby confirming the beneficial effects of more gender-diverse decision-making groups on firms' outcomes and, in a wider perspective, on the global economy.

1 Introduction

Over recent years, climate change and its impact have been central to the policy debate (Bailey, 2021; Lagarde, 2021). The number of natural disasters worldwide and the associated economic losses have risen sharply over the last four decades, peaking at 820 events in 2019 and recording a total loss for the period 1980-2019 of USD 5,200 billion. Furthermore, the majority of the extreme weather events, causing extensive devastation and economic disruption, are found to be likely exacerbated by human activity.[1]

The Paris Agreement, which represents a landmark treaty on climate change signed in December 2015, aims to maintain the global average temperature below 2°C above pre-industrial levels and the increase limited to 1.5°C.[2] Moreover, according to the Paris Agreement, countries are required to set out their plans and strategies for climate actions through nationally determined contributions (NDCs), which are regularly assessed and updated within a transparent and accountable framework.[3] Reducing pollution and the emissions of greenhouse gases (GHGs) are key objectives to attain the main purpose of sustainable economic growth, preserving ecosystems and biodiversity. Achieving carbon neutrality by 2050 represents the world's most urgent priority. The rules for the Paris Agreement have been finalized at the 26th Conference of the Parties (COP 26) in November 2021, including transparency regulations for how countries report their emissions and funding to help countries to adapt to climate change.

By relying on a unique sample of almost a million loans extracted from the analytical credit register (AnaCredit) of the European System of Central Banks (ESCB), for the year 2019, and matched with firm-level information on GHG emissions, we explore the potential influence of women in the boardroom on banks' lending strategies. To the best of our knowledge, this is the first paper to investigate whether and to what extent a greater female representation in the boardrooms influences banks' capability to "greening" the economy. In particular, we are interested in testing whether a greater gender diversity in the boardroom can shape banks' decisions to discriminate lending between more and less polluting firms, thereby driving more

[1] See www.carbonbrief.org/mapped-how-climate-change-affects-extreme-weather-around-the-world.

[2] The Paris Agreement is a legally binding internationally treaty negotiated by 196 countries at the 21st UN Climate Change Conference of the Parties (COP21) held in December 2015 in Paris. The Agreement has entered into force in November 2016.

[3] Based on a revised NDC, submitted in December 2020, the EU has committed to reducing its emissions by at least 55% by 2030, compared to 1990 (see https://www4.unfccc.int/sites/NDCStaging/pages/Party.aspx?party=EUU).

effective environmental policies. In light of the increasing relevance of climate change, also in terms of financial and price stability (Pereira da Silva, 2019; Lagarde, 2021), and the global effort in combating this phenomenon, the focus of this paper on the link between banks' gender diversity and sustainable lending appears to be particularly timely.

Our results indicate that banks with more gender-diverse boards provide less credit to more polluting companies. This inverse relationship between bank lending volumes and GHG emission intensities for boards with more female directors is confirmed also when we differentiate among Scope 1, 2 and 3 GHG emissions. In addition, we also show that female director-specific characteristics matter for lending behavior toward less polluting firms as better-educated directors grant lower credit volumes to polluting firms. Finally, we document that the "greening" effect associated with female members in banks' boardrooms is stronger in countries with more female climate-oriented politicians. These results are robust when we control for potential endogeneity concerns, such as sorting effect and sample selection biases. Given that banks more socially responsible may be more likely to hire female directors in their boards, compared to other banks, and women may self-select into banks that are *per se* more socially responsible than others, we employ an instrumental variable (IV) approach to extract the exogenous components from the percentage of female directors. Moreover, we employ an additional loan-level dataset, which covers the period 2014-2018, to evaluate the robustness of our main findings when we compare bank lending to less polluting firms in the case of a transition from a male-to-female director within the board.

Our findings hold important implications for both regulators and policymakers. We underline the crucial role played by banks in potentially driving the transition toward a greener economy. Furthermore, we identify a central contribution of female presence on boards in shaping banks' lending strategies in support of less polluting firms, thereby confirming the beneficial effects of more gender-diverse decision-making groups on firms' outcomes and, in a wider perspective, on the global economy.

As a major channel of credit to the real economy, banks have the potential to play a pivotal role in the global effort to promote green(er) projects and an effective shift toward a low-carbon economy. In order to meet the climate targets on time, most of the transition will likely be funded by the private financial sector, including banks (De Haas and Popov, 2019). Moreover, increasing pressure from policymakers, investors and customers could significantly influence banks' lending and investing activities.[4] At the same time, regulatory constraints, in terms of increasing capital requirements, associated with the higher risk of green energy projects (Hain et al., 2018; Brunnermeier and Landau, 2020), compared to fuel-based energy options, as well as lower returns might hinder banks' strategy to finance less polluting firms.[5] In addition, banks need to identify - and effectively manage - emerging risks associated with climate change. In particular, two broad categories of climate-related financial risks have been recognized: (i) the *transition risks*, which relate to the process of adjustments toward a low-carbon economy and are posed, among others, by rapid (unexpected) changes in relevant policies that adversely affect the value of financial assets and liabilities; and (ii) the *physical risks*, which relate to the economic losses arising from extreme climate-related events able to erode the value of financial assets and/or increase that of liabilities.

A bank's climate strategy and the commitment to align to the global sustainability agenda strongly depend on the direction assumed by the board. Climate-related decisions often involve sizeable investments with potentially complex and uncertain implications whose impact on different stakeholder groups can be varying (Walls et al., 2012). Therefore, a bank board must be sufficiently diverse to undertake effective decision-making through the sharing of a broader range of experiences and opinions, which ensure the representation of distinct interest groups, including financial and non-financial stakeholders. The existing literature has reported empirical evidence on the significance of board diversity for governance outcomes, which in turn influence financial, social and reputational dimensions (Adams and Ferreira, 2009; Bernile et al., 2018).

Related literature. Our study informs several strands of the literature. First, we contribute to the emerging body of research that analyses the role played by the financial sector in decarbonizing the global economy, thereby addressing climate change (De Haas and Popov, 2019; Mesonnier, 2019; Degryse et al., 2021; Reghezza et al., 2021). We add to existing literature on gender diversity in the boardroom and corporate outcomes (Adams and Ferreira, 2009; Bernile

[4]In this respect, it is worth mentioning that both the French and UK bank regulators have started to conduct stress tests that account for climate-related risks. In 2021, the European Banking Authority (EBA) has conducted an EU-wide pilot exercise on a sample of 29 volunteer banks from 10 countries. In the same year, the European Central Bank (ECB) has conducted an economy-wide climate stress test on both firms and banks in the European Union (EU), with a horizon of 30 years into the future.

[5]In June 2022, the Basel Committee on Banking Supervision (BCBS) has published principles for the effective management and supervision of climate-related financial risks. On disclosure measures, the Committee is exploring the use of the Pillar 3 framework to promote a common disclosure baseline for climate-related financial risks.

et al., 2018) with a specific focus on the banking industry. We provide novel evidence of the impact of a greater female representation on the banks' environmental decision-making process. In this respect, we shed some light on the debated relationship between gender, climate change and sustainable development (UNEP, 2016; Collins, 2019). Further, we extend the relatively unexplored and still limited literature that focuses on the environmental dimension with reference to the banking sector (Thompson and Cowton, 2004). More broadly, our evidence on the role of female directors in shaping banks' sustainability ties in with the strand of the literature that explores gender differences in environmentalism (Mohai, 1992; Dietz et al., 2002).

Prior empirical evidence seems to overall agree on the fact that firms with a greater female representation on their boards tend to have - other things being equal - better financial performance (Liu et al., 2014; Post and Byron, 2015), improved firm value (Gul et al., 2011; Kim and Starks, 2016) and greater governance quality and disclosure (Adams and Ferreira, 2009).[6] The dynamics according to which women in the boardroom can add value are explained by sociological and physiological theories (Cumming et al., 2015). Both socialization and gender socialization perspectives support the evidence of a positive impact of female directors on corporate social responsibility (CSR) because of women's lower likelihood, compared to men, to damage the environment and their greater concerns about ethical issues (Kennedy and Kray, 2014). The *social role theory* (Eagly, 1987) suggests that women and men behave on the basis of stereotypes and beliefs, depending on the social role they hold. In particular, across cultures, women are seen to be more community-minded than men and characterized by traits such as empathy, caring and remarkable concern for others (Dobbins, 1985; Eagly and Karau, 1991; Fondas, 1997). In this respect, women appear to be more socially oriented than their male peers, thereby likely to be more sensitive to environmental issues. In addition, socialization can contribute to shaping the underlying value structures, with women displaying more pronounced beliefs about consequences for themselves, the others and the biosphere (Stern et al., 1994). Female directors reveal a stronger orientation toward CSR, compared to male directors who are, instead, more focused on economic performance (Ibrahim and Angelidis, 1994). Moreover, by bringing different perspectives to the table and by adopting a more participative leadership style, women on boards might facilitate conversations and decisions on CSR-related tasks, being better able to manage the relationships with various stakeholder groups (Eagly et al., 2003).

[6] However, some studies point to a negative relationship between board gender diversity and firm performance/value (e.g. Adams and Ferreira, 2009; Ahern and Dittmar, 2012).

A growing body of the literature has linked gender representation on corporate boards to specific value-enhancing business strategies, such as greater firm innovation (Griffin et al., 2021) and initiatives in the sphere of CSR (McGuiness et al., 2017). In recent contributions, gender diversity has been associated with reduced cases of accounting misreporting (García Lara et al., 2017), environmental violations (Liu, 2018) and misconduct sanctions (Arnaboldi et al., 2021). Limited is the evidence with respect to the banking industry. Existing studies have mainly focused on the link between gender diversity and risk-taking (Berger et al., 2014; Cardillo et al., 2020). Furthermore, recent literature investigates the link between the financial sector activity and climate change, from the perspective of a transition to a low-carbon economy (De Haas and Popov, 2019; Reghezza et al., 2021). A number of contributions focus on the way central banks worldwide can effectively adopt climate policies in order to meet climate targets, as well as the implications of climate change in terms of financial stability and monetary policy (Batten et al., 2016; Campiglio et al., 2018; Bolton et al., 2020; FSB, 2020; Bernardini et al., 2021). However, to the best of our knowledge, there is a void in the existing literature on the role played by greater gender diversity on banks' boards as a factor with the potential to influence lending strategies in favor of less polluting firms.

We differentiate from the extant literature by drawing on the high granularity of our data. Recent studies on bank lending and corporate pollution mostly rely on data on large exposures (Reghezza et al., 2021) or syndicated loans (Delis et al., 2018; Degryse et al., 2021). In our paper, by using detailed loan-level data from the AnaCredit dataset and very granular fixed-effects, i.e. firm or industry-location-size (ILS) fixed-effects, we are able to disentangle credit supply effects from demand effects and effectively capture cross-sectional demand of bank credit for all the firms in our sample. While multiple bank relationships and firm fixed-effects allow us to grasp the heterogeneity in credit demand across firms, we also include single bank-lending relationships *via* ILS fixed-effects. This is essential in order to obtain a complete representation of firms' credit demand as in most countries single-bank relationships represent a large share of the universe of borrowing firms (Ongena and Smith, 2001; Kysucki and Norden, 2016). Furthermore, compared to existing studies on single countries (Mesonnier, 2019; Faiella and Lavecchia, 2020), by employing a European-wide credit register, we are able to exploit full heterogeneity across countries with different national settings. We can, this way, benefit from a large variation in cultural and institutional elements and investigate peculiarities in the "gender-green-lending" nexus of banks located in northern and southern euro area economies and in countries that adopted legislative board gender quotas. Lastly, we rely on detailed corporate-level data on GHG emissions, also distinguishing between Scope 1, 2 and 3 emissions.[7] In this respect, and differently from related contributions (Delis et al., 2018; De Haas and Popov, 2019), we consider the entire spectrum of GHG emissions and not only carbon dioxide (CO2) emissions. Following this approach, we are able to draw inference on wider industry coverage and include economic sectors that are commonly omitted, such as the agricultural one. In addition, by using firm-specific emissions data, we can conduct a very comprehensive analysis without relying on external proxies for sustainability, such as the Environmental, Social and Governance (ESG) ratings.

The remainder of the paper is organized as follows. Section 2 develops the hypothesis central to our study. Section 3 presents the data and methodology. Section 4 discusses the baseline results. Section 5 provides additional analyses to explain the "gender-green-lending" nexus. Section 6 presents the robustness tests. Section 7 concludes the paper and discusses the main policy implications.

2 Key testable hypothesis: Board gender diversity and green(er) bank lending

We believe that gender diversity in the boardroom has the potential to influence banks' lending behavior in favor of less polluting firms, thereby enhancing decision-making related to the environmental sphere. This prediction stems from prior literature, which suggests that female directors, compared to their male peers, demonstrate a lower propensity to damage the environment, greater concerns about ethical issues and a stronger orientation toward the CSR firm's dimension (Liu, 2018). They are also more likely to undertake actions to mitigate perceived risks (Schubert et al., 1999; Carter et al., 2003; Adams and Ferreira, 2009; Huang and Kisgen, 2013). The evidence of a relatively lower risk appetite of women compared to men, as well as differences in terms of judgment, are also documented in psychology and business studies (Lundeberg et al., 1994; Byrnes et al., 1999; Barber and Odean, 2001). Previous research finds that women: (i) invest in less risky assets (Sundén and Surette, 1998); (ii) are more conservative

[7] Scope 1 covers direct emissions from owned or controlled sources. Scope 2 covers indirect emissions from the generation of purchased electricity, steam, heating and cooling consumes by the reporting company. Scope 3 includes all other indirect emissions that occur in a company's value chain. More details are provided in Section 3.1.

in simulated gambles (Levin et al., 1988); (iii) and are less prone to assume risks than men (Prince, 1993). With reference to the banking industry, a number of contributions explore how boardroom gender diversity affects bank risk-taking (Berger et al., 2014; Palvia et al., 2015; Cardillo et al., 2020). Gender socialization and ethical theories lend support to the vision that female directors might present a greater propensity to address environmental concerns, including global warming. In general, women appear more community-minded, altruistic and caring than men (Gilligan, 1977; Eagly and Crowley, 1986) and, in relation to the environment, they are reported to show more concern and assume more pro-environmental behaviors than males. They are more likely to assume positions that prevent environmental risks with the potential to harm communities. Further, based on social psychological literature, gender differences in value orientations help explain women's greater attention to the environment. Stern et al. (1993), based on the norm-activation model of altruism by Schwartz (1977), propose a model to explain pro-environmental behavior and test differences between men and women. The authors find that women hold stronger beliefs than male peers about the detrimental consequences of poor environmental conditions for others, themselves and the biosphere and that these beliefs envisaged a more pro-environmental attitude. Stern and Dietz's (1994) study reinforces the view that women have a stronger perception of the negative effects of environmental degradation. These findings are aligned with the feminist theory that tends to suggest that women are more concerned about environmental issues than men (Griffin, 1978; Diamond and Orenstein, 1990). Zelezny et al. (2000) find that women display more pronounced environmental attitudes and behaviors than men and report higher levels of socialization to be other-oriented and socially responsible. Dietz et al. (2002)'s work underpins the importance of gender differences in altruism as a basis for differences in environmentalism.

