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Abstract

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JEL Classification: G21, G32, M14

Keywords: Green Loans, Sustainability Linked Loans, Environmental, Social, and Governance (ESG) Performance, Sustainable Finance

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Green versus sustainable loans: The impact on firms' ESG performance *

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1 Introduction

Sustainable finance refers to a growing field in the financial services industry integrating environmental, social, and governance (ESG) considerations into investment decisions (European Commission, 2020a). Early concerns regarding the effect of climate change on the world economy and the key arguments for determined actions against it were discussed in Stern (2006), which reveals the effect of global warming by providing estimates of the economic losses based on a cost-benefit analysis. Initial steps against climate change were made by the Paris Agreement within the United Nations (United Nations Framework Convention on Climate Change, 2015). This legally binding treaty aims to achieve the common goal of limiting global warming and adapting to its effects by implementing economic and social transformation. A key moment was the release of the European Commission's Action Plan on Sustainable Finance outlining ten reforms aimed at stimulating sustainable investing, inducing sustainability into risk management, and promoting transparency and long-term considerations in financial and economic activities (Principles for Responsible Investment, 2018). New regulations following the Action Plan include the development of a uniform green finance taxonomy (Regulation (EU) 2020/852) as well as precise disclosure requirements on climate-related information (Regulation (EU) 2019/2088). Next to the regulatory developments in the area of sustainability, the political pressure by green parties has been increasing – pleading for adequate climate change response and supporting the social justice and the civil rights (The Guardian, 2019).

On the market side, investors are rethinking their strategies and are actively employing ESG-oriented approaches. According to a survey by the European Leveraged Finance Association from 2019, more than 70% of the responding credit managers conveyed that they have to consider ESG factors in their investment strategies due to increased investor pressure (LoanlyPlanet, 2020). Moreover, key players on the market have been pulling back investments on environmentally dubious projects. For instance, the European Investment Bank has introduced a new energy lending policy banning fossil-fuel financing (European

Investment Bank, 2019). Central banks are also recognizing the impact of climate change on financial stability. The European Central Bank has recently announced its decision to invest in Bank for International Settlements' green bond fund rendering a contribution to the world's efforts against climate change (European Central Bank, 2021).

The increased focus on sustainable finance in recent years driven by political movements, investor demand, and regulatory changes has led to the development of a new green market offering sustainable debt that has marked a compound global growth of 61% in the years between 2013 and 2020 (Bloomberg, 2021). The green bond market is, up until now, the most popular and relatively mature one – in 2020, it marked a 13% growth compared to 2019. On the other side, green lending instruments, i.e., "green loans", earmarked for green projects, and sustainability linked-loans, henceforth "sustainable loans", bench-marked by ESG criteria, have recently become globally recognized. Green loans are similar to green bonds in the sense that their proceeds should be entirely used to finance green projects. To this extent, the Green Loan Principles, published by the Loan Market Association in March 2018, provide guidelines on which projects are eligible to be classified as "green" (Loan Market Association, 2018). For instance, in January 2020, the Swedish property company Wallenstam obtained a green loan of 258 million dollars to finance a project on the creation of "nearly zero-energy buildings" (LoanlyPlanet, 2020). In contrast to green loans, sustainable loans do not have any restrictions on the use of proceeds, i.e., financing could be utilized for general corporate needs. A defining factor here is the borrower's performance against predefined ESG criteria, which usually impacts the loan pricing (Loan Market Association, 2019). This contingency aims to incentivize borrowers to improve their sustainability performance. The Sustainability Linked Loan Principles were issued in 2019 by the Loan Market Association and outline the sustainability performance targets that allow the assessment of a borrower's sustainability profile (Loan Market Association, 2019). For example, Great Portland Estates, a UK based property development and investment company, has issued a revolving debt of 450 million pounds in February 2020 with a margin linked to its ESG per-

formance, such as portfolio energy intensity, i.e., targeting the reduction of CO_2 emissions. Other sustainability performance targets linked to loan interest rates might be: Improving the company's ESG rating, achieving predefined corporate social responsibility targets, increasing the female proportion in management positions, or reducing the incident and sick rates at the workplace (LoanlyPlanet, 2019). Hence, sustainable loans are available not only to firms active within green industries but also to a broader scope of companies; thus, they represent both a suitable (partial) substitute and complement to green loans (Nordea, 2020).

The market for green and sustainable loans has emerged due to the increasing environmental and sustainability awareness of companies and investors as well as regulatory requirements targeting climate risks and aiming at the transition to a low-carbon economy (Linklaters, 2019). On the one hand, the Green Loan Principles outline the particular importance of the use of proceeds and the eligibility of green projects to accomplish an efficient contribution to environmental sustainability. On the other hand, according to the Sustainability Linked Loan Principles, sustainable loans are related to the achievement of ambitious sustainability performance targets yielding a positive impact on firms' sustainability profile and development. Although they have been implemented to provide the best practice principles for the green and sustainable loan market, there is still a risk of "greenwashing" and, in the case of sustainable loans, "sustainability washing" (Lexology, 2020). It remains an open question whether these newly emerged financial instruments accomplish their purpose or if their popularity in recent years has been misleading and inflated, which would require more attention by regulators. This paper examines the effectiveness of green and sustainable loans in terms of their impact on the firms' ESG profile to address this concern. More specifically, it sheds light on how firms' ESG performance, measured by their different ESG scores, evolves following the issuance of green and sustainable loans, and whether these financial instruments positively impact firms' environmental and sustainability profiles.

The main hypothesis of our study is that firms issuing these types of loans are expected to improve their ESG profiles. Furthermore, it is expected that the link between sustainable

loans and ESG scores would be more pronounced due to their pricing being dependent on the borrower's performance against predetermined ESG criteria. On the other hand, green loans are expected to affect mainly the environmental dimension of the ESG score as a consequence of their design that the proceeds are explicitly used to finance green projects. We expect that focusing on one dimension of the ESG score might create externalities as firms might concentrate exclusively on their environmental performance and neglect their social or governance performance.

Our analysis begins by documenting salient features of the green lending market. We analyse the complete sample of green and sustainable loans issued by European firms in the period between 2014 and 2019. The loan data is downloaded from Bloomberg's fixed income database. We show that the green lending market in Europe has been growing tremendously in the last years. The total volume issued in each year have increased from 25.2 billion euros in 2014 to 93.8 billion euros in 2019, which implies a growth rate of 272%. The aggregate volume of sustainable loans issued by European firms is almost 128 billion euros whereas the green loans represent 100 billion euros. Although only 24% of the green loans are used for refinancing purposes, almost 57% of sustainable loans are utilized for refinancing general corporate needs. Not surprisingly, the majority of green loans are issued in the energy sector; this is similar to green bond issuance (Flammer, 2021). In contrast, sustainable loans are issued by firms operating in the industrial sector – transportation and logistics, machinery manufacturing, etc. Among the countries in Europe, United Kingdom has the largest green loan issuance, whereas France is the largest in terms sustainable loan volume.

We subsequently present an overview of European firms' ESG scores between 2010 and 2019, which is collected from Thomson Reuters' Refinitiv Eikon. Firms from the United Kingdom appear to lead in ESG reporting, which is followed by those from Germany and France. ESG-reporting firms have increased significantly over the years reaching 1,766 European firms in 2019. The average ESG score follows a relatively stable upward trend reaching a peak of 52.8 in 2017 from 48.7 in 2010, followed by a 5% decrease to 50.4 in 2018. However,

in 2019, it rebounds up to an average of 51.9. The upward trend mainly comes from the social score increasing from 48.6 in 2010 to 56.8 in 2019, whereas the environmental and the governance scores did not change much over the sample period.

After matching green and sustainable loans to their issuers' ESG scores, we continue with estimating the overall impact of green borrowing on firms' ESG behavior. According to our results, firms' ESG performance evolves differently after a green loan issuance compared to a sustainable loan issuance. We find that firms issuing more green loans shrink their environmental emissions in the long term. According to our results, a one standard deviation increase in the volume of green loans relative to the firm size results in a 4.2 points (8%) increase in the emissions reduction score. However, there is a possible negative externality of green loans: Firms' social performance deteriorates following the issuance of green loans in the long term. Firms experience a 3.4 points (6.3%) decrease in their social score with a one standard deviation increase in the volume of green loans relative to the firm size. This comes from a significant decrease in the scores of the following subcategories: Community score (by 16%), product responsibility score (by 13%), and human rights score (by 10%). These findings indicate that green loan issuers prioritize their environmental goals, while they disregard their social performance. As a result, their overall ESG performance does not improve following the issuance of green loans.