On a global scale, women undertake most of the decisions affecting households' energy consumption and these decisions in many cases appear to be mindful and prudent (Collins, 2019). Women tend to have a reduced carbon footprint compared to men (Kanyama et al., 2021) and, most likely, women in leadership positions would exploit their power to select more sustainable options. In this regard, Atif et al. (2021) find a beneficial impact of the board gender diversity on the consumption of renewable energy. These considerations, therefore, support the intuition of a positive association between a greater female representation in the boardroom and a bank's environmental policy and related lending strategy. In this respect, by enhancing the collective decision-making process, board gender diversity reveals a key role in driving the lending policies of a bank.

Fighting climate change is costly but essential. On the other hand, fighting climate change represents an opportunity of a "lifetime" (or "for a lifetime") that the financial sector is keen to exploit (Carney, 2020).[8] By playing a pivotal role in modern financial systems, banks can significantly contribute to a faster transition to a carbon-neutral economy. Sustainable lending decisions, in support of less polluting firms and industrial sectors, represent a core element of a wider "greening" strategy. A bank's climate strategy and the commitment to align its lending portfolios to the expectations set at the international level strongly rely on the trajectory followed by the board. Board diversity can entail both benefits and costs. Diversity in a management body can foster independence of opinions and the freedom to challenge core decisions (Westphal and Bednar, 2005), thereby enhancing strategic decision-making (Bantel and Jackson, 1989) and effective governance (Hillman and Dalziel, 2003). Furthermore, a sufficient degree of diversity in the boardroom leads to a higher set of information, unique skills and expertise with the potential to improve group decision-making (Kim and Starks, 2016).

To sum up, we contend that bank female directors are more likely to care about long-term societal issues, including climate change, and should therefore be more likely to promote greener lending than their male counterparts. Furthermore, greater gender diversity is expected to drive enhanced board dynamics and decision-making in a pro-environmental vision. Hence, we formulate the central hypothesis of our study:

H1: Banks with a greater female representation in the boardroom lend less to more polluting firms.

3 Data and methodology

3.1 Data and sample construction

To test our hypothesis, we construct a comprehensive dataset from multiple sources. Specifically, we gather: (i) loan-level information from the AnaCredit database; (ii) firm-level data on GHG emissions from Urgentem; (iii) banks' corporate governance variables from Refinitiv

[8]Refer to www.weforum.org/videos/christine-lagarde-says-fighting-climate-change-is-costly.

Eikon (hereafter, Eikon); (iv) bank balance-sheet characteristics at the consolidated level from the ECB's supervisory database; (v) bank ESG indicators from Eikon; (vi) firm-specific characteristics from Orbis Amadeus; and (vii) cultural/institutional variables from the European Institute for Gender Equality (EIGE). Given the relatively limited time coverage of the AnaCredit database, for which the data collection started in September 2018, and the likely effect of the Covid-19 pandemic on banks' lending patterns, in this study we focus on the year 2019. Bank balance-sheet and firm-specific characteristics are taken at December 2018, given their potential to influence subsequent lending decisions. Furthermore, the construction of our bank sample is driven by the availability of corporate governance information. In the end, we are able to consider the lending behavior of 52 banks, accounting for about 60% of banking total assets in the euro area. The high granularity of our loan-level dataset, which covers almost a million loans, enables us to fully exploit the heterogeneity in our sample, thereby enhancing the reliability of our inferences. In this respect, the use of confidential AnaCredit data has allowed for a finer and more robust analysis of banks' lending exposures.[9]

To classify our sample of loans into different industrial sectors, we follow the Statistical Classification of Economic Activities in the European Community (NACE Rev. 2) codes.[10] In particular, we exploit the whole granularity of the classification, i.e. from NACE-1 to 4-digits, based on which we are able to identify 931 industrial sectors within our dataset. Climate-warming data, measured in tonnes of GHG emissions, are gathered from Urgentem. The Urgentem Carbon Dataset covers the full spectrum of Scope 1, 2 and 3 emissions reported by more than 6,000 global companies at a consolidated level. In addition, emissions for all other companies are inferred by Urgentem via estimation models based on industry and intensity category. In our analysis, we use the relative GHG emissions and consider all three "scopes".[11] In the spirit of Bolton and Kacpercyk (2021), the relative GHG emissions, which measure the carbon intensity of a company, are expressed as tonnes of GHG equivalent divided by the company's

[9] The AnaCredit database, based on the Regulation ECB/2016/13 and developed by the ESCB, provides monthly loan-by-loan information on credit granted by credit institutions to firms and other legal entities, covering both euro area and European, non-euro area, countries. For further details, refer to www.ecb.europa.eu/stats/money_credit_banking/anacredit/html/index.en.html.

[10] NACE Rev. 2 classification is based on a hierarchical structure, which consists of first-level sections (alphabetical code), second-level divisions (2-digit numerical code), third-level groups (3-digit numerical code) and fourth-level classes (4-digit numerical code). For additional information, please refer to https://ec.europa.eu/eurostat/documents/3859598/5902521/KS-RA-07-015-EN.PDF

[11] Based on the 1997 Kyoto Protocol, seven greenhouse gases are considered. These are (i) carbon dioxide (CO2); (ii) methane (CH4); (iii) nitrous oxide (N2O); (iv) hydrofluorocarbons (HFCs); (v) perfluorocarbons (PCFs); (vi) sulphur hexafluoride (SF6); and (vii) nitrogen trifluoride (NF3).

revenues, expressed in EUR millions. Based on the Greenhouse Gas Protocol, GHG emissions are classified into three groups ("scopes"), depending on the source. *Scope 1* accounts for direct emissions that occur from sources owned or controlled by a firm. *Scope 2* covers indirect emissions associated with the purchase of electricity, steam, heating and cooling consumed by a firm. *Scope 3* comprises all other indirect emissions generated in a firm's value chain. Table 1, among others, reports the summary statistics for our GHG emission variables in 2019 (Panel B). With reference to the entire spectrum of scopes (i.e. from 1 to 3), the average firm in our sample produced 772.96 GHG relative emissions. The related distribution spans from a minimum of 126.11 GHG tonnes/millions to a maximum of 5,395.31 GHG tonnes/millions and the dispersion around the mean is relatively large (the standard deviation is 888.31 tonnes/millions).

The decision to consider firm-level GHG emission intensities, rather than sectoral or country breakdowns, is motivated by the substantial heterogeneity in the level of pollution across firms within each industrial sector and country. Figure 1 shows the difference between the median GHG emission intensity within a region (left-hand chart) and the firm-level GHG emission intensities (right-hand chart), with the latter representing the measure used in our analysis. As shown, the aggregate GHG emission intensity is relatively homogeneous in each region. By contrast, firm-level GHG emissions allow capturing a greater heterogeneity in the level of pollution caused by firms. Consequently, we add to several existing studies employing sector-level GHG emissions (e.g. Delis et al., 2018; Mesonnier, 2019; Faiella and Lavecchia, 2020; Degryse et al., 2020) by combining the use of sector-level information with data on the pollution propensities of individual firms. This enables us to also account for production processes and technologies, which in turn influence the level of pollution generated by each firm.

[Insert Figure 1 Here]

Panel A of Table 1 provides the summary statistics for our dependent variable. *Lending*, as per the AnaCredit manual, is the outstanding amount indebted by a debtor to a creditor. Our data covers a large number of loans, which is reflected in a relatively large variation in the size of the loans. The average loan size is €648,453 and the median is €150.707. The distribution ranges from a minimum of €25,000 to a maximum of €10,500,000.

Panel C of Table 1 reports the summary statistics for the bank corporate governance variables.

Relevant information is obtained from Eikon. The percentage of women on boards (*Female on board*) ranges between 0 and 57.14%. The mean value, 32.94%, is not distant from the median of 33.33%. In our analysis, we use a dummy variable (*Board_female*) which takes the value 1 if the percentage of female members on the board is above the 75th percentile, and 0 otherwise.[12] We anticipate an inverse relationship between our gender variables and the amount of bank credit toward less polluting firms ("greener" firms), as motivated in Section 2. Gender diversity in the boardroom might enhance the shared perception of green values among individuals, as well as fostering non-financial outcomes and thereby building environmental strengths. A larger proportion of female directors should, ultimately, exercise more pressure on environmental issues, thus resulting in an increased commitment toward the environment when shaping lending decisions.

Besides the presence of female directors on the board, we account for board size (*Board_size*), the tenure of the board members (*Board_tenure*), the share of independent board members (*Ind_board*) and whether the bank has in place a system of compensation for senior executives that is linked to CSR objectives (*CSR_comp*). *Board_size* is computed as the number of directors elected to the board, expressed as a logarithm. The average board size in our sample is 15.19 directors as represented by a logarithm of 2.70. de Villiers et al. (2011) document a positive relationship between board size and firm environmental performance, seen as a company's capability to strategically manage its impact on the environment. The authors argue that larger boards bring together different backgrounds, experiences and knowledge. This, in turn, increases the probability of having experts in environmental fields among the members which can contribute to the adoption of effective green practices. A positive association between board size and environmental performance is also revealed in Walls et al. (2012) and Liu (2018). On the other hand, studies by Eisenberg et al. (1998) and Boone et al. (2007) show that larger boards result in a lower degree of efficiency due to coordination and free-riding issues, which can result in underestimating environmental concerns. *Board_tenure* is employed to control for the directors' experience. The variable is measured as the average number of years that each board member has been on the board. Based on the *resource dependence theory*, a greater human and social capital, which also factors in the length of the directorship term, can

[12] The approach of using dummy variables to identify firms' boards with a higher/lower female representation is widely adopted in the corporate governance literature. See, for instance, Gul et al. (2011) and Liu (2018), amongst others.

be conducive to better addressing environmental issues, thereby influencing environmental performance (Hillman and Dalziel, 2003). *Ind_board* captures the percentage of independent board members. According to de Villiers et al. (2011), greater board independence is conducive to better corporate environmental performance. Furthermore, a larger percentage of independent board members is commonly associated with higher monitoring incentives (García Lara et al., 2017). *CSR_comp* accounts for the system of executives' compensation, which is considered to play an important role in fostering effective environmental practices. As argued in Berrone and Gomez-Mejia (2009), structuring the managers' pay around environmental performance can positively affect a firm, producing desirable outcomes for shareholders, managers and society.

Panel D of Table 1 provides the summary statistics for the bank-level controls, commonly employed in the banking literature. Confidential information is collected from the ECB's supervisory dataset. On average, banks have total assets (*TotAss*) of €647 billion. The median value is €639 billion, reflecting a relatively symmetrical distribution. The ratio of total deposits to total liabilities (*Dep_tl*), a proxy for the stability of banks' funding structure, is on average 76.79%. The ratio of non-performing loans to gross loans (*NPL_r*), which captures a bank's asset quality, presents a mean value of 7.07%. The average profitability of the banks in our sample, measured by the ratio of the net income to total assets (*ROA*), ranges between -0.49% and 1.01%. The ratio of cash and cash equivalents to total assets (*Cash_ta*), capturing banks' liquidity, is on average 6.99%. Banks' business model is proxied by the ratio of fees and commissions to operating income (*Fee_opInc*). This indicator for business diversification with respect to traditional intermediation activity ranges between 15.82% and 56.85%, presenting a relatively large dispersion around the mean (9.32%). The average ratio of common equity tier 1 ratio (*CET1_r*) is 12.74%, thus reflecting the relatively high soundness of banks within our sample. The *ESGscore* ranges between 37.7 and 94.11 with an average value of 75.8.

Panel E of Table 1 reports the summary statistics for the firm-level characteristics, collected from Orbis Amadeus. The average size of the firm included in our sample (*Firm_size*) is €9.56 million. The average ratio of cash holdings to current liabilities (*Firm_cash*), a proxy for the firm degree of short-term liquidity, is 22.16%, while the median is 9.23%. The average debt ratio, measured as the sum of current liabilities and non-current liabilities to total assets (*Firm_debt*), is 73.00%. The median is 74.24%, indicating a relatively symmetrical distribution. The ratio of earnings before interest and taxes to total assets (*Firm_ROA*), a proxy for firm profitability, is on average 3.81%. The *Firm_WC* indicator (working capital to total assets) spans from -22.93% and 85.06%, with an average value of 24.87%. Lastly, the average *Firm_gearing*, i.e. interest paid to earnings before interest and taxes, is 22.67%.

Panel F of Table 1 reports summary statistics for the cultural/institutional variables collected from the EIGE database. First, we assess whether cultural elements play a significant role in influencing a bank's lending strategy. To this end, we construct a dummy variable (*South*) that assumes value 1 if the considered bank is headquartered in a southern euro area country (i.e. Greece, Italy, Portugal and Spain), and 0 otherwise. Second, we consider whether the country where the bank is located has adopted binding board gender quotas to promote gender balance in the top decision-making bodies. We, therefore, construct a dummy variable (*Quotas*), which takes value 1 in case a bank is located in a country with legislative gender quotas (i.e. Austria, Belgium, France, Germany, Italy and Portugal), and 0 otherwise.[13] Lastly, we consider the potential influence of female climate-oriented political representation in national parliaments. Specifically, we construct a dummy variable (*Cpol*) that takes value 1 in case a bank is located in a country with a proportion of female ministers and government executives dealing with environment and climate change above 50%, 0 otherwise.