Our results on sustainable loans, on the other hand, suggest that the incentive mechanism of this type of loans is more effective. Following the issuance of sustainable loans, firms improve their overall ESG performance in the long term by increasing their environmental and governance scores. We find that a one standard deviation increase in the volume of sustainable loans relative to the firm size increases the overall ESG score by 5.8 points (11.2%), where the environmental score increases by 5.3 points (11.2%) and the governance score increases by 11.2 points (22.2%). The increase in the environmental performance is driven by an increase in firms' resource use score, whereas the increase in the governance performance is driven by an increase in the CSR strategy score. These findings imply that,

following the issuance of a sustainable loan, firms tend to implement eco-friendly solutions and also consider environmental and social factors in their business activities.

Overall, the issuance of a sustainable loan appears to indicate subsequent improvements in the firms' ESG performance consistent with the signaling theory discussed in Flammer (2021). However, issuing green loans cannot be interpreted as a clear signal on firms' ESG outlook. This could be attributed to the specific design of each debt instrument. While green loans aim to increase investments in environmentally beneficial projects, sustainable loans do not target firms' environmental performance in particular but, instead, focus on the overall sustainability profile. As a result, following the issuance of green loans, firms focus on their green projects and improve their environmental performance, while their social performance deteriorates. On the other hand, issuing sustainable loans increases the overall ESG performance.

Related Literature: Our paper contributes to the growing literature that studies the effectiveness of green financial products and their impact on the firms' ESG performance (see, e.g., Flammer, 2020; Fatica and Panzica, 2021; Flammer, 2021; Kim et al., 2022). Since green lending is relatively new, the research on the topic is scarce. We are aware of one paper, Kim et al. (2022), that studies the ESG-linked loans with a focus on loan pricing, stock market reactions, and firms' ESG performance. According to their results, the stock market reacts positively after the issuance of the loans only when there is enough information about the ESG content of the loan. Regarding the ESG performance, they focus solely on the environmental performance of firms and document a deterioration in the ESG performance for borrowers with low quality disclosures, whereas the ESG performance does not change for borrowers with high quality disclosures. The main distinction of our analysis is our focus on both green and sustainable loans as well as the integration of all three pillars of the ESG score with all subcategories, which enables us to comment on the social and the governance performance as well. This is particularly important for sustainable loans given that their proceeds do not have to be utilized in green projects. Moreover, our analysis

distinguishes between short- and long-term effects, which yields important insights on how the ESG performance evolves over time following the issuance.

The rest of the literature that examines green financial products focuses on green bonds. Papers that examine the impact of green bond issuances on firms' ESG outcomes tend to focus on individual ESG criteria such as environmental performance. Flammer (2021) examines the effectiveness of green bond issuances towards improving firms' environmental performance proxied by their CO_2 emissions and the environmental score from Thomson Reuters' ASSET4 database. The results show a statistically significant reduction in CO_2 emissions and an improved environmental score, especially in the long term. In another study, Flammer (2020) shows that the long-term improvement in environmental performance is significant only for certified green bonds. These findings suggest that independent third-party certification serves as a governance regime in the green bond market. The study by Fatica and Panzica (2021) supports the notion that external review of green financial instruments may play an essential role in achieving the aims of the Paris Agreement. They extend the research of Flammer (2021) by looking at the total and direct CO_2 emissions to overcome measurement errors affecting their results. Interestingly, they find more substantial evidence for the impact, especially for green bonds which are utilized for new projects. The study shows that green bonds that are used to refinance existing green projects do not materially impact firms' environmental performance. Taken all together, the findings in the literature so far suggest that green bonds, especially externally certified ones, appear to be effective at improving firms' environmental performance.

Several papers study the pricing of green bonds by examining whether investors are willing to trade off financial returns to invest in environmentally friendly projects. However, the results on green bond pricing are ambiguous. On the one hand, there is evidence of a pricing difference between conventional and green bonds. Some papers show that green bonds are priced at a premium compared to traditional bonds (see, e.g., Baker et al., 2018; Gianfrate and Peri, 2019; Kapraun et al., 2021), while others point out a green bond discount, i.e.,

green bonds are priced less favorably than brown bonds (see, e.g., Karpf and Mandel, 2017). On the other hand, further evidence in the context of the government securities market and the corporate green bond market shows that the pricing of green and conventional bonds at issue is economically identical (Larcker and Watts, 2019; Flammer, 2021).

Another strand of the literature focuses on the impact of a green bond issuance on firms' financial performance. This literature focuses on firms' stock market performance or their risk taking. Flammer (2021) employs an event study methodology to examine the stock market reaction to the announcement of green bond issuances. The results point to an increase in the cumulative abnormal return in the time window around the announcement. Hence, similarly to the signalling theory, green bond issuance is taken positively by investors as it may convey information on the company's commitment to the environment. In another study, Flammer (2020) documents a positive and statistically significant effect of green bonds on firms' return on assets (ROA) and their return on equity (ROE) in the long term. The results are consistent with the previous findings on companies' financial benefits from implementing Corporate Social Responsibility (CSR) strategies. Specifically, there is evidence of an increase in shareholder value after the adoption of CSR proposals (Flammer, 2015). To this extent, Huang (2021) undertakes a comprehensive review of the literature on the topic and argues that the overall empirical evidence reveals a positive link between the ESG performance and the corporate financial performance. However, the positive impact is less likely to be solely due to the ESG involvement but should be considered with firms' overall business activity.

Our paper complements the literature on green bonds by documenting evidence on the effectiveness of green and sustainable loans with respect to firms' ESG performance. One important distinction of our paper is that we do not focus only on the environmental performance, but instead take a more holistic view on firms' ESG performance by examining the evolution of the overall ESG profile with its three pillars, environmental, social, and governance, and all of the subcategories. This allows us to analyze the key differences be-

tween green and sustainable loans and distinguish their impact on firms' ESG performance. As a result, we can investigate whether they achieve their objectives, which is crucial for the success of the regulatory initiatives aiming at stimulating sustainable economic activity. We find that green loans motivate firms to shrink their environmental emissions; however, their social performance deteriorates. This indicates that they prioritize their environmental goals, yet neglect their commitment towards their clients and the society. Sustainable loans, on the other hand, incentivize firms to improve their ESG performance by increasing their environmental and governance scores. Our results imply that sustainable loans might be a more efficient instrument to enhance firms' overall ESG performance.

The rest of the paper is organized as follows. Section 2 introduces the data. Section 3 presents the empirical methodology and Section 4 exhibits main empirical results. Section 5 shows the robustness checks, and Section 6 concludes.

2 Data

2.1 Green and sustainable loans

The loan data are extracted from Bloomberg's global syndicated loan database and consists of more than 250,000 active loan tranches as well as replaced or retired loans. Bloomberg's loan database consists of green loans as well as sustainable loans aligned with the principles set by the Loan Market Association (BloombergNEF, 2020). Bloomberg's green loan indicator is implemented to identify green loans from the fixed income universe – indicating whether the loan proceeds are linked to green projects or activities. The sustainability linked loan indicator is used to compile the data – specifying whether the loan terms correspond to the company's performance relative to predetermined sustainability targets aiming to enhance its sustainability profile. The original loan sample employed in this study consists of 900 green loans and 211 sustainable loans issued by firms headquartered in Europe in the period from January 1, 2014, to December 31, 2019. We focus on the time period until

the end of 2019 to avoid including any confounding effects of the COVID-19 pandemic on banks' loan supply and firms' loan demand. Furthermore, as in Flammer (2021), government and sovereign loans are not considered in the sample as they are not traditional corporations. For each syndicated loan, information on its original deal amount, green loan or sustainable loan tranche size, use of proceeds, and maturity is obtained.

Table 1 displays the volume of green and sustainable loans in the years between 2014 and 2019. It shows a clear positive trend in the number of both green and sustainable loans, more pronounced for green loans. In 2014, the total issuance of green loans amounted to 4.3 billion euros (62 loans) compared to 20.9 billion euros (16 loans) total issuance of sustainable loans. In 2019, 28.8 billion euros in green loans (240 loans) were issued, which indicates more than 574% increase from 2014. Sustainable loans, on the other hand, grew by 225% to almost 65 billion euros (109 loans) in 2019 compared to 2014. The large growth rates are not surprising considering that the green lending market is not mature yet (Bloomberg, 2021). Although the number of sustainable loans is relatively lower than green loans, their volumes are much higher. The aggregate volume of sustainable loans exceeds 127.7 billion euros for the sample period, which is around 28% higher than the aggregate green loan volume (100 billion euros).

Table 2 provides an overview of green and sustainable loans by industry defined according to the Bloomberg Industry Classification Standard. Not surprisingly, the majority of green loans are utilized in the energy sector. Similarly to green bonds as outlined by Flammer (2021), they are most popular in environmentally sensitive industries, i.e. where the environment is central for firms' businesses. In contrast, sustainable loans are issued mainly by firms operating in the industrial sector (e.g., transportation and logistics, machinery manufacturing). As the use of proceeds does not define sustainable loans, firms tend to utilize them in their businesses that are not necessarily concentrated in sectors in which the environment is a leading factor.

By examining loans' aggregate volumes, Panel A of Table 3 reveals that the United Kingdom, followed by Spain and Germany, are the largest green loan issuers. Turning to

sustainable loans, Panel B shows that France, followed by Spain and the United Kingdom, have issued the most significant volumes during the sample period.

Table 4 reports the use of proceeds for both types of loans. According to the data, 68% of green loans are utilized to finance new green projects as per definition, whereas 24% for refinancing existing green projects. In contrast, 57% of sustainable loans are used for refinancing purposes, most of which refinance general corporate needs. The reported statistics on the loans' use of proceeds correspond to the guidelines for green loans set out in the Green Loan Principles and the characteristics of sustainable loans described in the Sustainability Linked Loan Principles. Furthermore, the analysis reveals that sustainable loans are more flexible financial instruments that are better tailored to different organizational needs and more comprehensive sustainability strategies (Nordea, 2020). This observation also sheds light on their particular popularity in recent years.

2.2 Firm-level data

Among academics and researchers, the ESG scores from Thomson Reuters' Refinitiv Eikon have been frequently used for analyzing sustainable practices of firms, including its evolution after green bond issuances (see, e.g., Berg et al., 2019; Drempetic et al., 2020; Fatica and Panzica, 2021; Flammer, 2021; Aevoae et al., 2022).[1] We follow the literature and use annual ESG data obtained from Thomson Reuters' Refinitiv Eikon database. The database provides information on various environmental, social, and governance factors for around 9,000 firms globally, out of which over 1,700 firms are located in Europe. Refinitiv

[1]There exists no unique definition of firms' ESG performance. To this extent, rating agencies play a crucial role by gathering and interpreting non-financial information on firms and employing ESG criteria to study and evaluate the companies' sustainability and environmental profiles (Escrig-Olmedo et al., 2010; Del Giudice and Rigamonti, 2020). In general, ESG rating agencies use their own calculation methodologies based on surveys and publicly available information to develop firms' ESG scores (Escrig-Olmedo et al., 2010). The popularity and importance of ESG rating agencies have surged since the financial crisis in 2008 due to the growing importance of ESG risks as well as the increase in sustainable and socially responsible investments (see, e.g., Escrig-Olmedo et al., 2019; SustainAbility, 2020). Subsequently, the ESG rating industry has undergone consolidation and developed a more comprehensive ESG expertise (Escrig-Olmedo et al., 2019). In recent years, even traditional credit rating agencies such as S&P Global and Moody's have made an entrance into the ESG marketplace. Hence, the ESG scoring system has rapidly expanded and become multifaceted (SustainAbility, 2020).

Eikon's ESG scores are annual according to firms' ESG reporting. Furthermore, the data is recalculated on a weekly basis based on newly available ESG information and controversies as well as essential changes in the disclosure or corporate structure of firms during the year. Scores older than five years are considered definitive for the whole historical period and remain unaltered (Refinitiv, 2021). To this extent, the database maintains an up-to-date universe of ESG scores based on publicly available company data. Hence, the availability of ESG ratings heavily depends on corporate reporting. Nevertheless, ESG disclosure is still in its development phase. Since there is no mandatory requirement on the ESG reporting or the content and the structure of the disclosed information, firms have the discretion to decide themselves which non-financial information to make publicly available (Berg et al., 2019). There is a particular lack of regularly disclosed information on green projects (Fatica and Panzica, 2021), which provides the main reason why the sample of ESG-rated firms from Refinitiv Eikon does not cover all green lending issuers.

The score calculation is based on a set of over 500 different company-level ESG metrics. The information on each measure is prudently analyzed and standardized to ensure that ESG scores are objective and comparable across the entire set of firms. The ESG score ranges between 0 and 100, with 100 being the maximum. After calculating the company-level ESG metrics, the process continues by reorganizing these measures into ten categories which build up the three main ESG pillars – environmental, social, and governance pillar scores. Category weights are subsequently determined for each ESG topic according to its importance and assigned to an ESG materiality matrix that identifies individual score's critical points. For the environmental and the social pillar scores, each subscore weight differs according to the company's industry, whereas country benchmarks are applied to the subscores underlying the governance pillar. The ESG pillar scores are determined as the relative sum of the category weights. The overall ESG score is equal to the sum of all subscores multiplied by their category weights. Furthermore, the ESG controversies score calculation considers 23 ESG controversy themes disclosed in the market or the media, which have a reflection on

the score. Finally, the ESG combined score accounts for any negative news in firms' overall ESG performance score. The exact definition of each score can be found in Table 5.

Overall, the data from Refinitiv Eikon covers 1,766 European firms with ESG scores in 2019. Table 6 summarizes the ESG reporting firms across economic sectors and countries. Sectors are defined according to the Refinitiv Eikon's economic sector description. Firms from the United Kingdom, followed by those from Germany and France, appear to lead in ESG reporting. In the current sample, the industrial sector leads with around 19% of the firms classified to it, followed by the financial sector with 17%, while the firms in the academic and educational services as well as utilities tend to have very limited ESG-reporting.

The number of European ESG-reporting firms included in Refinitiv Eikon's database has increased over time implying that firms have disclosed more ESG information in recent years. Figure 1 depicts the development of the average ESG score as well as its three pillars over the sample period. The average ESG score follows a relatively stable upward trend reaching a peak of 52.8 in 2017, followed by a 5% decrease in 2018. However, in 2019 it rebounds to an average of 51.9. The average governance score development has been relatively flat around 49. Since 2012, the social pillar score has been on average higher than the environmental and the governance scores, and it had a steady growth up to 2017. The average environmental pillar score, on the other hand, develops at a lower rate relative to the social score until 2017, followed by a substantial drop in 2018 from 47.3 to 42.9. One possible explanation for the break in the upward trend in 2018 might be the regulatory changes in this period. The 2018 update of the EU Action Plan strategies emphasized the need for a taxonomy classifying environmentally sustainable economic activities (European Commission, 2020b). To this extent, in 2018, the European Commission issued a proposal for the development of the EU taxonomy and introduced a Technical Expert Group on sustainable finance to achieve the EU's climate and energy goals for 2030 (European Commission, 2020c). Moreover, the Green Loan Principles and the Green Bond Principles providing guidelines for the eligibility of green projects were also published in 2018. Overall, ESG activities have come under

increased scrutiny, which might have triggered a more critical ESG performance assessment.

The issuance of green and sustainable loans is not expected to be the only determinant of the ESG performance. Thus, to provide compelling evidence on the development of firms' ESG performance following the issuance of green lending, one should control for other firm-specific factors that might simultaneously affect ESG scores and account for differences across firms. To achieve this, we include size, profitability, leverage, and book-to-market ratio (BM) as control variables, which are described in Table 7 (see, e.g., Flammer, 2021; Drempetic et al., 2020). The data on firm characteristics are obtained from Refinitiv Eikon's company portfolio. Firm size is a likely driver of ESG ratings since larger firms are expected to disclose more ESG information as a way to earn their legitimacy from society and investors (Drempetic et al., 2020). Profitability is included as a control variable in the analysis as more profitable firms are likely to have the resources for investments that improve their ESG scores (Garcia et al., 2020). Leverage is found to be positively correlated with ESG scores as firms that are dependent on financial markets benefit from improving their ESG scores by shrinking their financing costs (see, e.g., Garcia et al., 2020; Crespi and Migliavacca, 2020). Finally, the literature suggests that lower book-to-market ratio tends to be associated with a decline in ESG scores (Del Giudice and Rigamonti, 2020). To eliminate outliers, all firm-level control variables are winsorized at the 1st and 99th percentiles of their empirical distribution.

2.3 Sample selection and summary statistics

To study the development of firms' ESG scores following the issuance of green and sustainable loans, we match loans obtained from Bloomberg to their issuers' ESG scores from Refinitiv Eikon using firms' legal entity identifier (LEI), which is a 20-character alphanumeric code that enables a unique identification of legal entities participating in financial transactions. Firms without LEI are dropped from the sample since they could not be matched. Entities with a single ESG score during the sample period or with no ESG reporting after 2013 are removed since they have no explanatory value for this study. Overall, the final

sample covers 1,679 ESG-rated European firms in the years between 2010 and 2019. ESG information on private firms is scarce since they are less likely to voluntarily report ESG performance, e.g., on their CO_2 emissions (LoanlyPlanet, 2019). To this extent, only 8% (142) of the firms are private. As a result, our final sample is restricted to public firms due to the lack of comprehensive ESG scores data on private firms. Our final sample includes 10,866 firm-year observations, which corresponds to 1,613 ESG-reporting public firms headquartered in Europe. In this sample, 97 firms have issued green or sustainable loans during the time period from 2010 to 2019.[2]

Table 8 provides an overview of all variables utilized in this study. Panel A reports the descriptive statistics of the overall ESG score as well as its three main pillars and the ten underlying subcategories. Additionally, the ESG controversies and the combined scores are described. The average firm in the sample has an ESG score of 51.7. On average, firms in the sample tend to perform better in the social (54.4) and governance (50.3) dimensions than in the environmental one (47.5). Looking at the different subcategories of the main pillar scores, firms show the highest performance on the workforce score (67.9) whereas the environmental innovation score (32) reveals the lowest performance. Moreover, the environmental score, the human rights score, and the corporate social responsibility score have averages lower than 50. Overall, according to Refinitiv Eikon's description of the ESG categories, firms included in the sample reflect on average a satisfactory to good ESG performance as average ESG scores are within the second and third quartile of the score range (25 to 50 and 50 to 75) (Refinitiv, 2021). Finally, firms in the sample perform on average very highly (90) on the ESG controversies dimension, indicating that they maintain a good reputation over the sample period. The average ESG combined score is slightly lower than the average ESG score, which could be explained by the fact that it is discounted for the firms' ESG controversies (Refinitiv, 2021).