[Insert Table 1 Here]

Table 2 describes the selected variables and provides the labels, related sources and definitions.

[Insert Table 2 Here]

3.2 Methodology

In order to explore whether and to what extent the presence of female members on boards influence banks' lending toward firms with lower GHG emissions, we employ loan-level fixed-effects regressions on our cross-section as they allow us to effectively disentangle credit supply from credit demand shifts.

For identification purposes, we follow two distinct approaches. First, and in the spirit

[13] The number of banks that fit in the *South* category is 25, while those in the category of *Quotas* is 30. In order to construct the *Quotas* variable, we only consider countries that adopted binding gender quotas, excluding those that implemented softer measures. For further details, refer to eige.europa.eu/gender-statistics/dgs/data-talks/legislative-quotas-can-be-strong-drivers-gender-balance-boardrooms.

of Khwaja and Mian (2008), we exploit multiple bank-firm relationships to control for firm credit demand, hence firms that borrow from multiple banks and within-firm comparisons across banks with more/less female representation on board. However, one shortcoming of the Khwaja and Mian (2008) econometric identification strategy is represented by the exclusion of single-bank relationships, which are absorbed by firm fixed-effects. Since the majority of single-bank relationships involve small and medium enterprises (SMEs), which are predominant in most European countries, we follow the approach by Popov and Van Horen (2015), Acharya et al. (2019) and Degryse et al. (2019) and construct ILS fixed-effects. The industry clusters are based on 4-digit NACE codes. The location clusters are based on 5-digit postal codes and the size clusters are built on quartiles of firms' total assets. The inclusion of ILS fixed-effects allows us to retain more than 300,000 additional single bank-firm relationships in our estimation. The baseline econometric equation is specified as follows:

$$\begin{aligned} Lending_{bj} = \alpha_{j,ILS} + \beta Board\_female_b + \delta GHGemissions_j + \\ \gamma Board\_female_b * GHGemissions_j + \theta X_{b,t-1} + \tau T_{b,t-1} + \upsilon Z_{j,t-1} + \epsilon_{bj} \quad (1) \end{aligned}$$

where b indicates the bank and j the firm, respectively. The reference year, t, is 2019. Our dependent variable, *Lending*, is the logarithm of the outstanding amount indebted by a debtor j to a bank b. α alternately indicates firm (j) or industry-location-size (ILS) fixed-effects, employed to control for the heterogeneity of credit demand across firms. *Board_female* is a dummy variable that takes the value 1 if the percentage of female members on the board of bank b at the end of 2018 is above the 75th percentile, 0 otherwise. The 75th percentile of the distribution corresponds to 36.82% of female directors on board and in our sample, 18 (34) banks have 36.82% or more (or less) of the seats in the boardroom assigned to female members. Selecting this threshold enables us to effectively split our sample into banks with a sizeable number of female directors on the board and those with a limited representation, also accounting for the concept of a "consistent minority" able to make the difference in decision-making as suggested by the literature on the critical mass theory.[14] *GHGemissions* is a variable

[14] Based on the literature on the critical mass theory, at least three women (namely, a consistent minority) must be seated on a firm's board in order to be able to exert power over key decisions and add value (Kramer et al., 2006; Torchia et al., 2011; Schwartz-Ziv, 2017; Arnaboldi et al., 2021). This matches with the choice to construct our key gender diversity variable as a dummy indicator taking the value 1 if the percentage of women on banks' boards is above 36.8% (i.e. the 75th percentile), and 0 otherwise (also considering the board average size of 15.2 directors for our sample). This indicator is able to capture the fact that female directors tend to be

that captures the emission of climate-warming gases of firm j. We employ the GHG relative emissions, measured as tonnes over revenues (EUR millions), and separately account for (i) total emissions, i.e. Scope 1, 2 and 3 emissions (*GHGtot*); (ii) Scope 1 and 2 emissions (*GHG12*); and (iii) Scope 3 emissions (*GHG3*). *Board_female*GHGemissions*, a central variable of our analysis, is included to test whether banks' lending behavior toward more polluting *vis-à-vis* less polluting firms is influenced by a greater/lower representation of women in the boardroom (i.e. above/below the 75th percentile).

X is a vector of lagged (end of 2018) bank corporate governance characteristics, including *Board_size* (i.e. the logarithm of the number of directors elected to the board), *Board_tenure* (i.e. the average number of years that each board member has been on the board), *Ind_board* (i.e. the percentage of independent board members) and *CSR_comp* (i.e. a dummy to account for whether the compensation of senior executives is linked to CSR objectives).

T is a vector of lagged (end of 2018) bank-level controls, which comprises bank size (*TotAss*), measured by the logarithm of total assets, and a number of relevant ratios, such as (i) deposits to total liabilities (*Dep_tl*); (ii) NPLs to gross loans (*NPL_r*); (iii) net income to total assets (*ROA*); (iv) cash and equivalents to total assets (*Cash_ta*); (v) fees and commissions to operating income (*Fee_opInc*); and (vi) CET1 capital to risk-weighted assets (*CET1_r*). Furthermore, we include (i) the environmental, social and governance score (*ESGscore*); (ii) the number of ESG-related controversies reported in the press (*ESGcontroversies*); and (iii) a dummy variable equal to 1 if a bank engages with its stakeholders, and 0 otherwise (*Stakeholders*).[15]

Z is a vector of lagged (end of 2018) firm-level characteristics that include: (i) *Firm_size*, measured as the logarithm of firm total assets; (ii) the ratio of cash holdings to current liabilities (*Firm_cash*); (iii) current liabilities plus non-current liabilities to total assets (*Firm_debt*); (iv) the ratio of earnings before interest and taxes to total assets (*Firm_ROA*); (v) working capital to total assets (*Firm_WC*); (vi) interest paid to earnings before interest and taxes (*Firm_gearing*); and (vii) the bank-firm level amount of loan impairments identified and recognized by the bank

more influential if they attain a critical mass of three or more. An analysis of this critical threshold is reported in Table A1 in the Appendix.

[15] We include the dummy *Stakeholders* to account for external governance pressures as a potential substitute (or complement) for internal forces driving banks to adopt more sustainable lending practices. The indicator is collected from Refinitiv Eikon and is based on the following information: (i) whether the bank engages with its stakeholders; (ii) whether the bank is involving the stakeholders in its decision-making process; and (iii) whether the bank has an established two-way communication between the company and its various stakeholders.

over the overall loan amount granted to the firm (*Loan_provisions*). Robust standard errors (ε_bj) are two-way clustered at the bank-firm level.

4 Empirical findings

This section discusses the empirical results for the cross-sectional regression based on the Equation (1). Tables 3 reports the main findings of our analysis, with *Lending* as the dependent variable and, respectively, the inclusion of (i) the total amount of GHG emissions (columns 1 and 4); (ii) Scope 1 and 2 GHG emissions (columns 2 and 5); and (iii) Scope 3 GHG emissions (columns 3 and 6). The rationale for separately considering the different scopes is to increase the degree of detail in investigating the lending behavior of banks in our sample toward less polluting. Columns 1, 2 and 3 report the estimates with the inclusion of firm fixed-effects, whilst columns 4, 5 and 6 are those with ILS fixed-effects. Bank and firm two-way clustering technique is adopted to adjust the robust standard errors. The model specifications control for credit demand, bank corporate governance factors and other relevant bank- and firm-specific characteristics.

4.1 Board gender diversity, bank lending and firms' GHG total emissions

Table 3 (columns 1 and 4) reports the results of our regression analysis including all the spectrum of firms' GHG emission intensities. The results are interesting for a number of reasons. First, the single coefficient on the *GHGtot* variable for the ILS fixed-effects specification (column 4) indicates a positive and statistically significant (at the 1% level) relationship between firms' GHG emission intensities and bank lending. This evidence reflects a general stylized fact that firms in more polluting industrial sectors tend to be larger firms with larger investment needs and tend, therefore, to have more funding needs (see Figure A1 reported in the Appendix for a simple graphical representation). However, other things being equal, banks with a % of female directors on board below the 75th percentile of the distribution display larger lending volumes to more polluting firms. Second, the coefficient on the interaction *Board_female*GHGTot* is negative and statistically significant at the 5% level for the firm fixed-effects regression (column 1) and at the 1% level for the ILS fixed-effect regression (column 4), suggesting that banks with a more female-oriented board tend to reduce their lending volumes as the level of firms' total GHG emissions increases, compared to the other group of banks.

To investigate whether the effect on bank lending is economically meaningful, we plot in Figure 2 the estimated relationship between GHG emissions (x-axis) and the log of lending volumes (y-axis). The coefficients are taken from the specification in column 4 of Table 3. In particular, the left-hand chart of Figure 2 reports the estimated log of lending volumes at different levels of GHG emissions between the categories of banks with a % of female directors below and above the 75th percentile, whilst the right-hand chart reports the estimated difference in lending volumes at different levels of GHG emissions between the two groups of banks. For the selection of the GHG levels, we rely on the descriptive statistics and select the 5th (245 GHG tonnes/revenues), 25th (300 GHG tonnes/revenues), 50th (564 GHG tonnes/revenues), 75th (847 GHG tonnes/revenues) and 95th (1,386 GHG tonnes/revenues) percentiles of the distribution. As shown in the left-hand chart of Figure 2, lending volumes to firms with a level of GHG emissions equal to and/or below 847 tonnes/revenues (75th percentile) are not statistically different for the two groups of banks at the 95% confidence level (the related confidence intervals overlap). This evidence suggests that banks with a greater female representation in the boardroom tend to grant lending volumes to low and mid-polluting firms comparable to those granted by banks with a greater male representation. However, we find that banks with more female board members lend less to firms with a level of GHG emissions equal to and/or above 1,386 tonnes/revenues (95th percentile), i.e. highly polluting firms. As an illustration of the different effects in the two groups of banks, in the right-hand chart of Figure 2, banks with an above-75th percentile of female directors display about 10% lower lending volumes toward firms with 1,386 tonnes (last quartile) of relative GHG emissions compared to the other group of banks. Our findings point to a key role played by female directors in shaping banks' lending strategies, on the one hand, and greater consideration for the environmental dimension within a more gender-diverse board, on the other hand.

[Insert Figure 2 Here]

Among bank-specific controls (columns 1-6), we document a negative association between bank ROA and lending volumes. We also find a negative and statistically significant (at the 1% level) relationship between bank liquidity ($Cash\_ta$) and bank lending. *ESGcontroversies* displays a positive and statistically significant association with our dependent variable.

Regarding firm-specific controls, significant associations are documented for size, liquidity, debt, profitability and gearing proxies (columns 4-6). Arguably, larger and more profitable firms tend to borrow more than smaller firms, which is reflected in the positive and highly statistically significant relationship between our dependent variable and *Firm_size* and *Firm_ROA*, respectively. Reasonably, more leveraged firms (as captured by *Firm_debt* and *Firm_gearing*) are shown to receive more bank lending. Working capital (*Firm_WC*) and *Loan_provisions* do not appear to have a significant impact on the volumes of funds granted by banks.

Among banks' corporate governance factors (columns 1 to 6), our findings reveal a positive and economically significant impact of board size on the volumes of bank lending. Finally, we find that the coefficient on CSR_comp is negative and highly statistically significant (at the 1% level), suggesting that, *ceteris paribus*, banks that link their senior executives' compensation to CSR objectives grant lower volumes of credit.

4.2 Board gender diversity, bank lending and firms' Scope 1&2 GHG emissions

Columns 2 and 5 of Table 3 report the results for the regression analysis that accounts only for firms' Scope 1 and 2 GHG emissions ($GHG12$). Scope 1 emissions are those caused directly by a firm's activities, while Scope 2 emissions include indirect emissions arising from a firm's energy consumption. These two categories of emissions can be measured relatively easily, referring to the firm's utility bills and fuel expenses.

Similarly to the results presented in columns 1 and 4, we find a positive and statistically significant relationship between *GHG12* and the logarithm of lending volumes (column 5), indicating that banks with a % of female directors below the 75th percentile lend more to firms with higher levels of Scope 1 and 2 relative GHG emissions. The interaction terms are, once again, negative and statistically significant at the 5% (column 2) and at the 1% levels (column 5), suggesting that banks with more female directors on the board reduce their lending volumes as GHG emissions increase, compared to the other banks.

Figure 3 (left-hand chart) compares the estimates of the log of lending volumes at different levels of Scope 1 and 2 relative GHG emissions for both banks with a % of female directors above and below the 75th percentile. For the selection of the GHG levels, we rely on the descriptive statistics and select the 5th (10 GHG tonnes/revenues), 25th (14 GHG tonnes/revenues), 50th (27 GHG tonnes/revenues), 75th (52 GHG tonnes/revenues) and 95th (232 GHG tonnes/revenues) percentiles of the related distribution. The right-hand chart reports the estimated difference in lending volumes at different levels of GHG relative emissions for the two groups of banks. While lending volumes increase for banks with fewer female directors (solid blue line), this pattern is reversed for banks with more female members on the board. For GHG values equal and/or below the 75th percentile (52 GHG tonnes/revenues), we do not find a statistically significant difference between the two groups of banks (the confidence intervals overlap). However, for GHG values equal and/or above the 95th percentile (232 GHG tonnes/revenues) the difference is statistically significant, indicating that banks with a greater female representation showcase lower lending volumes to more polluting firms. As displayed in the right-hand chart, institutions with an above 75th percentile of female directors display 12.5% lower lending volumes to firms with 232 tonnes of Scope 1 & 2 GHG emissions per million revenues.

[Insert Figure 3 Here]

4.3 Board gender diversity, bank lending and firms' Scope 3 GHG emissions

Columns 3 and 6 of Table 3 display the results for the regression analysis that accounts only for firms' Scope 3 GHG emissions ($GHG3$). This category, among the three, is the most difficult to be measured, given that it covers indirect, value chain and product-related emissions (not captured in Scope 2) and includes both upstream and downstream emissions. Scope 3 emissions often represent a corporate's largest GHG impact (GHG Protocol) and should be carefully tracked and assessed. Based on the Protocol, there are 15 categories of Scope 3 emissions and often firms' disclosure is limited to those deemed to be material. While the level of regulation is increasing, there is still room for a certain degree of case-by-case interpretation. However, the increased transparency in terms of reporting, fostered by the recommendations stemming from international authorities, such as the Task Force on Climate-Related Financial Disclosure set by the Financial Stability Board (FSB), contributes to enhancing banks' awareness and commitment to reducing the carbon emissions they fund.[16]

Our results confirm a beneficial effect associated with a larger proportion of female directors in the boardroom on bank lending toward firms generating higher levels of climate-warming

[16] See www.fsb-tcfd.org/.

emissions. The relationship between *GHG3* and our dependent variable (*Lending*) is positive and statistically significant, reflecting a direct link between firms' GHG emission intensities and bank lending. The interaction term (*Board_female*GHG3*) is negative and statistically significant at the 1 and 5% levels, across all model specifications, suggesting that banks with more female directors on the board reduce their lending volumes as GHG relative emissions increase, compared to their peers. The graphical evidence in Figure 4 displays similarities with that reported for all spectrums of GHG emissions (Figure 2). It appears that greater attention to the environmental dimension associated with bank lending is paid by banks with more women in leadership positions. From a wider perspective, this evidence assumes a specific relevance if considering the contribution of climate-related risks, within the banking sector, in terms of overall financial stability.

[Insert Table 3 Here]

[Insert Figure 4 Here]

5 Inside the "gender-green-lending" nexus

In this section, we discuss some additional analyses that explain the "gender-green-lending" nexus. First, we try to understand whether there is a difference in banks' lending behavior depending on the country where the bank is located. In particular, we aim at evaluating if the beneficial effect of a more gender-diverse board, in terms of lending toward less polluting firms, is linked to the geographical area where the bank operates. In this respect, different cultural factors could potentially enhance or hinder the influence of female directors on greener banks' lending strategies. To test this hypothesis we enrich Equation (1), by including a dummy variable *South* that takes value 1 if the bank is located in a southern euro area country (i.e. Greece, Italy, Portugal and Spain), and 0 otherwise. The rationale underlying this geographical selection lies in the historical predominance of the so-called "male-breadwinner" model in southern Europe (Gonzalez et al., 1999; Pfau-Effinger, 2004). Based on this theoretical model, there exists a clear hierarchical and patriarchal division of labor and power within the nuclear family, where only male members participate in the labor market, being the family providers, and women are mostly confined to the role of housewives.

Second, we are interested in understanding how and to what extent the female climate-oriented representation in the national political settings plays a relevant role in influencing banks' lending decisions in favor of less polluting firms. To test this hypothesis, we include in Equation (1) a dummy variable *Cpol* equal to 1 if a bank is located in a country with a proportion of female ministries and government executives dealing with environment and climate change above 50% and 0 otherwise. The politicians' gender might have implications for national policy outcomes, such as the provision of services in the health (Bhalotra and Clots-Figueras, 2014) or education (Clots-Figueras, 2012) sphere, also including climate change initiatives. Mavisakalyan and Tarvedi (2019), based on a cross-country analysis, argue that female political representation positively contributes to the adoption of more stringent climate change actions, also leading to lower CO2 emissions.

Third, we aim to test whether the adoption of legislative gender quotas to promote the gender-equality in decision-making bodies has relevance to the "gender-green-lending" nexus we identified in our baseline analysis. To this end, we construct and include in our cross-sectional regression a dummy variable *Quotas* that takes value 1 if a bank is located in a country with legislative gender quotas (Austria, Belgium, Germany, France, Italy and Portugal), and 0 otherwise. The significant under-representation of women in corporate boards worldwide is a timely topic of great interest to policymakers, practitioners and academics (Reding, 2012; OECD, 2015; Terjesen and Sealy, 2016). Assessing the implications associated with the adoption of gender quotas is a core part of the current debate on how to improve gender equality in decision-making positions. To date, the evidence is mixed. Ahern and Dittmar (2012) document a negative impact of quotas on the value and performance of Norwegian firms.[17] A similar evidence is shown in Matsa and Miller (2013) and Greene et al. (2020). Other studies reveal a relatively neutral impact of gender quotas on firms' value (Eckbo et al., 2022) or a beneficial impact in terms of the labor market for directors (Ferreira et al., 2019). Terjesen and Sealy (2016) argue that female directors positively impact social capital within the board, acting as knowledge brokers between others. The related discussion also involves the banking industry (Cardillo et al., 2020).

[17]In 2003, Norway was the first country in the world to introduce binding gender quotas for all publicly traded and state-owned companies.

5.1 The role of cultural factors

In columns 1 and 4 of Table 4, we report the results of the analysis including the *South* dummy in Equation (1). The estimated coefficient on the double interaction term (*Board_female* GHGTot*) is negative and statistically significant in the ILS fixed-effects regression (column 4) - although it loses statistical significance in the firm fixed-effects regression (column 1). However, when we turn our attention to the triple interaction term (*Board_female*GHGTot*South*), we can infer that the discussed inverse relationship between more gender-diverse boards and lending toward less polluting firms does not hold for banks located in southern euro area countries. The related coefficients are positive and, in the ILS fixed-effects specification, statistically significant at the 10% level, suggesting that banks with more female directors on boards and located in southern euro area countries lend more to more polluting firms, compared to banks located in other areas. This evidence might be explained by a predominance of the "male-breadwinner" model in southern Europe, which places women in the role of housewives, mostly excluded from the labor market. This collective cultural approach would tend to undermine female empowerment within the organization and in the top-level decision-making positions.

5.2 The role of female climate-oriented politicians

In columns 2 and 5 of Table 4, we report the results for the cross-sectional regression analysis, based on Equation (1), with the inclusion of the *Cpol* dummy variable (equal to 1 if a bank is located in a country with more than 50% of female ministries and government executives dealing with environment and climate change, and 0 otherwise). The triple interaction term (*Board_female*GHGTot*Cpol*) is negative (columns 2 and 5) and highly statistically significant. This evidence suggests that banks with more female representation on board and that are located in countries with a share of female climate-oriented politicians above 50% tend, *ceteris paribus*, to lend lower volumes of funds to more polluting firms. This result is in line with the literature analysing the relationship between women's political empowerment and CO2 emissions, which points to a negative and statistically significant correlation between the number of ministerial positions held by women and changes in CO2 emission (Ergas and York, 2012). Either because of the greener orientation of women, which could be crucial for successful environmental policy-making or because of the general effect that more gender equality at the political level might have on the way people perceive the environment, a higher number of female ministers and climate-government executives contribute to promoting gender equality and environmental instances, which in turn eases the task of bank female directors in achieving better environmentally-related results.

5.3 The role of gender quotas

In columns 3 and 6 of Table 4, we report the findings with the inclusion of the dummy variable *Quotas* that takes value 1 if a bank is located in a country with legislative gender quotas, and 0 otherwise. Both the double (*Board_female*GHGTot*) and the triple interaction terms (*Board_female*GHGtot*Quotas*) are lacking statistical significance (the sum of the two coefficients is statistically significant), suggesting that there are no differences in terms of lending to less polluting firms between banks operating in countries with/without legislative gender quotas. In this respect, gender quotas do not appear to play a relevant role in enhancing female influence on banks' lending strategies, within a pro-environmental vision. As suggested by Ahern and Dittmar (2012), this evidence could be explained by a lack of work and leadership experience of post-quota female directors, compared to male counterparts. Furthermore, as argued in Terjesen and Sealy (2016), it might be the case that post-quota female directors are "busier" because simultaneously sit on multiple boards, thereby being less capable to exert their power. Lastly, a problem in terms of female directors' legitimacy in quota-mandating countries (Tienari et al., 2009) might undermine women's influence on the board and on strategic decisions.

[Insert Table 4 Here]

5.4 The role of female directors' specific characteristics: Age, education & background

In this section, we aim to shed some light on the effects coming from specific characteristics of female directors in our sample. To this end, we deepen our investigation by looking at three aspects that differentiate the women on the banks' boards. Specifically, we consider their (i) age; (ii) level of education; and (iii) background. We, therefore, include three additional variables in the model specification presented in Section 3.2 (Equation (1)) and, alternatively, interact them with the *Board_female* indicator. The first inclusion is *Age*, which measures the average age of the female directors on the board. The second one is *PhD*, which accounts for the number of female directors holding a doctoral degree. The third one is *Academic*, which indicates whether a female director holds (or has held) an academic position. For the latter variable, we construct a dummy that takes value 1 if the director is an academic, 0 otherwise. All information is manually gathered from the banks' annual reports.

Table 5 provides the results of our investigation. Although age is found to largely explain the variance in moral judgment, with older individuals displaying higher moral reasoning (Ruegger and King, 1992), we do not find any relationship between *Age* and lending to less polluting firms as the coefficient on the interaction term *Board_female*GHGTot*Age* is negative and lacking statistical significance.

In exploring the impact of the directors' level of education on banks' lending to less polluting firms, we find that better-educated female directors, i.e. holding a doctoral degree, positively influence the collective decisions toward greener borrowers. The coefficient on the triple interaction $Board\_female{*}GHGTot{*}PHD$ is negative and statistically significant at the 10% (column 2) and 5% levels (column 5). The educational level is seen to impact managers' cognitive skills and value system, which in turn influence a firm's strategic decisions (Hitt and Tyler, 1991). Furthermore, the managers' educational background can affect a firm's degree of innovativeness and, thus, a firm's strategic address (Hambrick and Mason, 1984). More educated managers, with greater environmental awareness, due to an enhanced capability to develop and leverage a larger breadth of understanding, may be able to put higher green pressure on firms than their less-educated peers (Rest and Narvaez, 1994; Diamantopoulos et al., 2003). Our findings appear to corroborate the evidence that more educated female directors can effectively exert greater pressure on decision-making toward greener options.

Finally, given the central role played by universities in driving societal changes and pushing for a more sustainable future (Cortese et al., 2003; Wang et al., 2013), it is reasonable to expect that directors with an academic position might be more responsive to younger generations' concerns, including those related to the environment. However, our findings do not support the hypothesis of greater attention to the environment of female directors with an academic background. The coefficient on the *Board_female*GHGTot*Academic* term is lacking statistical significance (columns 3 and 6).

[Insert Table 5 Here]

6 Robustness checks to account for endogeneity

6.1 Sorting effect

It is well known that corporate governance studies may suffer from endogeneity problems (Coles et al., 2012). Consequently, in this section, we control for the so-called *sorting effect*, namely for the possibility that reverse causality drives our results. Indeed, banks more socially responsible may be more likely to hire female directors on their boards than other banks. In addition, women may *self-select* into banks that are *per se* more socially responsible than others. Lastly, given that we suggest that women are more risk-averse than their male peers, it is also plausible that women tend to select boards of less risk-taking banks.

We account for these endogeneity concerns by employing the instrumental variable (IV) approach and estimate the regressions using a two-stage least squares (2SLS) framework to extract the exogenous component from the percentage of female directors. The main challenge in using 2SLS is the identification of exogenous IVs that are not directly correlated with the dependent variable. We, therefore, need to identify a source of exogenous variation in our main variable of interest. To this end, we employ the ratio of female participation in the workforce at the country level (*Womenpart)* as our instrumental variable. We borrow the idea about this instrument from Huang and Kisgen (2013) and Chen et al. (2017), who suggest that the greater the female participation in the workforce, the higher is the probability for a bank (or firm) to find talented female candidates from a larger pool of contenders. By contrast, there is no evidence suggesting that female participation in the workforce of a country influences bank lending volumes. The IV econometric identification is specified as follows:

$$
\begin{aligned}
Stage1: E[Board\_female_b | Womenpart, Controls] = \\
\Phi(Womenpart_k, Controls_{b,t-1}) \qquad (2)
\end{aligned}
$$

$$
\begin{aligned}
Stage2: Lending_{bj} = \alpha_{j,ILS} + \beta Fitted\_Board\_female_b + \delta GHGtot_j + \\
\gamma Board\_female_b * GHGTot_j + \theta X_{b,t-1} + \tau T_{b,t-1} + \upsilon Z_{j,t-1} + \epsilon_{bj} \qquad (3)
\end{aligned}
$$

In the first stage of Equation (2), we rely on a probit model and regress our main variable of interest (*Board_female*) on the instrumental variable (*Womenpart*), as well as on the bank- and corporate governance-specific characteristics used throughout the paper to capture the probability of having an above-75th percentile of females on board. In the second stage, we introduce the fitted values of *Board_female* from the stage 1 regression into Equation (3) and regress our main dependent variable (*Lending*) on the same set of variables employed in Equation (1).

Column 1 of Table 6 reports the results of the first-stage regression. In line with the requirements for a valid instrument, *Womenpart* is statistically significant at the 1% level and positively correlated with the probability of having an above-75th percentile of females in the bank boardroom, suggesting the validity of the IV. Moreover, the instrument employed is strong as per the Kleibergen-Paap, Cragg-Donald test statistics (Cragg and Donald, 1993; Stock and Yogo, 2005). Columns 2 and 3 of Table 6 display the results for the second-stage regression, which makes use of the predicted probability from the first-stage regression (*Fitted_Board_female*) to estimate the banks' lending behavior to less polluting firms. The results are in line with those obtained for the baseline regression (Table 3), indicating an inverse relationship between a higher percentage of female directors and lending volumes to more polluting firms, which further corroborates our main findings.