[2]In total, 104 public firms, headquartered in Europe, have issued green or sustainable loans during the sample period. Hence, the matched loan sample can be considered to a large extent as representative of the whole set of public green lending issuers.

Panel B of Table 8 reports the volume of green and sustainable loans divided by the firm size (multiplied by 100). The average volume of sustainable loans tends to be around 10.3% of a firm's total assets. In contrast, the volume of green loans accounts on average around 4% of a firm's total assets. Panel C of Table 8 shows the summary statistics for firm characteristics used as control variables in our analysis. Examining the financial data shows that the average firm in the sample has 30.2 billion euros of total assets and the profitability (ROA) is almost 6%. Furthermore, firms have, on average, a leverage ratio of 0.98 and a book-to-market ratio of 0.73.

3 Empirical methodology

We aim to analyze European firms' ESG performance following the issuance of green and sustainable loans. The data includes the loan issuances between 2014 and 2019.[3] A larger time horizon is considered for the ESG scores, from 2010 to 2019, to allow for a better comparison of firms' ESG outcomes before and after the loan issuances relative to other European firms that have not borrowed any green or sustainable loans.

To test the link between green loans and firms' ESG performance, the following regression is estimated:

$$\begin{aligned} ESG\ performance_{i,t} = {} & \alpha Green\ loans\ (short-term,\ 1\ year)_{i,t} \\ & + \beta Green\ loans\ (long-term,\ 2+\ years)_{i,t} \\ & + \gamma X_{i,t-1} + \delta_{s,t} + \delta_{c,t} + \delta_i + u_{i,t}, \end{aligned} \tag{1}$$

where i indicates firms, t indicates years, c indicates countries, and s indicates the industry group code from Thomson Reuters. The main independent variables are "Green loans (short-term, 1 year)" and "Green loans (long-term, 2+ years)". "Green loans (short-term, 1 year)", is defined as the total volume of green loans issued by a firm in the previous year divided

[3] 2014 is the year that the first green loan was issued.

by the firm's total assets (multiplied by 100) accounting for the short-term effect (1 year). "Green loans (long-term, 2+ years)" is the total volume of green loans issued by a firm two years ago divided by the firm's total assets (multiplied by 100) carried forward in all subsequent years representing the long-term impact (2+ years). To account for the fact that there are firms that issued more than one loan during the period between 2014 and 2019, the loan volumes are cumulated over time after the first issuance of green or sustainable loans. The coefficient of interests, α and β, measure the short- and long-term change in the ESG performance with respect to the volume of the loan relative to the change in the ESG performance at other ESG-rated firms that are not borrowers of green loans.

ESG performance is measured by the overall ESG score, its three main pillars, their ten underlying subcategories, as well as the ESG combined and controversies scores, which are all described in Table 5. $X_{i,t-1}$ is a set of firm characteristics described in Table 7 to control for observed heterogeneity across firms. Following Flammer (2021), the following fixed effects are included in the regressions: Firm fixed effects, δ_i, industry-year fixed effects, $\delta_{s,t}$, and country-year fixed effects, $\delta_{c,t}$. Firm fixed effects allow controlling for time-invariant unobserved heterogeneity across firms. Including country-year and industry-year fixed effects control for omitted variables correlated with ESG performance and vary within countries, industries and years. This allows us to compare the ESG performance of firms operating in the same industry or headquartered in the same country. All standard errors are clustered at the firm level.

To study the relationship between sustainable loans and ESG performance, we extend the regression in equation 1 by replacing "Green loans (short-term, 1 year)" with "Sustainable loans (short-term, 1 year)" and "Green loans (long-term, 2+ years)" with "Sustainable loans (long-term, 2+ years)".

4 Main results

We begin our analysis by studying how the ESG performance of a firm evolves following the issuance of green and sustainable loans. Table 9 reports the results of the main regression in equation 1 for the overall ESG score, ESG controversies score, and ESG combined score. Columns (1) to (3) show the results on green loans. According to the results, neither firms' overall ESG performance nor their controversies scores or combined scores improve following the issuance of green loans. On the other hand, the results on sustainable loans, reported in columns (4) to (6), reveal that sustainable loans lead to a significant positive effect on the overall ESG score in the long term. We find that a one standard deviation (18 percentage points) increase in the volume of sustainable loans relative to the firm size increases the ESG score by 5.8 points in the long term (2+ years). This indicates an increase of 11.2% as the mean ESG score is 51.7. In addition, firms improve their ESG controversies and combined scores as well. As reported in columns (5) and (6), a one standard deviation increase in the volume of sustainable loans relative to the firm size leads to an increase of 10.8 points in the ESG controversies score, which is equivalent to an increase of 12% (the mean controversies score is 90), and an increase of 6.1 points in the ESG combined score, which indicates an increase of 12.5% given the mean of 49.3. The substantial increase in the ESG controversies and combined scores suggests that, following the issuance of sustainable loans, firms tend to avoid adverse events that might be revealed in the media.

According to the presented results, in contrast to green loans, sustainable loans appear to have a significant impact on the overall ESG score. Issuing high volumes of sustainable loans enhances firms' overall ESG profile in the long term. This is probably due to the specific design of this debt instrument, which hinges upon the borrower's performance against a predefined sustainability performance target, which includes the firm's ESG rating as proposed by the Sustainability Linked Loan Principles. More specifically, a possible explanation might be the two-way pricing method of this type of sustainable debt (Linklaters, 2019), i.e., borrowers are granted a pricing reduction if they show an improvement in their ESG score,

whereas a pricing increase is applied as a punishment if ESG performance deteriorates. Extrapolating from the presented results, this contingency appears to incentivize borrowers to improve their ESG performance. Although the effect is not immediate, it enhances a firm's sustainability profile in the long term.

We subsequently study the impact on the three main components of the ESG score – environment, social and governance pillars – for both types of loans. The results are presented in Table 10. As reported in columns (1) to (3), following the issuance of green loans, firms' environmental and governance scores do not change. Surprisingly, their social pillar score deteriorates significantly in the long term. We find that a one standard deviation (5.8 percentage points) increase in the volume of green loans relative to the firm size results in a significant reduction in the social score by 3.4 points in the long term. This indicates a reduction of 6.3% given that the mean social score is 54.4. This evidence might indicate that green loan issuers neglect their social performance in the long term, while they focus mainly on their green projects and environmentally friendly business activities.

As opposed to green loans, the issuance of sustainable loans leads to a significant positive effect on the environmental and governance scores in the long term, whereas the social performance does not change over time. As shown in columns (4) to (6) of Table 10, firms' environmental score increases by 5.3 points, which implies an increase by 11.2% given the mean environmental score is 47.5, and their governance score increases by 11.2 points (equivalent to 22.2% given the mean of 50.3) with a one standard deviation increase in the volume of sustainable loans. This implies that the sustainable loan issuers tend to increase their ESG performance by focusing on their environmental and governance outcomes rather than the social dimension.

Although we find that firms' environmental score does not change following the issuance of green loans, one expects to see an increase in the environmental performance of firms as green loans target the use of proceeds to direct investments towards green projects. To investigate this further, we next analyze the changes in each subcategory that forms the

environmental score of a firm's ESG performance. These three subscores are resource use score, emissions score, and environmental innovation score, which are described in Table 5. As shown in column (2) of Table 11, we find a positive significant increase in firms' emissions score in the long term. According to the reported coefficient, the emissions reduction score goes up by 4.2 points (equivalent to 8%) with a one standard deviation increase in the volume of green loans relative to the firm size. This finding suggests that firms effectively commit to reducing CO_2 emissions following the issuance of green loans. However, the resource use score and the environmental innovation score are not affected.

The results on sustainable loans, on the other hand, reveal that the positive impact on the environmental score appears to be explained by the increase in firms' resource use score. According to the results reported in columns (4) and (5) of Table 11, we find that a one standard deviation increase in the volume of sustainable loans increases firms' resource use score by 10.3 points (19.5%) in the long term, although the emissions score decreases by 5.9 points (11%) in the short term. These findings suggest that as part of their efforts to meet sustainability performance targets in the long term, firms that issue large volumes of sustainable loans tend to implement eco-friendly solutions in their business activities efficiently.