[Insert Table 6 Here]

6.2 Sample selection biases

6.2.1 Large exposures

As a second robustness check, we account for the possible existence of sample selection biases. In the previous analyses, we show that the presence of female directors in the boardroom has a significant effect on shaping banks' lending decisions toward less polluting firms. However, the average lending amount granted by the banks in the credit register sample is relatively small (€648,453) and reflects a composition oriented to SMEs. While credit register data are fundamental to assessing the effect of female members in bank boards for a broader spectrum of borrowing firms - in contrast to studies that focus on specific loan categories (Delis et al., 2018; Reghezza et al., 2021) - it may be the case that female directors' "voice" on a greener lending behavior is less heard when loans are large and directed to international corporations. This could be due to a lower female's perception of self-efficacy and confidence (Lenney, 1977;

Barber and Odean, 2001), compared to men, in undertaking complex financial decisions (Endres et al., 2008). With this additional test, we, therefore, aim to understand whether the greening effect of female directors holds regardless of the category of loans and related board decisions.

To tackle this concern, we employ an additional loan-level dataset which is collected under the large exposures regime.[18] An exposure to a single borrower or a connected group of borrowers is considered to be a large exposure when, before the application of credit risk mitigation measures and exemptions, is equal to or higher than 10% of an institution's eligible capital or has a value equal to or higher than €300 million (Article No.393 of the Capital Requirements Regulation, CRR).[19] As for AnaCredit, we match the large exposure dataset with bank corporate governance variables, bank-specific characteristics and GHG emissions. Our large exposures sample covers 40 large banks and 124 large corporations over the period 2014-2018, for a total of 2,270 observations. The econometric identification we employ in this analysis is very similar to that presented in Equation (1) and is specified as follows:

$$
\begin{aligned}
Lending_{bjt} = \alpha_{jt} + \beta Board\_female_{bt} + \\
\gamma Board\_female_{bt} * GHG12_{jt} + \theta X_{bt} + \tau T_{bt} + \epsilon_{bjt}
\end{aligned} \tag{4}
$$

As in the baseline specification, we use as a dependent variable the logarithm of bank lending volumes (*Lending*). In addition, we define a dummy *Board_female_p75* equal to 1 for those banks with a percentage of female directors above the 75th percentile of the distribution, 0 otherwise. We capture firms' GHG emission intensities by weighting Scope 1 and 2 emissions over firm total assets (*GHG12*). Differently from credit register data, the large exposure dataset enables us to exploit a panel dataset as the time series spans from 2014 to 2018. Table A2 in the Appendix reports the summary statistics for the variables employed in this further analysis. X is a vector of bank-level controls, which includes bank size (*TotAss*), measured by the logarithm of total assets, and some relevant ratios, such as (i) deposits to total liabilities (*Dep_tl*); (ii) NPLs to

[18] Information on euro area bank large exposures data to individual counterparties is taken from the Supervisory Reporting (COREP 27-31), which requires banks to report to the Single Supervisory Mechanism (SSM) detailed information on their large exposures since 2014. Introduced in the EU in 2014, the regime aims to ensure that risks arising from large exposures are reduced by limiting the maximum loss a bank can incur in the event of a sudden counterparty's failure.

[19] The large exposure dataset encompasses detailed information on the exposures (e.g. instruments) and reporting entities, which allows us to link the large-exposure dataset to the complementary data source. The large-exposure templates used here are reported at the highest level of consolidation and also, form the most relevant group sub-structures, at the individual level.

gross loans ratio (*NPL_r*); (iii) net income to total assets (*ROA*); (iv) cash and equivalents to total assets (*Cash_ta*) and the common equity tier 1 ratio (*CET1_r*). T is a vector of lagged bank corporate governance characteristics, including *Board_size* (i.e. the logarithm of the number of directors elected to the board), *Board_tenure* (i.e. the average number of years that each board member has been on the board) and *CSR_comp* (i.e. a dummy variable to account whether the compensation of senior executives is linked to CSR objectives). Given that the large exposures dataset only covers large corporations that borrow from multiple banks (firms have on average about 4 large exposure loans), we follow the approach of Khwaja and Mian (2008) and include borrower*time fixed-effects to control for the time-varying heterogeneity in credit demand across firms. Robust standard errors are two-way clustered at the bank-firm level.

Columns 1 and 2 of Table 7 display the results based on Equation (4). As in the baseline results, we find an inverse and statistically significant relationship between the lending volumes of banks with more female directors and *GHG12* relative emissions (at the 5 and 1% levels, respectively). This evidence suggests that our main results are not driven by the sample composition and they are even more robust when considering larger loans and a longer sample period. The magnitude of the effect is also economically meaningful. As an illustration, banks with a percentage of female directors on board above the 75th percentile lend about 1.2% less to firms that generate 285 tonnes of GHG emissions/million assets (i.e. firms in the 75th percentile of the GHG emissions distribution), in comparison to the other banks.

6.2.2 Transition effects in bank boardroom composition: From male-to-female director

As a third robustness check, we control for the possibility that psychological traits and/or risk-aversion of women in the bank boardroom may not differ from those of their male peers. The key rationale underlying our analysis contends that female directors are more environmentally-oriented than men due to their psychological traits and/or a different level of risk-aversion. For instance, Adams and Funk (2012), by using data from the European Social Survey (ESS) and survey data on directors' psychological traits show that women in the boardroom can be very different from women in the general population. Specifically, they argue that female directors are both less tradition-oriented than women in the population at large and less tradition-oriented than male directors. Their analysis suggests that it is important to consider the choices women might face to attain their positions before making assumptions about the preferences of women in corporate leadership positions.

To account for this possibility, we follow the approach of Huang and Kisgen (2013) and Faccio et al. (2016) and compare banks' lending to less polluting corporations before and after a transition from a male to a female director with a control group of banks that face a female-to-male transition. Specifically, we define a dummy equal to 1 if in the bank boardroom one or more male directors are replaced by one or more female directors (*male-to-female*). This dummy is time-varying and allows for the inclusion of bank fixed-effects: the same bank can face a male-to-female transition in one year and a female-to-male transition in a different year. In contrast to previous studies (see, for instance, Huang and Kisgen, 2013), we do not use an indicator (dummy) variable at *t+1* to capture the effect on the outcome variable (*Lending*) after the executive transition as decisions to grant new large exposure loans and/or the renewal of existing ones are commonly revised at the board level several times within the same year (EBA). Consequently, a female replacing a male director can immediately affect the decision on whether the large exposure loan is granted, extended or renewed.

The results of this additional test are presented in columns 3 and 4 of Table 7. The coefficient that captures the transition from male-to-female (interaction *male-to-female*GHG12*) is negative and statistically significant at the 5% level, thus indicating that in years where a male director is replaced by a female director, lending volumes to more polluting/large corporations are lower. This evidence should further strengthen the core hypothesis of this paper, which sees female directors more inclined, than their male peers, to account for the risks (and related implications) arising from climate change.

[Insert Table 7 Here]

6.2.3 Banks with a strong climate agenda and strategic election of female members

A final interesting aspect to explore is whether banks with strong climate agenda strategically elect female members to their boards to facilitate the change. Of course, that selection is likely endogenous. However, one could think of some visible changes in the way banks commit to the agenda. For example, Kacperczyk and Peydró (2021) show that banks committing to Science Based Targets Initiative (SBTi) subsequently alter the provision of credit. Similarly, banks committing to the SBTi may be more willing to reduce credit to more polluting firms. Committing to a climate agenda might be correlated to the number of females in banks' boardrooms, given that more responsible banks, which pay more attention to the environmental sphere, might also be the ones hiring more female directors. To control for this possibility, and following Kacperczyk and Peydró (2021), we hand-collected information about the participation of banks in the SBTi and create a dummy variable SBTi equal to 1 for those banks that joined the initiative, and 0 otherwise.[20] In our sample, SBTi assumes the value 1 for 10 banks, and 0 for 42 banks. The results from the inclusion of the dummy variable SBTi reported in Table A3 of the Appendix indicate a positive and statistically significant relationship between SBTi and bank lending, suggesting, *ceteris paribus*, that banks that joined the initiative lend more to firms compared to banks that did not join it. More importantly for our identification strategy, the inclusion of the dummy variable SBTi does not affect our coefficients of interest.[21]

7 Conclusions

This study aims to investigate the impact of gender diversity on banks' boards on lending decisions toward less polluting firms. While existing academic papers explore the role of gender diversity in banks' decision-making (Berger et al., 2014; Owen and Temesvary, 2018; Cardillo et al., 2020; Arnaboldi et al., 2021), there is a lack of evidence about the impact of gender diversity in banks' boards in shaping lending strategies in favor of greener options. Given the extremely relevance of climate change and the increasing attention on how to combat its effects, this paper represents a timely and significant contribution to the extant literature, of interest to policymakers, academics and practitioners.

Using granular credit register data matched with GHG firms' emissions, as well as an extensive range of bank- and firm-specific information, we show that banks with more gender-diverse boards lend less to more polluting firms. This "greening" effect is robust to a variety of additional analyses and tests, including those to rule out endogeneity concerns. An investigation of the female-director specific characteristics suggests that better-educated directors pay greater

[20] Data have been collected from: https://sciencebasedtargets.org/companies-taking-action.

[21] We also checked whether banks made their board more gender diverse following the commitment to SBTi. On average, banks committing to the SBTi increased the share of female board members by 2 percentage points within the 2 years following the commitment. This provides additional supporting evidence to our main findings that highlight the key relevance of female directors for banks' greener lending strategies

attention to the environment, thereby granting lower credit volumes to browner firms. We also document that the “greening” effect associated with female members in banks’ boardrooms is stronger in countries with more female climate-oriented politicians

Our results have important implications for policymakers. Policies that envisage a larger percentage of women at the bank management level not only have an impact on gender diversity imbalances but allow for more efficient fulfillment of environmental objectives. However, our results do not investigate the potential trade-off between the environmental results achieved by females in the bank boardroom and the corporate financial performance and risk objectives. Is the achievement of climate objectives also in the interest of bank shareholders? Additional research is needed to study the alignment (or potential misalignment) between the climate-related benefits and the financial repercussions that might stem the deployment of green lending strategies. Recent empirical evidence shows that the stock market values carbon emissions, as investors require higher compensation for holding the stocks of more polluting companies (Bolton and Kacpercyk, 2021a; Bolton and Kacpercyk, 2021b). The increasing cost of equity for companies with higher emissions can be regarded as an alternative system of decentralized taxation and a way to pass the problem to financial markets. Our study offers an alternative view, as also banks can do their part through their lending decisions, and with the help of a greater presence of females in bank boardrooms.

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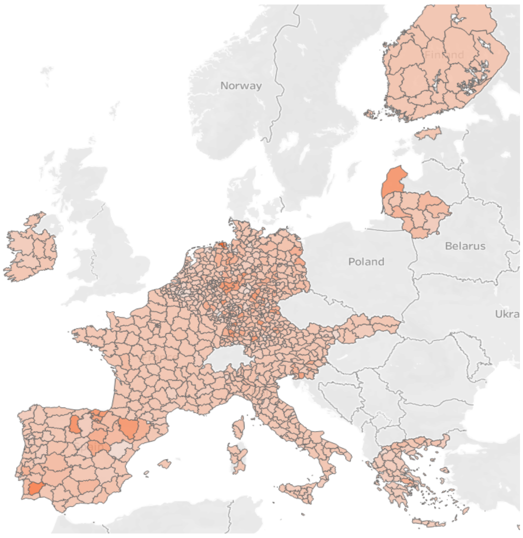
Figure 1. Comparison of GHG emissions
This figure displays the difference between the median of the sectoral GHG emission intensities within a region (left-hand chart) and the firm-level GHG emission intensities (right-hand chart). GHG emissions are relative to firm's revenues in logarithm.



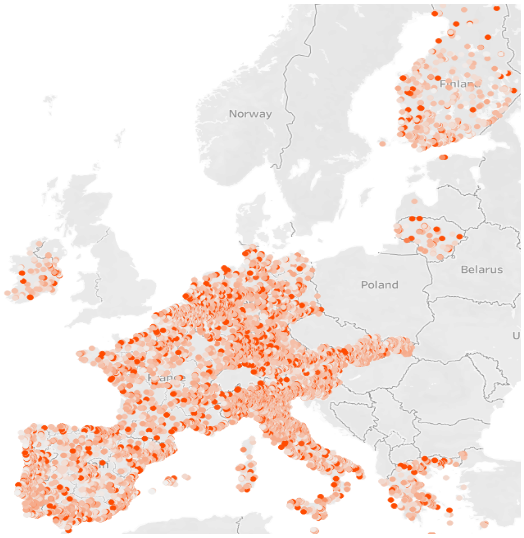
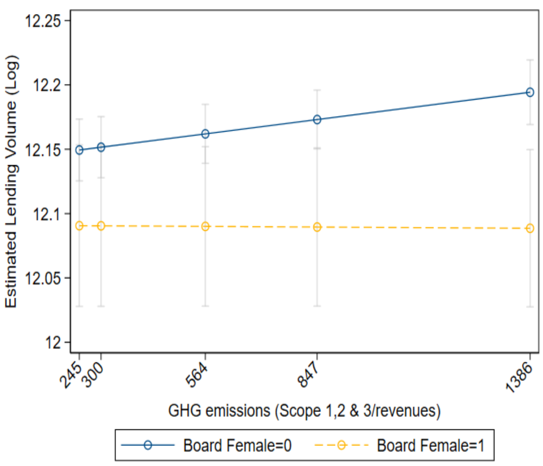


Figure 2. Estimated relationship between GHG emissions (Scope 1, 2 & 3) and bank lending
The left-hand chart plots the estimated relationship between GHG emissions (Scope 1, 2 & 3) and lending for banks with a below-75th percentile of female directors in the boardroom (blue solid line) and banks with an above-75th percentile of female directors in the boardroom (yellow dashed line). The right-hand chart plots the estimated difference in bank lending at different levels of GHG emissions for banks with a below-75th percentile of female directors on the board and banks with an above-75th percentile of female directors on the board. The grey bands represent the 95% confidence intervals. In both charts, the y-axis refers to the estimated logarithm of lending volume whilst the x-axis indicates the GHG emissions over firm revenues. The coefficients are taken from the specification in column 4 of Table 3.



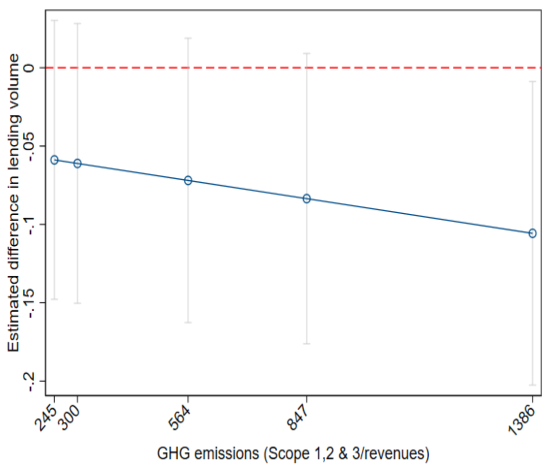


Figure 3. Estimated relationship between GHG emissions (Scope 1 & 2) and bank lending The left-hand chart plots the estimated relationship between GHG emissions (Scope 1 & 2) and lending for banks with a below-75th percentile of female directors in the boardroom (blue solid line) and banks with an above-75th percentile of female directors in the boardroom (yellow dashed line). The right-hand chart plots the estimated difference in bank lending at different levels of GHG emissions for banks with a below-75th percentile of female directors on the board and banks with an above-75th percentile of female directors on the board. The grey bands represent the 95% confidence intervals. In both charts, the y-axis refers to the estimated logarithm of lending volume whilst the x-axis indicates the GHG emissions over firm revenues. The coefficients are taken from the specification in column 5 of Table 3.

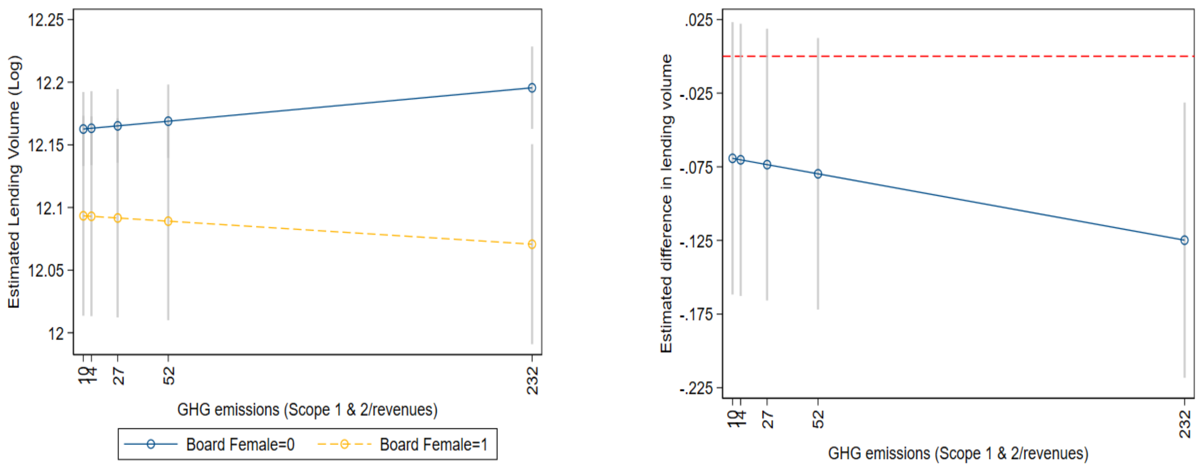


Figure 4. Estimated relationship between GHG emissions (Scope 3) and bank lending The left-hand chart plots the estimated relationship between GHG emissions (Scope 3) and lending for banks with a below-75th percentile of female directors in the boardroom (blue solid line) and banks with an above-75th percentile of female directors in the boardroom (yellow dashed line). The right-hand chart plots the estimated difference in bank lending at different levels of GHG emissions between banks with a below-75th percentile of female directors on the board and banks with an above-75th percentile of female directors on the board. The grey bands represent the 95% confidence intervals. In both charts, the y-axis refers to the estimated logarithm of lending volume whilst the x-axis indicates the GHG emissions over firm revenues. The coefficients are taken from the specification in column 6 of Table 3.

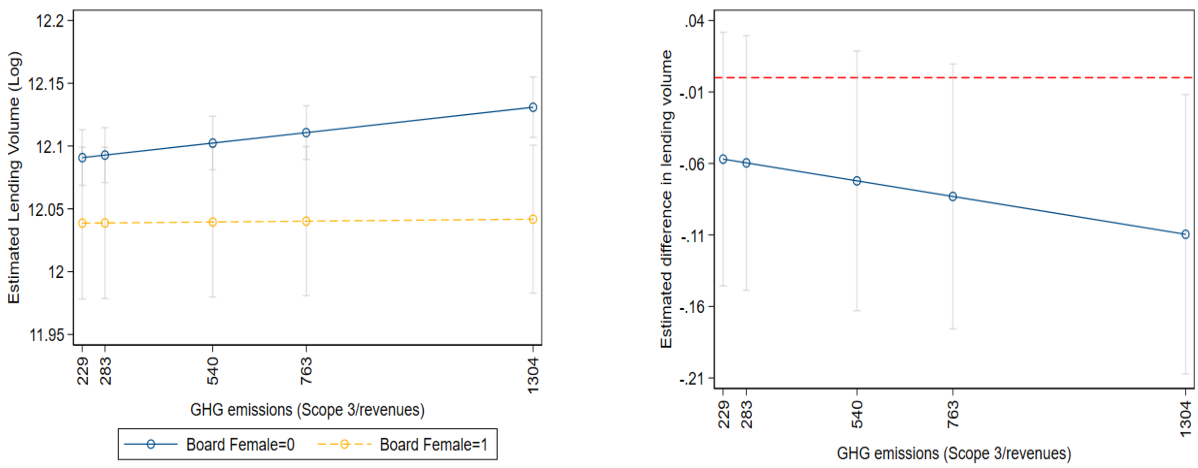


Table 1. Summary statistics

This table reports the summary statistics for the variables employed in the empirical analysis.

	Obs	Min	Max	p25	Median	p75	Mean	SD
Panel A. Dependent Variable								
Lending (log)	910,895	10.12	16.16	11.06	11.92	12.98	12.15	1.39
Lending (€)	910,895	25,000	10,500,000	63,593	150,707	435,160	648,453	1,614,857
Panel B: GHG emission variables								
Scope 1-3 relative GHG (%)	910,895	126.11	5,395.31	300.57	564.76	847.41	772.96	888.31
Scope 1 and 2 relative GHG (%)	910,895	5.47	928.37	14.96	27.22	52.36	60.80	134.88
Scope 3 relative GHG (%)	910,895	107.85	4,529.76	283.06	540.92	763.87	707.10	769.65
Panel C: Bank corporate governance variables								
Female on board (%)	910,895	0.00	57.14	30.00	33.33	36.82	32.94	8.22
Board Female (dummy)	910,895	0.00	1.00	0.00	0.00	1.00	0.28	0.45
Board size (level)	910,895	9.00	21.00	14.00	15.00	17.00	15.19	2.42
Board size (log)	910,895	2.19	3.04	2.63	2.70	2.83	2.70	0.16
CSR compensation (dummy)	910,895	0.00	1.00	0.00	0.00	1.00	0.48	0.49
Board tenure (years)	910,895	1.76	12.15	3.43	5.48	7.88	5.64	2.60
Ind_board (%)	910,895	16.66	100.00	50.00	68.42	76.47	65.17	18.19
Panel D: Bank-specific variables								
Bank size (log total assets)	910,895	23.78	28.23	25.80	27.18	27.51	26.64	1.19
Bank size (€bn)	910,895	21.30	1,830.00	160.00	639.00	887.00	647.00	571.00
Deposits (%)	910,895	44.41	96.24	71.14	79.26	82.07	76.79	10.17
NPLs (%)	910,895	1.20	45.52	3.19	3.77	7.52	7.07	7.47
ROA (%)	910,895	-0.49	1.01	0.27	0.55	0.64	0.48	0.30
Cash (%)	910,895	0.72	14.62	4.05	7.85	8.87	6.99	3.29
Fees and commissions (%)	910,895	15.82	56.85	32.39	37.58	44.20	39.09	9.39
CET1 ratio (%)	910,895	11.02	18.35	11.75	12.05	13.54	12.74	1.49
ESGscore	918,895	37.68	94.11	65.88	77.24	87.19	75.75	13.83
ESGcontroversies	918,895	0.00	1.00	1.00	1.00	1.00	0.98	0.11
Stakeholders	910,895	0.61	100.00	41.35	77.77	100	70.97	29.92
Panel E: Firm-level variables								
Firm size (log total assets)	910,895	11.42	18.91	14.11	14.31	15.39	14.72	1.42
Firm size (€ml)	910,895	0.09	163	1.34	1.64	4.83	9.56	26.20
Liquidity ratio (%)	910,895	0.03	411.00	3.68	9.23	13.59	22.16	53.13
Debt (%)	910,895	14.19	148.40	65.66	74.24	83.41	73.00	20.46
Firm ROA (%)	910,895	-28.23	30.84	2.19	3.54	5.01	3.81	6.90
Working capital (%)	910,895	-22.93	85.06	12.10	20.86	35.17	24.87	21.59
Gearing ratio (%)	910,895	-151.87	194.51	9.48	15.22	34.11	22.67	43.30
Loan_provisions (%)	910,895	0.00	89.74	0.11	0.38	1.28	5.52	15.51
Panel F: Cultural/Institutional variables								
South (dummy)	910,895	0.00	1.00	0.00	1.00	1.00	0.73	0.44
Gender quotas (dummy)	910,895	0.00	1.00	0.00	1.00	1.00	0.56	0.49
Cpol (dummy)	910,895	0.00	1.00	0.00	0.00	0.00	0.14	0.35

Table 2. Variables, definitions and sources

Variable (*label*)	Definition	Source
Dependent variable		
Lending (*Lending*)	Outstanding amount (in logarithm) indebted by a debtor to a creditor	AnaCredit
GHG emission variables		
Scope 1-3 GHG relative emiss (*GHGtot*)	Sum of Scope 1, 2 and 3 GHG emissions to firm's revenues	Urgentem
Scope 1-2 GHG relative emiss (*GHG12*)	Sum of Scope 1 and 2 GHG emissions to firm's revenues	Urgentem
Scope 3 GHG relative emiss (*GHG3*)	Scope 3 GHG emissions to firm's revenues	Urgentem
Bank corporate governance variables		
Female on board (*Female_board*)	Percentage of women on board	Refinitiv Eikon
Board Female (*Board_female*)	Dummy variable equal to 1 for banks with a percentage of female on board above the 75th percentile, 0 otherwise	Authors' calculation
Board size (*Board_size*)	Number of members on bank board	Refinitiv Eikon
CSR compensation (*CSR_comp*)	Dummy variable equal to 1 if the senior executive's compensation is linked to CSR targets, 0 otherwise	Refinitiv Eikon
Board tenure (*Board_tenure*)	Average number of years each board member has been on the board	Refinitiv Eikon
Independent Board Members (*Ind_board*)	Percentage of independent directors to overall directors	Refinitiv Eikon
Bank-specific variables		
Bank size (*TotAss*)	Logarithm of bank total assets	Supervisory data
Deposits (*Dep_tl*)	Ratio of customer deposits to total liabilities	Supervisory data
NPLs (*NPL_r*)	Ratio of non-performing loans to gross loans	Supervisory data
ROA (*ROA*)	Ratio of net income to total assets	Supervisory data
Cash (*Cash_ta*)	Ratio of cash and cash equivalent to total assets	Supervisory data
Fees and commissions (*Fee_opInc*)	Ratio of fees and commissions to operating income	Supervisory data
capitalization (*CET1_r*)	Ratio of common equity tier1 capital to risk-weighted assets	Supervisory data
ESG score (*ESGscore*)	Environmental, social and governance score	Refinitiv Eikon
ESG controversies (*ESGcontroversies*)	Number of ESG-related controversies reported in the press	Refinitiv Eikon
Stakeholder engagement (*Stakeholders*)	Dummy variable equal to 1 if a bank engages with its stakeholders, 0 otherwise	Refinitiv Eikon
Firm-specific variables		
Firm size (*Firm_ta*)	Logarithm of firm total assets	Orbis Amadeus
Liquidity ratio (*Firm_cash*)	Ratio of cash and cash equivalent to current liabilities	Orbis Amadeus
Debt (*Firm_debt*)	Ratio of current liabilities + non-current liabilities to total assets	Orbis Amadeus
Firm ROA (*Firm_ROA*)	Ratio of earnings before interest and taxes to total assets	Orbis Amadeus
Working capital (*Firm_WC*)	Ratio of working capital to total assets	Orbis Amadeus
Gearing ratio (*Firm_gearing*)	Ratio of interest paid to earnings before interest and taxes	Orbis Amadeus
Loan Provisions (*Loan_provisions*)	Bank-firm level amount of loan impairments identified and recognizedby the bank over the overall loan amount granted to the firm	AnaCredit
Cultural/Institutional variables		
South (*South*)	Dummy variable equal to 1 if a bank is located in a southern euro area country (Greece, Italy, Portugal and Spain), 0 otherwise	Authors' calculation
Gender quotas (*Quotas*)	Dummy variable equal to 1 if a bank is located in a country with legislative gender quotas (Austria, Belgium, France, Germany, Italy and Portugal), 0 otherwise	European Institute for Gender Equality
Climate politicians (*Cpol*)	Dummy variable equal to 1 if a bank is located in a country with a percentage above 50% of female ministries and government executives dealing with environment and climate change, 0 otherwise	European Institute for Gender Equality

Table 3. Baseline results (Total, Scope 1&2 and Scope 3 GHG emissions)