As reported above, we find that firms' social performance deteriorates following the issuance of green loans. To explore this further, we subsequently investigate the impact on each subscore of the social pillar (workforce score, human rights score, community score, and product responsibility score). Columns (1) to (4) in Table 12 present the results. We find a negative effect on each social subcategory except for the workforce score, which improves in the long term significantly by 3 points (4.4%) for a one standard deviation increase in the volume of green loans relative to the firm size. Both community and product responsibility scores decrease in the long term, by 8.1 and 6.7 points (16% and 13%), respectively, whereas the reduction in human rights score happens only in the short term by almost 4 points (9.5%). These findings indicate that issuing high volumes of green loans tends to

improve firms' social performance within the organization, which is implied by the increase in the workforce score, showing e.g., a long-term rise in job satisfaction. However, firms tend to perform poorly on the rest of the social pillar subscores (community score, human rights score, and product responsibility score), which measures the commitment towards their clients and society.

When we turn to sustainable loans, we find that, although the social pillar score does not change following the issuance of sustainable loans, the findings on the social subscores indicate a consistent improvement in the firms' product responsibility score both in the short and the long term. Column (8) in Table 12 show that the short-term performance of the product responsibility increases by almost 9 points (17.4%), while the long-term performance increases by 11.3 points (22%) for a one standard deviation increase in the volume of sustainable loans relative to the firm size. This evidence suggests that sustainable loan issuers tend to focus on producing quality goods and services in the interest of their clients.

As the last analysis, we study the impact of issuing green and sustainable loans on the subscores of the governance pillar: management score, shareholders score, and CSR strategy score. Issuing green loans does not lead to significant changes in any of these subcategories, which is consistent with our finding that the governance pillar does not change. According to the results on sustainable loans, the substantial increase in firms' governance score in the long term seems to be explained by the improvement in their management score. As presented in column (5) of Table 13, a one standard deviation increase in the volume of sustainable loans results in a significant increase in the management score by 12.8 points (25%) in the long term, while shareholders and CSR strategy scores seem to be unaffected. This implies that firms that issue large volumes of sustainable loans improve their governance performance by implementing better corporate governance principles.

All in all, our findings reveal a potential shortcoming of green loans. Although firms seem to reduce their environmental emissions in the long term following the issuance of green loans,

their outcomes in the social dimension of the ESG performance deteriorate over time. This suggests that they tend to neglect their social performance, while they increase investments in environmentally beneficial projects. Sustainable loans, on the other hand, have a direct positive impact on firms' overall ESG score as well as their ESG combined and controversies scores. This might be an outcome of the specific pricing of this type of sustainable debt: A pricing increase is implemented if ESG performance deteriorates and a price reduction takes place if there is an improvement in the ESG score. This appears to motivate borrowers to improve their overall ESG performance following the issuance of sustainable loans. Although the effect is not immediate, it enhances firms' sustainability profile in the long term.

5 Robustness

5.1 Matched sample

As shown in Table 14, issuer and non-issuer firms have different firm characteristics in the last pre-issuance year of 2013. Green loan issuers have on average higher environmental scores and thus higher ESG scores compared to non-issuers. They are on average larger firms with higher book-to-market ratios. Similarly, sustainable loan issuers are also larger with higher environmental, social, and governance scores. In our baseline analysis, we control for these differences by including lagged values of size, leverage, profitability, and book-to-market ratios as controls in our regression. In this section, we instead use the nearest neighbor matching procedure to find the best matching firms to the issuers as control firms and repeat the same regressions with this new subsample. Our aim is to find the largest number of closest neighbors to each issuer firm without replacement so that each control firm is unique. We have 15 green loan issuers and could match them to 345 control firms out of 869 non-issuer firms, where the ESG score pillars and firm controls are very similar for both groups after the matching. Similarly, we could match the 56 sustainable loan issuers to 238 control firms. As shown in Table 15, there are no remaining significant differences

between the issuers and the control firms after the matching for both green and sustainable loan issuers.

When we repeat our regressions for the matched subsamples, the results are very similar to our baseline regressions. As reported in Table 16, ESG scores improve following the issuance of sustainable loans whereas they do not change following the green loan issuances. Studying ESG pillars separately also reveal similar results as presented in Table 17: Although firms improve their environmental score following the issuance of green loans, their social score deteriorates. On the other hand, both environmental and governance scores improve following the issuance of sustainable loans. The results on each subscore are also very similar to the baseline results as presented in Tables A1 to A3.

5.2 Cross sectional results

Our findings imply that sustainable loans incentivize firms to improve their ESG performance. We argue that the two-way pricing of these loans might be the underlying mechanism. Firms improve their ESG scores to avoid an increase in their loan rates. One would expect that this incentive mechanism would work particularly for larger loans as an increase in interest rates would be more costly if the volume of the loan is larger. To test this, we divide our sample into larger and smaller loans at the median and repeat our analysis for these two subsamples. Table 18 presents the results. We find that firms' ESG performance improves mainly following the issuance of larger loans. This is consistent with the argument that the two-way pricing of sustainable loans motivates firms to better their ESG scores. On the other hand, firms' ESG performance does not change following a green loan issuance irrespective of the loan size.

Following the issuance of sustainable loans, the increase in the ESG score takes place in the long term. This might change across different maturities as firms with longer maturity loans might be slower in their progress compared to firms with shorter maturity loans. To study this, we divide our sample into longer and shorter maturities, where longer maturities

are the loans with a maturity in the top quartile and shorter maturities are the rest. As reported in Table 18, the ESG performance improves already in the short term following a short-term loan issuance and the progress happens mainly in the long term after a long-term loan issuance as shown in columns 7 and 8. This implies that firms with short-term sustainable loans act faster on their ESG performance relative to firms with long-term loans. The issuance of green loans, on the other hand, does not trigger any improvement in the ESG performance irrespective of the maturities.

6 Conclusion

This paper contributes to a newly developing strand of the literature investigating the effectiveness of green lending instruments. We provide insights on the development of a firm's ESG performance following the issuance of green and sustainable loans. By examining the change in the ESG score, its three main pillars, and all ten underlying subcategories, this paper provides a comprehensive overview of the dynamics in the firms' overall ESG profile.

Our results indicate that firms' ESG performance evolves differently following a green loan issuance compared to a sustainable loan issuance. This could be explained by the specific design of each debt instrument. While green loans aim to increase investments in environmentally beneficial projects, sustainable loans do not target firms' environmental performance but, instead, focus on their overall sustainability profile. As expected, we find that firms issuing more green loans appear to be effective in shrinking their environmental emissions, indicated by an increase in their emissions reduction score in the long term. However, there is a possible negative externality: Following the issuance of green loans, firms' social performance deteriorates in terms of effectively protecting human rights, contributing to public health, and offering quality products and services. This is indicated by the decrease in firms' human rights, community, and product responsibility scores. These findings suggest that green loan issuers tend to neglect their performance towards external stakeholders and,

instead, prioritize their environmental goals. On the other hand, the results on sustainable loans reveal that their incentive mechanism seems to be more effective. Following the issuance of a sustainable loan, firms' overall ESG improves, which comes from an increase in environmental and governance scores. Hence, the issuance of a sustainable loan appears to indicate subsequent improvements in firms' ESG performance consistent with the signaling theory discussed in Flammer (2021). However, issuing green loans cannot be interpreted as a clear signal of firms' ESG outlook.

Examining whether green and sustainable loans achieve their objectives is crucial for the success of regulatory initiatives aiming at stimulating environmentally sustainable economic activity. This paper suggests that sustainable loans might be a more efficient instrument to enhance firms' overall ESG performance. As expected, green loans seem to be linked to firms' environmental performance. As indicated by Ehlers et al. (2020), green labels are assigned to individual projects rather than to the company's overall business. This suggests that the successful delivery of green projects might not necessarily imply that firms effectively improve their ESG performance in the rest of their business activities. Our evidence on worsening social performance following a green loan issuance is consistent with this argument.

Due to the lack of comprehensive ESG data on private companies, this research focuses on public issuers only. To this extent, the analysis does not cover the majority of green loans that are issued by private companies. Considering the positive trend in ESG reporting and the introduction of regulations on ESG disclosure and taxonomy for sustainable activities, future research should be able to shed more light on the effectiveness of green loans on private firms' ESG performance.

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Table 1. Green lending over time
This table reports the total volume (in EUR billion) and the number of green and sustainable loans on an annual basis.

A. Green loans

	Number	Amount (EUR billion)
2014	62	4.260
2015	71	8.833
2016	142	16.095
2017	144	14.131
2018	202	27.905
2019	240	28.746
Total	861	99.97

B. Sustainable loans

	Number	Amount (EUR billion)
2014	16	20.921
2015	5	7.601
2016	8	4.580
2017	17	9.200
2018	30	20.542
2019	109	64.807
Total	185	127.651

Table 2. Green lending across industries

This table reports the total volume (in EUR billion) and the number of green and sustainable loans by industry. Industries are defined according to Bloomberg's BICS (Bloomberg Industry Classification System) codes.