This table reports the results of the baseline regression that accounts for all three scopes of GHG emissions. *Lending*, the dependent variable, is the logarithm of the outstanding amount indebted by a debtor to a creditor as per the AnaCredit definition. Banks' corporate governance variables, balance-sheet controls, ESG indicators and firm-level characteristics are included. For more details on the variables' construction and sources, refer to Table 2. ILS indicates industry*location*size fixed-effects. All variables are winsorized at the 1st and 99th percentiles. Robust standard errors clustered at the bank-firm level are reported in parentheses. *** p<.01, ** p<.05, * p<.1.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Lending	Lending	Lending	Lending	Lending	Lending
Board_female	0.02343	0.01423	0.02565	0.04221	0.02724	0.04463
	(0.087)	(0.091)	(0.087)	(0.062)	(0.066)	(0.062)
GHGTot				0.00004***		
				(0.000)		
GHG12					0.00014**	
					(0.000)	
GHG3						0.00004***
						(0.000)
Board_female*GHGTot	-0.00002**			-0.00004***		
	(0.000)			(0.000)		
Board_female*GHG12		-0.00008**			-0.00022***	
		(0.000)			(0.000)	
Board_female*GHG3			-0.00002**			-0.00004***
			(0.000)			(0.000)
L.TotAss	0.15292***	0.15308***	0.15293***	0.08327	0.08322	0.08333
	(0.043)	(0.043)	(0.043)	(0.052)	(0.052)	(0.052)
L.Dep_tl	0.00867**	0.00867**	0.00867**	0.00369	0.00368	0.00370
	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)
L.NPL_r	0.00627	0.00630	0.00627	0.00211	0.00210	0.00211
	(0.005)	(0.005)	(0.005)	(0.004)	(0.004)	(0.004)
L.ROA	-0.36944***	-0.36975***	-0.36939***	-0.28945**	-0.28973**	-0.28941**
	(0.101)	(0.101)	(0.101)	(0.111)	(0.111)	(0.111)
L.Cash_ta	-0.03054***	-0.03049***	-0.03054***	-0.02582***	-0.02578***	-0.02582***
	(0.010)	(0.010)	(0.010)	(0.008)	(0.008)	(0.008)
L.Fees_opinc	0.00713**	0.00714**	0.00713**	0.00471	0.00470	0.00471
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
L.CET1_r	0.02135	0.02126	0.02137	0.03530*	0.03524*	0.03532*
	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
L.ESGscore	0.00073	0.00071	0.00073	0.00259	0.00257	0.00258
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
L.ESGcontroversies	0.00400***	0.00401***	0.00400***	0.00309***	0.00309***	0.00308***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
L.Stakeholders	-0.19729	-0.19701	-0.19719	-0.36460**	-0.36510**	-0.36434**
	(0.188)	(0.188)	(0.188)	(0.165)	(0.165)	(0.165)
L.Firm_ta				0.58431***	0.58446***	0.58435***
				(0.022)	(0.022)	(0.022)
L.Firm_cash				0.00057***	0.00056***	0.00057***
				(0.000)	(0.000)	(0.000)
L.Firm_debt				0.00771***	0.00770***	0.00771***
				(0.000)	(0.000)	(0.000)
L.Firm_ROA				0.00519***	0.00518***	0.00519***
				(0.001)	(0.001)	(0.001)
L.Firm_WC				-0.00006	-0.00006	-0.00006
				(0.000)	(0.000)	(0.000)
L.Firm_gearing				0.00031***	0.00031***	0.00031***
				(0.000)	(0.000)	(0.000)
Loan_provisions				0.06545	0.06535	0.06546
				(0.068)	(0.068)	(0.068)
L.Board_size	0.76225***	0.76214***	0.76215***	0.62719***	0.62778***	0.62699***
	(0.160)	(0.160)	(0.160)	(0.165)	(0.165)	(0.164)
L.CSR_comp	-0.14370***	-0.14365***	-0.14368***	-0.12521***	-0.12538***	-0.12514***
	(0.044)	(0.044)	(0.044)	(0.042)	(0.042)	(0.042)
L.Board_tenure	0.03582***	0.03585***	0.03582***	0.01983	0.01978	0.01985
	(0.013)	(0.013)	(0.013)	(0.015)	(0.015)	(0.015)
L.Ind_board	0.00303	0.00304	0.00303	0.00362*	0.00364*	0.00362*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Observations	607,445	607,445	607,445	910,895	910,895	910,895
R-squared	0.7329	0.7329	0.7330	0.6341	0.6340	0.6341
Firm FE	Yes	Yes	Yes	No	No	No
ILS FE	No	No	No	Yes	Yes	Yes
N.Banks	52	52	52	52	52	52
N.Firms	236,478	236,478	236,478	539,928	539,928	539,928
Cluster	Bank-firm	Bank-firm	Bank-firm	Bank-firm	Bank-firm	Bank-firm

Table 4. The "gender-green-lending" nexus: The role of cultural and institutional factors

This table reports the results of the regression model specification that also accounts for cultural and institutional variables (South, Cpol and Quotas). *Lending*, the dependent variable, is the logarithm of the outstanding amount indebted by a debtor to a creditor as per the AnaCredit definition. Banks' corporate governance variables, balance-sheet controls, ESG indicators and firm-level characteristics are included. For more details on the variables' construction and sources, refer to Table 2. ILS indicates industry*location*size fixed-effects. All variables are winsorized at the 1st and 99th percentiles. Robust standard errors clustered at the bank-firm level are reported in parentheses. ∗∗∗p<.01, ∗∗p< .05, ∗p< .1.

VARIABLES	(1) Lending	(2) Lending	(3) Lending	(4) Lending	(5) Lending	(6) Lending
Board_female	0.05493	o.10509	-0.25913*	0.09939	0.05128	-0.06992
	(0.087)	(0.081)	(0.132)	(0.072)	(0.077)	(0.177)
GHGTot				0.00004***	0.00004***	0.00003
				(0.000)	(0.000)	(0.000)
Board_female*GHGTot	-0.00002	0.00000	0.00001	-0.00005***	-0.00001	-0.00003
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
South	0.17786			0.14010		
	(0.162)			(0.152)		
Board_female*South	-0.00136			-0.10760		
	(0.115)			(0.127)		
South*GHGTot	-0.00000			-0.00001		
	(0.000)			(0.000)		
Board_female*GHGTot*South	0.00001			0.00003*		
	(0.000)			(0.000)		
Cpol		0.02793			0.19269*	
		(0.102)			(0.103)	
Board_female*Cpol		-0.15384			-0.15745	
		(0.095)			(0.117)	
Cpol*GHGTot		0.00008***			0.00002	
		(0.000)			(0.000)	
Board_female*GHGTot*Cpol		-0.00010***			-0.00006***	
		(0.000)			(0.000)	
Quotas			-0.08256			-0.14050
			(0.089)			(0.090)
Board_female*Quotas			0.35482*			0.19291
			(0.181)			(0.201)
Quotas*GHGTot			-0.00000			0.00002
			(0.000)			(0.000)
Board_female*GHGTot*Quotas			-0.00002			-0.00001
			(0.000)			(0.000)
Observations	607,445	607,445	607,445	910,895	910,895	910,895
R-squared	0.7332	0.7331	0.7331	0.6342	0.6342	0.6342
Firm FE	Yes	Yes	Yes	No	No	No
ILS FE	No	No	No	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes
Governance controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm controls	Absorbed	Absorbed	Absorbed	Yes	Yes	Yes
N.Banks	52	52	52	52	52	52
N.Firms	236,478	236,478	236,478	539,928	539,928	539,928
Cluster	Bank-firm	Bank-firm	Bank-firm	Bank-firm	Bank-firm	Bank-firm

Table 5. The "gender-green-lending" nexus: The role of female directors' specific characteristics

This table reports the results of the regression model specification that also accounts for female directors' specific characteristics (Age, PhD, Academic). *Lending*, the dependent variable, is the logarithm of the outstanding amount indebted by a debtor to a creditor as per the AnaCredit definition. Banks' corporate governance variables, balance-sheet controls, ESG indicators and firm-level characteristics are included. For more details on the variables' construction and sources, refer to Table 2. ILS indicates industry*location*size fixed-effects. All variables are winsorized at the 1st and 99th percentiles. Robust standard errors clustered at the bank-firm level are reported in parentheses. ***p<.01, **p<.05, *p<.1.

VARIABLES	(1) Lending	(2) Lending	(3) Lending	(4) Lending	(5) Lending	(6) Lending
Board_female	3.4953***	0.27559**	0.24601***	2.6719**	0.1891	0.1863
	(1.164)	(0.1179)	(0.113)	(1.093)	(0.1204)	(0.122)
GHGTot				-0.00002	0.00002*	0.00003**
				(0.000)	(0.000)	(0.000)
Board_female*GHGTot	0.00011	-0.00000	-0.00002	0.00004	-0.00001	-0.00004**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age	-0.0058			-0.00503		
	(0.007)			(0.007)		
Board_female*Age	-0.0598***			-0.0454**		
	(0.019)			(0.018)		
GHGTot*Age	0.00000**			0.00000		
	(0.000)			(0.000)		
Board_female*GHGTot*Age	-0.00000			-0.00000		
	(0.000)			(0.000)		
PhD		0.02884			0.00510	
		(0.037)			(0.032)	
Board_female*PhD		-0.14320***			-0.07915*	
		(0.037)			(0.043)	
GHGTot*PhD		0.00000			0.00001***	
		(0.000)			(0.000)	
Board_female*GHGTot*PhD		-0.00001*			-0.00002**	
		(0.000)			(0.000)	
Academic			0.08970			0.06201
			(0.073)			(0.066)
Board_female*Academic			-0.31139**			-0.21196*
			(0.122)			(0.122)
Academic*GHGTot			0.00000			0.00001
			(0.000)			(0.000)
Board_female*GHGTot*Academic			0.00001			0.00001
			(0.000)			(0.000)
Observations	607,445	607,445	607,445	910,895	910,895	910,895
R-squared	0.7335	0.7337	0.7334	0.6345	0.6344	0.6343
Firm FE	Yes	Yes	Yes	No	No	No
ILS FE	No	No	No	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes
Governance controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm controls	Absorbed	Absorbed	Absorbed	Yes	Yes	Yes
N.Banks	52	52	52	52	52	52
N.Firms	236,478	236,478	236,478	539,928	539,928	539,928
Cluster	Bank-firm	Bank-firm	Bank-firm	Bank-firm	Bank-firm	Bank-firm

Table 6. Robustness check: Instrumental variable regressions

This table reports the results of the instrumental variable (IV) regressions. *Lending*, the dependent variable, is the logarithm of the outstanding amount indebted by a debtor to a creditor as per the AnaCredit definition. *Womenpart* is the ratio of female participation in the workforce at the country level. Banks' corporate governance variables, balance-sheet controls, ESG indicators and firm-level characteristics are included. For more details on the variables' construction and sources, refer to Table 2. ILS indicates industry*location*size fixed-effects. All variables are winsorized at the 1st and 99th percentiles. Robust standard errors clustered at the bank or the bank-firm level are reported in parentheses. ***p<.01, **p<.05, *p< .1.

VARIABLES	(1) Board Female	(2) Lending	(3) Lending
Womenpart	0.2857***		
	(0.0007)		
Fitted_Board_female		0.1821	0.1710
		(0.1204)	(0.1265)
GHGTot			0.0001***
			(0.0000)
Fitted_Board_female*GHGTot		-0.0001**	-0.0002***
		(0.0000)	(0.0000)
L.TotAss	-2.7976***	0.1428***	0.1101**
	(0.040)	(0.0420)	(0.0431)
L.Dep_tl	-0.5251***	0.0094**	0.0086*
	(0.0005)	(0.0039)	(0.0048)
L.NPL_r	0.0267***	0.0045	0.0040
	(0.0002)	(0.0057)	(0.0043)
L.ROA	1.3490***	-0.3783***	-0.1513
	(0.064)	(0.1115)	(0.1086)
L.Cash_ta	0.01115***	-0.0342***	-0.0194**
	(0.007)	(0.0119)	(0.0092)
L.Fees_opInc	0.0429***	0.0083**	0.0058
	(0.002)	(0.0036)	(0.0055)
L.CET1_r	0.4078***	0.0226	0.0165
	(0.009)	(0.0186)	(0.0180)
L.ESGscore	0.1372***	0.0012	0.0174
	(0.001)	(0.0021)	(0.0187)
L.ESGcontroversies	0.0953***	0.0038***	0.0307***
	(0.001)	(0.0011)	(0.001)
L.Firm_ta			0.58433***
			(0.022)
L.Firm_cash			0.00058***
			(0.000)
L.Firm_debt			0.00770***
			(0.000)
L.Firm_ROA			0.00520***
			(0.001)
L.Firm_WC			-0.00005
			(0.000)
L.Firm_gearing			0.00030***
			(0.000)
Loan_provisions			0.06463
			(0.069)
L.Board_size	-14.2913***	0.8087***	0.62695***
	(0.250)	(0.1702)	(0.165)
L.CSR_comp	12.9715***	-0.1552***	-0.12515***
	(0.206)	(0.0494)	(0.042)
L.Board_tenure	-1.7900***	0.0383***	0.01980
	(0.0098)	(0.0140)	(0.016)
L.Ind_board	-0.2633	0.0040	0.00363*
	(0.0036)	(0.0140)	(0.002)
Observations	1,853,303	607,445	910,895
Firm FE		Yes	No
ILS FE		No	Yes
Kleibergen-Paap rk LM statistic	42.576		
Cragg-Donald Wald F-statistic	1.1e+05		
Stock-Yogo weak ID test critical values at 10% IV size	16.87		
Cluster	Bank	Bank-firm	Bank-firm

Table 7. Sample selection bias: Large exposures and transition effects

This table reports the results for the regression analysis that considers the large exposure dataset. *Lending*, the dependent variable, is the logarithm of the outstanding amount indebted by a debtor to a creditor as per the AnaCredit definition. The *male-to-female* variable accounts for the replacement, over time, of male directors by female directors. Banks' corporate governance variables and balance-sheet controls are included. For more details on the variables' construction and sources, refer to Table 2. All variables are winsorized at the 1st and 99th percentiles. Robust standard errors clustered at the bank level. ∗∗∗p <.01, ∗∗p< .05, ∗p< .1.