A. Green loans by industry

	Number	Amount (EUR billion)
Energy	460	55.478
Utilities	279	28.169
Financials	67	8.699
Industrials	37	5.306
Consumer Discretionary	9	1.222
Communications	2	0.374
Materials	2	0.275
Technology	1	0.250
Consumer Staples	3	0.149
Health Care	1	0.047
Total	861	99.970

B. Sustainable loans by industry

	Number	Amount (EUR billion)
Industrials	41	22.589
Utilities	28	26.112
Materials	29	13.064
Energy	10	16.223
Financials	24	14.451
Consumer Discretionary	17	10.517
Consumer Staples	18	10.899
Health Care	9	7.308
Communications	8	4.987
Technology	1	1.500
Total	185	127.651

Table 3. Green lending across countries
This table reports the total volume (in EUR billion) and the number of green and sustainable loans by country.

A. Green loans

	Number	Amount (EUR billion)
UK	192	36.161
ES	152	12.154
DE	54	10.271
IT	135	9.336
FR	77	7.467
NL	43	4.847
BE	31	4.811
LU	10	1.922
IE	30	1.854
PL	16	1.553
SE	16	1.356
RU	6	1.272
FI	9	1.135
NO	13	1.024
Others	77	4.807
Total	861	99.970

B. Sustainable loans

	Number	Amount (EUR billion)
FR	29	29.200
ES	45	23.096
UK	21	19.458
DE	11	11.863
NL	20	13.458
IT	15	9.453
FI	11	4.785
BE	6	3.435
IE	3	3.047
SE	1	2.000
CH	5	1.984
AT	4	1.920
LU	8	1.322
Others	6	2.630
Total	185	127.651

Table 4. Description of the use of proceeds for green and sustainable loans
This table reports the total volume (in EUR billion) and the number of green and sustainable loans by the use of proceeds.

Panel A: Green Loans	Number	Amount (EUR billion)
Project Finance	582	62.962
Project Refinance	207	27.235
Project Finance General Corporate Purposes	12	1.398
Real Estate	9	1.285
Acquisition Financing Project Refinance	5	1.015
Project Finance Capital Expenditures	8	0.872
Acquisition Financing Project	7	0.620
Working Capital Project	6	0.169
Other	25	4.414
Total	861	99.970

Panel B: Sustainable Loans	Number	Amount (EUR billion)
Refinance General Corporate Purposes	66	58.177
Refinance	40	17.373
Refinance General Corporate Purposes CP Backup	6	15.888
General Corporate Purposes	35	15.546
Working Capital Refinance	6	6.137
Project Finance Refinance	3	2.755
Refinance Real Estate	6	2.433
Working Capital General Corporate Purposes	3	1.055
Other	20	8.287
Total	185	127.651

Table 5. Description of ESG scores used as a measure of ESG performance
This table reports the definition of individual category scores, according to Refinitiv (2021).

ESG Scores	Definitions
Environmental Pillar Score (ES)	Proxy for a company's capacity to implement best management techniques to mitigate environmental risks and exploit environmental innovations
Resource Use Score (RUS)	Measure for a company's ability and success at implementing eco-efficient solutions and cutting its resource use (e.g., water, energy)
Emissions Score (EMS)	Benchmark for a company's engagement and effectiveness towards curtailing environmental emissions in its business activities
Environmental Innovation Score (EIS)	Measure of a company's ability to optimize its customers environmental costs
Social Pillar Score (SS)	Proxy for company's effectiveness at maintaining a healthy reputation among workforce, customers and society and therefore achieving long-term shareholder value
Workforce Score (WFS)	Measure of a company's capability of ensuring workforce diversity, opportunity, safety and job satisfaction
Human Rights Score (HRS)	Benchmark for a company's effectiveness in protecting vital human rights
Community Score (CMS)	Measure of a company's contribution to public health and maintenance of good business ethics
Product Responsibility Score (PRS)	Measure of a company's effectiveness at offering quality products and services without harming its customers
Governance Pillar Score (GS)	Proxy for the effectiveness of a company's organization and operations at ensuring that the best interests of its long-term shareholders are protected
Management Score (MNS)	Measure of a company's capacity to consistently implement well defined corporate governance principles yielding near-optimum results
Shareholders Score (SHS)	Benchmark for a company's success at ensuring equal treatment of shareholders and implementing anti-takeover measures
CSR Strategy Score (CSRS)	Proxy reflecting a company's effectiveness in terms of considering economic, social and environmental factors in its usual business
ESG Controversies Score	Measure of a company's exposure to ESG controversies and negative media events
ESG Combined Score	Overall company score covering disclosed information on the three main ESG pillars and ESG controversies

Table 6. Number of ESG-rated companies by economic sector and by country of headquarters

	UK	DE	SE	FR	CH	IT	ES	NL	NO	BE	DK	IE	FI	Others	Total
Industrials	81	37	34	35	34	19	14	12	4	5	11	7	12	26	331
Financials	104	17	17	12	20	26	12	8	12	5	8	2	3	56	302
Consumer Cyclicals	77	27	28	36	15	23	9	6	4	4	3	8	3	16	260
Technology	40	29	15	15	17	8	6	12	5	7	4	4	7	24	193
Basic Materials	32	17	8	8	9	3	7	6	7	6	1	4	7	35	150
Healthcare	24	20	20	11	18	4	5	7	1	8	12	10	1	3	144
Consumer Non-Cyclicals	31	9	11	11	9	3	2	7	7	3	4	6	3	15	121
Real Estate	35	10	17	8	6	1	6	3	3	8	0	2	3	17	119
Energy	24	3	1	6	2	4	4	8	12	2	2	1	1	20	90
Utilities	8	5	0	4	1	11	6	0	3	0	1	0	1	14	54
Academic and Educational Services	1	0	1	0	0	0	0	0	0	0	0	0	0	0	2
Total	457	174	152	146	131	102	71	69	58	48	46	44	42	226	1,766

Figure 1. Development of the overall ESG, environmental, social, and governance scores
This figure plots the average ESG score as well as environmental (ES), social (SS), and governance scores (GS) during the sample period from 2010 to 2019.

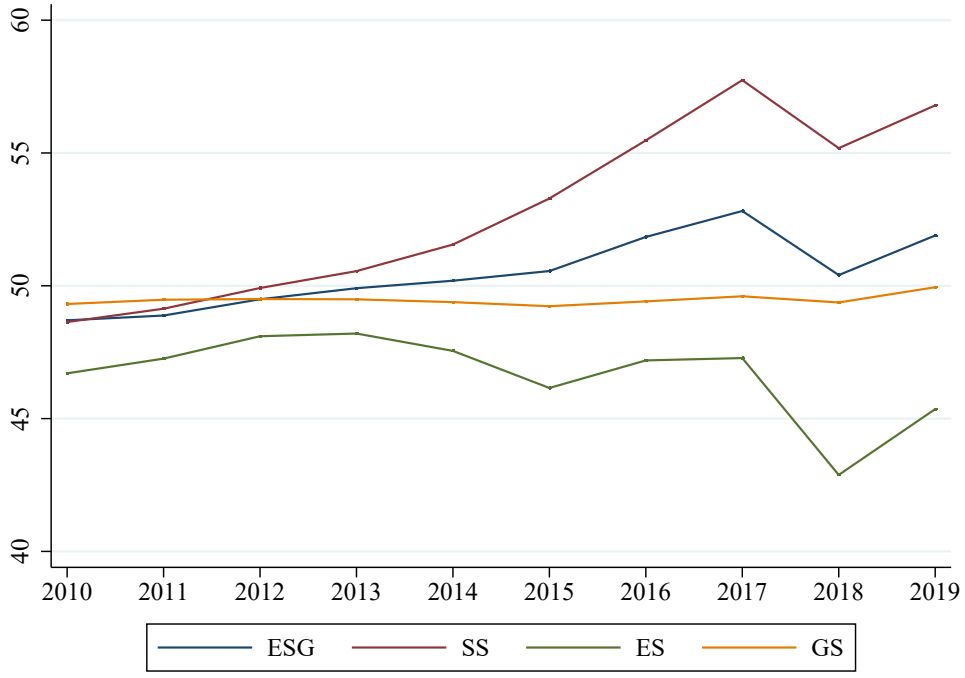

Table 7. Description of firm-level control variables
This table reports the definition of firm characteristics that are included as controls in our analysis.

Control Variable	Description
Size	Firm size is defined as the natural logarithm of the firm's total assets in the analysis.
Leverage	Leverage as a proxy for capital structure is constructed by dividing the firm's total debt by total equity
Return on assets (ROA)	ROA is included in the analysis as a proxy for firms' profitability. ROA is downloaded from Refinitiv Eikon as the ratio between a company's net income prior to financing costs and total assets.
Book-to-market ratio (BM)	BM is calculated by dividing the company's common shareholder's equity by its market capitalization.