	(1)	(2)	(3)	(4)
VARIABLES	Lending	Lending	Lending	Lending
Board_female	0.0223	0.0994		
	(0.078)	(0.084)		
Male-to-Female			0.1831**	0.1852***
			(0.075)	(0.066)
Board_female*GHG12	-0.0004**	-0.0004***		
	(0.000)	(0.000)		
Male-to-Female*GHG12			-0.0003**	-0.0003**
			(0.000)	(0.000)
TotAss	0.5865***	0.5725***	-0.4768	-0.5259
	(0.096)	(0.087)	(0.434)	(0.597)
Dep_tl	0.0072	0.0063	-0.0233	-0.0265
	(0.008)	(0.009)	(0.017)	(0.0203)
NPL_r	0.0278	0.0297	0.0442**	0.0582**
	(0.036)	(0.035)	(0.019)	(0.026)
ROA	0.0757	0.0143	-0.1394	-0.1477
	(0.201)	(0.221)	(0.113)	(0.102)
Cash_ta	-0.0056	-0.0157	-0.0381	-0.0381*
	(0.022)	(0.021)	(0.022)	(0.020)
CET1_r	-0.0129	-0.0067	0.0665***	0.0620***
	(0.0338)	(0.0291)	(0.021)	(0.019)
Observations	2,270	2,270	2,263	2,263
R-squared	0.426	0.430	0.460	0.471
Firm*time FE	Yes	Yes	Yes	Yes
Bank FE	No	No	Yes	Yes
Governance controls	No	Yes	No	Yes
N.Banks	40	40	33	33
N.Firms	124	124	123	123
Cluster	Bank-firm	Bank-firm	Bank-firm	Bank-firm

Appendix A

Figure A1. Firm size and GHG relative emissions by NACE industry code
This figure displays the relationship between the average firm total assets (y-axis) and the average GHG total emissions to revenues by the 2-digit NACE industry code.

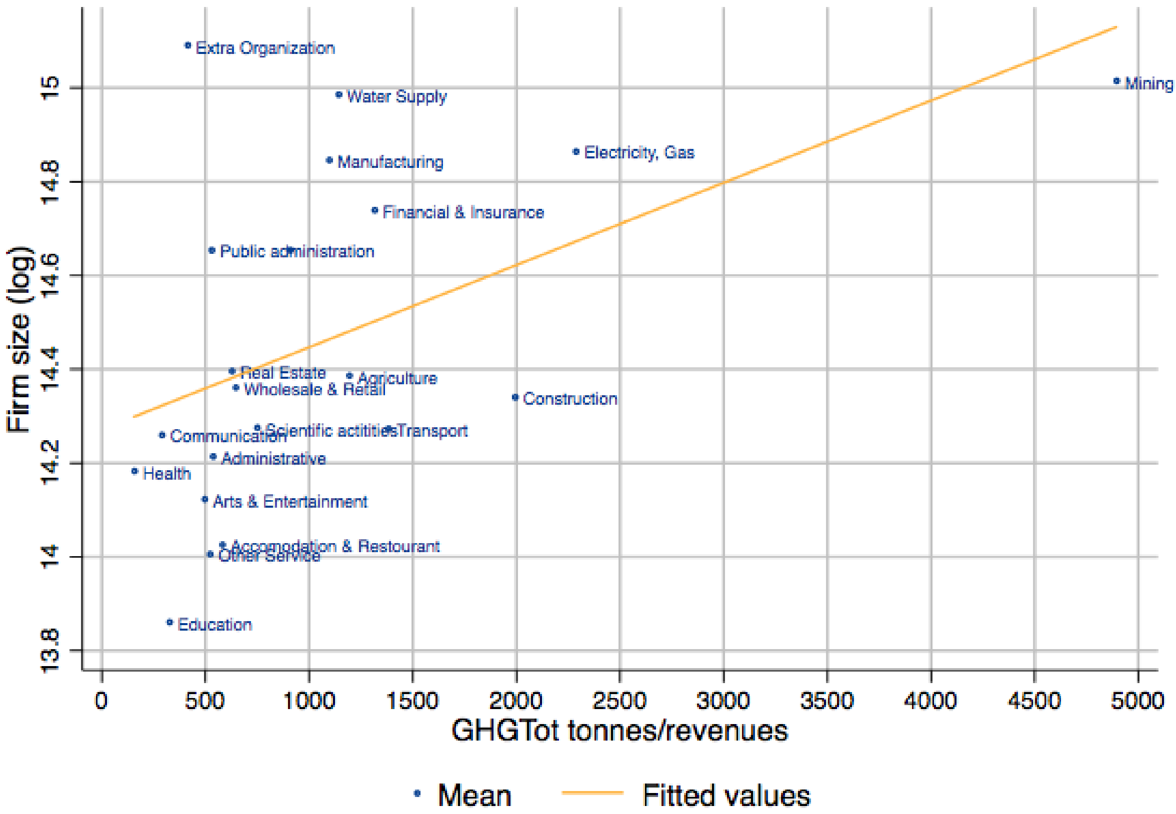


Table A1. Baseline results using alternative threshold values

This table reports the results of the baseline regression model specification by using alternative threshold values. *Lending*, the dependent variable, is the logarithm of the outstanding amount indebted by a debtor to a creditor as per the AnaCredit definition. Banks' corporate governance variables, balance-sheet controls, ESG indicators and firm-level characteristics are included. For more details on the variables' construction and sources, refer to Table 2. ILS indicates industry*location*size fixed-effects. All variables are winsorized at the 1st and 99th percentiles. Robust standard errors clustered at the bank-firm level are reported in parentheses. ∗∗∗p<.01, ∗∗p< .05, ∗p< .1.

VARIABLES	(1) Lending (90th perc)	(2) Lending (90th perc)	(3) Lending (75th perc)	(4) Lending (75th perc)	(5) Lending (66th perc)	(6) Lending (66th perc)	(7) Lending (50th perc)	(8) Lending (50th perc)
Board_female	0.0234	0.0422	0.0234	0.0422	0.0067	0.0433	0.0427	0.0602
	(0.086)	(0.061)	(0.087)	(0.062)	(0.273)	(0.282)	(0.060)	(0.041)
GHGTot		0.00003***		0.00004***		0.00002***		0.00003**
		(0.000)		(0.000)		(0.000)		
Board_female*GHGTot	-0.0001**	-0.0003***	-0.00002**	-0.00004***	-0.00001*	-0.00001*	-0.0000	-0.0000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	607,445	910,895	607,445	910,895	607,445	910,895	607,445	910,895
R-squared	0.7329	0.6341	0.7329	0.6341	0.7329	0.6340	0.7330	0.6341
Firm FE	Yes	No	Yes	No	Yes	No	Yes	No
ILS FE	No	Yes	No	Yes	No	Yes	No	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Governance controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm controls	Absorbed	Yes	Absorbed	Yes	Absorbed	Yes	Absorbed	Yes
N.Banks	52	52	52	52	52	52	52	52
N.Firms	236,478	539,928	236,478	539,928	236,478	539,928	236,478	539,928
Cluster	Bank-firm	Bank-firm	Bank-firm	Bank-firm	Bank-firm	Bank-firm	Bank-firm	Bank-firm

Table A2. Descriptive statistics for the dataset on the large exposures

	(1) Mean	(2) SD
Lending (log)	18.378	1.63
Lending (€ml)	269	462
GHG12 (tonnes)	17,300,000	34,600,000
GHG12 (tonnes/millions)	230.81	451.87
Board_size (log)	27.65	0.67
TotAss (€bn)	1141.08	520.55
Dep_tl (%)	61.06	12.10
ROA (%)	0.31	0.38
Cash_ta (%)	7.09	3.81
NPL_r (%)	4.47	3.73
CET1_r (%)	12.10	1.56
Female_board (%)	35.95	9.95
Board_size (level)	15.84	3.59
CSR_comp (%)	0.44	0.50
Board_tenure	5.92	2.18
Observations	2417	

Table A3. Baseline results with the inclusion of the dummy SBTi

This table reports the results of the baseline regression that accounts for banks with a greater climate agenda. *Lending*, the dependent variable, is the logarithm of the outstanding amount indebted by a debtor to a creditor as per the AnaCredit definition. Banks' corporate governance variables, balance-sheet controls, ESG indicators and firm-level characteristics are included. For more details on the variables' construction and sources, refer to Table 2. ILS indicates industry*location*size fixed-effects. All variables are winsorized at the 1st and 99th percentiles. Robust standard errors clustered at the bank-firm level are reported in parentheses. *** p<.01, ** p<.05, * p<.1.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Lending	Lending	Lending	Lending	Lending	Lending
Board_female	0.01517	0.0539	0.01742	0.02339	0.00802	0.02579
	(0.084)	(0.088)	(0.084)	(0.057)	(0.062)	(0.057)
GHGTot				0.00003***		
				(0.000)		
GHG12					0.00014***	
					(0.000)	
GHG3						0.00004***
						(0.000)
Board_female*GHGTot	-0.00001**			-0.00003***		
	(0.000)			(0.000)		
Board_female*GHG12		-0.00003**			-0.00022***	
		(0.000)			(0.000)	
Board_female*GHG3			-0.00002**			-0.00004***
			(0.000)			(0.000)
L.TotAss	0.13527***	0.13550***	0.13527***	0.06570	0.06568	0.06576
	(0.043)	(0.043)	(0.043)	(0.048)	(0.048)	(0.048)
L.Dep_tl	0.00952**	0.00952**	0.00952**	0.00504	0.00502	0.00504
	(0.006)	(0.003)	(0.003)	(0.005)	(0.005)	(0.005)
L.NPL_r	0.00190	0.00194	0.00189	-0.00126	0.00126	0.00125
	(0.006)	(0.006)	(0.006)	(0.004)	(0.004)	(0.004)
L.ROA	-0.41060***	-0.41085***	-0.41064***	-0.35184***	-0.35205***	-0.35180**
	(0.105)	(0.105)	(0.105)	(0.112)	(0.112)	(0.112)
L.Cash_ta	-0.0419***	-0.04140***	-0.04150***	-0.03811***	-0.035205***	-0.035180***
	(0.014)	(0.014)	(0.014)	(0.010)	(0.010)	(0.010)
L.Fees_opinc	0.00589**	0.00590**	0.00588**	0.00318	0.00317	0.00318
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
L.CET1_r	0.03949*	0.03932*	0.03952*	0.05475***	0.05466***	0.05477***
	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)
L.ESGscore	0.00261	0.00258	0.00261	0.00454**	0.00452**	0.00454**
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
L.ESGcontroversies	0.00318***	0.00319***	0.00318***	0.00206**	0.00207**	0.00206**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
L.Stakeholders	-0.28876	-0.28812	-0.28869	-0.43447**	-0.43490**	-0.43421**
	(0.213)	(0.213)	(0.213)	(0.166)	(0.166)	(0.166)
L.Firm_ta				0.58418***	0.58432***	0.58422***
				(0.022)	(0.022)	(0.022)
L.Firm_cash				0.00056***	0.00056***	0.00056***
				(0.000)	(0.000)	(0.000)
L.Firm_debt				0.00771***	0.00770***	0.00771***
				(0.000)	(0.000)	(0.000)
L.Firm_ROA				0.00520***	0.00519***	0.00520***
				(0.000)	(0.000)	(0.000)
L.Firm_WC				-0.00004	-0.00004	-0.00004
				(0.000)	(0.000)	(0.000)
L.Firm_gearing				0.00031***	0.00031***	0.00031***
				(0.000)	(0.000)	(0.000)
Loan_provisions				0.06737	0.06726	0.06738
				(0.068)	(0.068)	(0.068)
L.Board_size	0.85122***	0.85076***	0.85115***	0.73404***	0.73450***	0.73384***
	(0.186)	(0.186)	(0.186)	(0.170)	(0.170)	(0.170)
L.CSR_comp	-0.14932***	-0.14924***	-0.14930***	-0.12800***	-0.12817***	-0.12792***
	(0.047)	(0.047)	(0.047)	(0.043)	(0.043)	(0.043)
L.Board_tenure	0.03690***	0.03693***	0.03691***	0.02312	0.02307	0.02314
	(0.012)	(0.012)	(0.012)	(0.015)	(0.015)	(0.015)
L.Ind_board	0.00339	0.00340	0.00339	0.00371*	0.00373*	0.00371*
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
SBTi	0.07976*	0.07945	0.07980*	0.11014***	0.10999***	0.11014***
	(0.047)	(0.047)	(0.047)	(0.0397)	(0.0397)	(0.0397)
Observations	607,445	607,445	607,445	910,895	910,895	910,895
R-squared	0.7331	0.7331	0.7331	0.6344	0.6343	0.6344
Firm FE	Yes	Yes	Yes	No	No	No
ILS FE	No	No	No	Yes	Yes	Yes
N.Banks	52	52	52	52	52	52
N.Firms	236,478	236,478	236,478	539,928	539,928	539,928
Cluster	Bank-firm	Bank-firm	Bank-firm	Bank-firm	Bank-firm	Bank-firm

Acknowledgements

We thank two anonymous referees for very useful comments and suggestions. We are also indebted to comments received from colleagues in the Directorate General Macroprudential Policy and Financial Stability of the European Central Bank (ECB) and Monetary and Economic Department of the Bank for International Settlements (BIS). We also thank participants at the: ALTIS Graduate School Business and Society - Università Cattolica del Sacro Cuore; Centre for Responsible Banking Finance (CRBF) – University of St.Andrews, School of Management; Essex Finance Centre (EfiC) Research Seminar – Essex Business School; 2022 International Finance and Banking Society (IFABS) conference – University of Naples Federico II; Strathclyde Business School – research seminar series; Sustainable Finance and Governance conference – University of Bath; 11th Financial Engineering Banking Society (FEBS) conference – Climate change, Regulatory Responses and Sustainable Finance; University of Technology Sydney research seminar; University of Sydney research seminar; University of New South Wales research seminar; 2022 European Economic Association (EEA); 2022 Wolpertinger conference for very useful comments.
This paper should not be reported as representing the views of neither the ECB nor the BIS. The views expressed are those of the authors and do not necessarily reflect those of the ECB and/or BIS.

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PDF ISBN 978-92-899-5389-4 ISSN 1725-2806 doi:10.2866/530595 QB-AR-22-106-EN-N