Table 8. Descriptive statistics
This table reports the summary statistics for the main variables utilized in this research. In total, our final sample comprises of 10,866 firm-year observations in the period between 2010 and 2019. Panel A summarizes all dependent variables described in Table 5, Panel B reports the loan amount to assets ratio (multiplied by 100) for green and sustainable loans, which is used as an explanatory variable in our analysis. Panel C shows the firm-level controls as described in Table 7.

	mean	sd	p25	p50	p75
Panel A					
ESG Score	51.647	20.597	36.433	52.341	67.844
Environmental Score	47.475	28.237	24.113	48.681	72.098
Resource Use Score	53.097	32.468	25.952	57.317	82.365
Emissions Score	53.671	31.445	28.804	57.500	81.349
Environmental Innovation Score	31.993	33.143	0.000	24.675	60.000
Social Score	54.367	23.646	36.346	55.423	73.687
Workforce Score	67.859	24.536	51.639	73.077	88.178
Human Rights Score	42.274	35.931	0.000	42.300	76.923
Community Score	51.027	30.331	24.206	50.966	79.136
Product Responsibility Score	51.575	32.606	25.000	53.409	81.395
Governance Score	50.305	22.876	31.864	50.983	68.763
Management Score	51.019	28.844	26.042	51.420	76.172
Shareholders Score	51.343	28.797	26.563	51.967	76.437
CSR Strategy Score	45.183	31.295	16.355	44.118	73.893
ESG Combined Score	49.330	19.185	35.821	50.076	63.709
ESG Controversies Score	89.960	23.745	100.000	100.000	100.000
Panel B					
Green loans	4.094	5.786	0.774	1.289	5.212
Sustainable loans	10.275	18.025	2.947	5.828	11.323
Panel C					
Size	21.773	1.962	20.478	21.584	22.923
Leverage	0.975	1.721	0.171	0.549	1.134
Profitability	0.058	0.063	0.021	0.048	0.083
Book-to-market ratio	0.727	0.734	0.277	0.532	0.934

Table 9. ESG performance following the issuance of green and sustainable loans

This table reports how firms' ESG performance evolves following the issuance of green and sustainable loans. The outcome variables are firms' overall ESG score, ESG controversies score, and ESG combined score. "Green loans (short-term, 1 year)" ("Sustainable loans (short-term, 1 year)") is the total volume of green (sustainable) loans issued by a firm in the previous year divided by the firm's total assets accounting for the short-term effect (1 year). "Green loans (long-term, 2+ years)" ("Sustainable loans (long-term, 2+ years)") is the total volume of green (sustainable) loans issued by a firm two years ago divided by the firm's total assets carried forward in all subsequent years representing the long-term impact (2+ years). Standard errors are clustered at the firm level.

	Green loans			Sustainable loans		
	ESG Score	Controversies Score	Combined Score	ESG Score	Controversies Score	Combined Score
	(1)	(2)	(3)	(4)	(5)	(6)
Green loans (short-term, 1 year)	-0.096	-0.078	-0.052			
	(0.290)	(0.517)	(0.308)			
Green loans (long-term, 2+ years)	-0.169	-0.547	-0.208			
	(0.222)	(1.208)	(0.334)			
Sustainable loans (short-term, 1 year)				0.082	0.404	0.172
				(0.145)	(0.346)	(0.174)
Sustainable loans (long-term, 2+ years)				0.320*	0.764***	0.446**
				(0.180)	(0.196)	(0.196)
Size	4.017***	-1.660	3.667***	3.977***	-1.756	3.614***
	(0.788)	(1.416)	(0.840)	(0.785)	(1.408)	(0.836)
Leverage	-0.074	0.270	0.009	-0.085	0.244	-0.006
	(0.139)	(0.412)	(0.175)	(0.138)	(0.411)	(0.173)
Profitability	-3.187	9.902	-3.615	-3.153	9.857	-3.596
	(4.043)	(8.541)	(4.484)	(4.044)	(8.545)	(4.488)
Book-to-market ratio	0.036	-2.042**	-0.676**	0.040	-2.032**	-0.669*
	(0.276)	(0.898)	(0.342)	(0.276)	(0.900)	(0.342)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry × year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country × year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7209	7209	7209	7209	7209	7209
Adjusted R-squared	0.879	0.445	0.763	0.880	0.446	0.763

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 10. Three main pillar scores following the issuance of green and sustainable loans

This table reports how the three main pillar scores evolve following the issuance of green and sustainable loans. "Green loans (short-term, 1 year)" ("Sustainable loans (short-term, 1 year)") is the total volume of green (sustainable) loans issued by a firm in the previous year divided by the firm's total assets accounting for the short-term effect (1 year). "Green loans (long-term, 2+ years)" ("Sustainable loans (long-term, 2+ years)") is the total volume of green (sustainable) loans issued by a firm two years ago divided by the firm's total assets carried forward in all subsequent years representing the long-term impact (2+ years). Standard errors are clustered at the firm level.

	Green loans			Sustainable loans		
	Environmental Score	Social Score	Governance Score	Environmental Score	Social Score	Governance Score
	(1)	(2)	(3)	(4)	(5)	(6)
Green loans (short-term, 1 year)	-0.070	-0.521	0.289			
	(0.271)	(0.398)	(0.341)			
Green loans (long-term, 2+ years)	0.085	-0.595**	0.401			
	(0.278)	(0.240)	(0.452)			
Sustainable loans (short-term, 1 year)				0.054	0.162	-0.012
				(0.133)	(0.178)	(0.234)
Sustainable loans (long-term, 2+ years)				0.295**	0.112	0.620***
				(0.150)	(0.294)	(0.213)
Size	5.522***	3.657***	3.609***	5.491***	3.620***	3.560***
	(0.919)	(0.980)	(1.052)	(0.917)	(0.979)	(1.049)
Leverage	-0.073	-0.239	0.175	-0.081	-0.245	0.158
	(0.166)	(0.155)	(0.235)	(0.165)	(0.154)	(0.235)
Profitability	-3.710	-0.313	-5.070	-3.639	-0.406	-4.856
	(5.650)	(5.385)	(5.752)	(5.654)	(5.391)	(5.742)
Book-to-market ratio	-0.310	0.385	-0.160	-0.303	0.378	-0.141
	(0.397)	(0.371)	(0.485)	(0.397)	(0.371)	(0.486)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry × year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country × year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7209	7209	7209	7209	7209	7209
Adjusted R-squared	0.890	0.852	0.737	0.890	0.852	0.738

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 11. The subscores underlying the environmental score following the issuance of green and sustainable loans
This table reports how the subscores underlying the environmental score evolve following the issuance of green and sustainable loans. "Green loans (short-term, 1 year)" ("Sustainable loans (short-term, 1 year)") is the total volume of green (sustainable) loans issued by a firm in the previous year divided by the firm's total assets accounting for the short-term effect (1 year). "Green loans (long-term, 2+ years)" ("Sustainable loans (long-term, 2+ years)") is the total volume of green (sustainable) loans issued by a firm two years ago divided by the firm's total assets carried forward in all subsequent years representing the long-term impact (2+ years). Standard errors are clustered at the firm level.

	Green loans			Sustainable loans		
	Resource Use Score	Emissions Score	Environmental Innovation Score	Resource Use Score	Emissions Score	Environmental Innovation Score
	(1)	(2)	(3)	(4)	(5)	(6)
Green loans (short-term, 1 year)	0.008	-0.268	0.128			
	(0.177)	(0.198)	(0.724)			
Green loans (long-term, 2+ years)	-0.270	0.731***	-0.110			
	(0.254)	(0.279)	(0.700)			
Sustainable loans (short-term, 1 year)				0.168	-0.327*	0.323
				(0.253)	(0.170)	(0.205)
Sustainable loans (long-term, 2+ years)				0.574*	0.124	0.226
				(0.320)	(0.134)	(0.319)
Size	5.317***	6.734***	5.178***	5.250***	6.735***	5.152***
	(1.176)	(1.354)	(1.560)	(1.171)	(1.352)	(1.558)
Leverage	0.034	-0.242	-0.045	0.013	-0.240	-0.050
	(0.200)	(0.243)	(0.268)	(0.197)	(0.243)	(0.268)
Profitability	-3.274	-3.316	-9.291	-3.229	-3.018	-9.403
	(7.517)	(7.267)	(7.631)	(7.522)	(7.268)	(7.625)
Book-to-market ratio	-0.513	-0.361	0.508	-0.505	-0.352	0.515
	(0.504)	(0.511)	(0.564)	(0.504)	(0.512)	(0.565)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry × year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country × year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7209	7209	7209	7209	7209	7209
Adjusted R-squared	0.855	0.851	0.829	0.855	0.851	0.830

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 12. The subscores underlying the social score following the issuance of green and sustainable loans

This table reports how the subscores underlying the social score evolve following the issuance of green and sustainable loans. "Green loans (short-term, 1 year)" ("Sustainable loans (short-term, 1 year)") is the total volume of green (sustainable) loans issued by a firm in the previous year divided by the firm's total assets accounting for the short-term effect (1 year). "Green loans (long-term, 2+ years)" ("Sustainable loans (long-term, 2+ years)") is the total volume of green (sustainable) loans issued by a firm two years ago divided by the firm's total assets carried forward in all subsequent years representing the long-term impact (2+ years). Standard errors are clustered at the firm level.

	Green loans				Sustainable loans			
	Workforce Score	Human Rights Score	Community Score	Product Responsibility Score	Workforce Score	Human Rights Score	Community Score	Product Responsibility Score
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Green loans (short-term, 1 year)	0.178	-0.678**	-1.481	-0.528				
	(0.284)	(0.327)	(0.982)	(0.523)				
Green loans (long-term, 2+ years)	0.524**	-0.164	-1.407**	-1.157***				
	(0.266)	(0.661)	(0.582)	(0.343)				
Sustainable loans (short-term, 1 year)					-0.069	0.335	0.028	0.497**
					(0.103)	(0.523)	(0.190)	(0.245)
Sustainable loans (long-term, 2+ years)					-0.108	1.150	-0.198	0.629*
					(0.169)	(0.788)	(0.290)	(0.368)
Size	4.918***	6.457***	1.047	3.064**	4.945***	6.317***	1.006	2.958**
	(1.160)	(1.661)	(1.273)	(1.456)	(1.159)	(1.639)	(1.278)	(1.451)
Leverage	-0.199	-0.605*	-0.350	0.262	-0.190	-0.637**	-0.354	0.236
	(0.183)	(0.315)	(0.219)	(0.259)	(0.183)	(0.310)	(0.218)	(0.258)
Profitability	9.219	-4.610	-7.717	-0.015	9.279	-4.433	-7.884	-0.195
	(6.531)	(9.364)	(8.073)	(9.053)	(6.531)	(9.380)	(8.072)	(9.072)
Book-to-market ratio	0.360	0.328	-0.288	1.167*	0.366	0.350	-0.317	1.166*
	(0.471)	(0.686)	(0.599)	(0.682)	(0.471)	(0.686)	(0.599)	(0.683)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry × year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country × year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7209	7209	7209	7209	7209	7209	7209	7209
Adjusted R-squared	0.807	0.771	0.797	0.779	0.807	0.771	0.797	0.779

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 13. The subscores underlying the governance score following the issuance of green and sustainable loans

This table reports how the subscores underlying the governance score evolve following the issuance of green and sustainable loans. "Green loans (short-term, 1 year)" ("Sustainable loans (short-term, 1 year)") is the total volume of green (sustainable) loans issued by a firm in the previous year divided by the firm's total assets accounting for the short-term effect (1 year). "Green loans (long-term, 2+ years)" ("Sustainable loans (long-term, 2+ years)") is the total volume of green (sustainable) loans issued by a firm two years ago divided by the firm's total assets carried forward in all subsequent years representing the long-term impact (2+ years). Standard errors are clustered at the firm level.

	Green loans			Sustainable loans		
	Management Score	Shareholders Score	CSR Strategy Score	Management Score	Shareholders Score	CSR Strategy Score
	(1)	(2)	(3)	(4)	(5)	(6)
Green loans (short-term, 1 year)	0.171	0.497	0.569			
	(0.433)	(0.461)	(0.622)			
Green loans (long-term, 2+ years)	0.430	0.116	0.677			
	(0.696)	(0.689)	(0.415)			
Sustainable loans (short-term, 1 year)				-0.084	-0.049	0.406
				(0.252)	(0.399)	(0.283)
Sustainable loans (long-term, 2+ years)				0.711***	0.466	0.393
				(0.256)	(0.402)	(0.297)
Size	4.215***	0.427	5.347***	4.156***	0.393	5.329***
	(1.367)	(1.527)	(1.363)	(1.365)	(1.525)	(1.359)
Leverage	0.210	0.111	0.099	0.189	0.093	0.098
	(0.299)	(0.288)	(0.259)	(0.299)	(0.288)	(0.258)
Profitability	-6.148	-10.026	7.757	-5.865	-9.885	7.729
	(7.865)	(9.362)	(7.817)	(7.856)	(9.363)	(7.823)
Book-to-market ratio	-0.406	0.540	0.022	-0.386	0.550	0.047
	(0.600)	(0.896)	(0.587)	(0.601)	(0.896)	(0.587)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry × year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country × year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7209	7209	7209	7209	7209	7209
Adjusted R-squared	0.706	0.612	0.812	0.706	0.612	0.812

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 14. Robustness: Differences between issuer and non-issuer firms
This table reports the differences in ESG scores (with pillars) and firm characteristics between issuer and non-issuer firms in 2013, one year before the issuances started.

A. Green loans						
	Issuer firms		*Non-issuer firms*			
	Mean	SD	Mean	SD	Difference	t-stat
ESG Score	60.028	21.458	50.845	20.191	-9.183*	(-1.744)
Environmental Score	65.441	30.892	49.100	27.636	-16.341**	(-2.266)
Social Score	58.808	26.662	51.520	23.693	-7.287	(-1.178)
Governance Score	53.914	15.558	50.190	22.399	-3.723	(-0.641)
Size	22.464	1.601	21.606	2.043	-0.858**	(-2.170)
Leverage	1.294	1.453	1.013	1.995	-0.281	(-0.729)
Profitability	0.036	0.016	0.060	0.065	0.023	(1.253)
Book-to-market ratio	1.205	0.936	0.673	0.653	-0.532***	(-3.930)
Number of firms	15		869			

B. Sustainable loans						
	Issuer firms		*Non-issuer firms*			
	Mean	SD	Mean	SD	Difference	t-stat
ESG Score	65.180	14.78	50.042	20.202	-15.138***	(-5.507)
Environmental Score	71.611	19.264	47.873	27.606	-23.737***	(-6.329)
Social Score	66.499	19.143	50.639	23.703	-15.859***	(-4.899)
Governance Score	56.201	21.501	49.851	22.308	-6.349**	(-2.066)
Size	22.792	1.582	21.566	2.042	-1.226***	(-4.989)
Leverage	0.992	1.275	1.019	2.014	-0.026	(0.111)
Profitability	0.051	0.051	0.060	0.065	0.008	(0.907)
Book-to-market ratio	0.637	0.404	0.684	0.671	0.046	(0.556)
Number of firms	56		828			

Table 15. Robustness: Differences between issuer and control firms
This table reports the differences in ESG scores (with pillars) and firm characteristics between issuer and control firms in 2013, one year before the issuances started, where control firms are the matched non-issuer firms using the nearest neighbor matching procedure.

A. Green loans

	Issuer firms		*Control firms*			
	Mean	SD	Mean	SD	Difference	t-stat
ESG Score	60.028	21.458	58.214	18.749	-1.814	(-0.364)
Environmental Score	65.441	30.892	61.575	23.230	-3.866	(-0.621)
Social Score	58.808	26.662	58.185	22.101	-0.622	(-0.105)
Governance Score	53.914	15.558	54.735	22.607	0.821	(0.139)
Size	22.464	1.601	22.897	1.941	0.175	(0.347)
Leverage	1.294	1.453	1.129	1.881	0.297	(0.611)
Profitability	0.036	0.016	0.048	0.056	0.009	(0.488)
Book-to-market ratio	1.205	0.936	0.960	0.952	-0.416	(-1.647)
Number of firms	15		345			

B. Sustainable loans

	Issuer firms		*Control firms*			
	Mean	SD	Mean	SD	Difference	t-stat
ESG Score	65.180	14.783	62.680	17.359	-2.499	(-0.995)
Environmental Score	71.611	19.264	67.345	19.603	-4.265	(-1.469)
Social Score	66.499	19.143	63.390	20.970	-3.108	(-1.014)
Governance Score	56.201	21.501	56.770	22.478	0.569	(0.171)
Size	22.792	1.582	23.116	1.891	0.051	(0.188)
Leverage	0.992	1.275	1.158	1.601	0.115	(0.510)
Profitability	0.051	0.051	0.062	0.061	0.007	(0.825)
Book-to-market ratio	0.637	0.404	0.687	0.603	0.033	(0.388)
Number of firms	56		238			

Table 16. Robustness: ESG performance following the issuance of green and sustainable loans - with matched sample
This table reports how firms' ESG performance evolves following the issuance of green and sustainable loans for the matched sample. The outcome variables are firms' overall ESG score, ESG controversies score, and ESG combined score. "Green loans (short-term, 1 year)" ("Sustainable loans (short-term, 1 year)") is the total volume of green (sustainable) loans issued by a firm in the previous year divided by the firm's total assets accounting for the short-term effect (1 year). "Green loans (long-term, 2+ years)" ("Sustainable loans (long-term, 2+ years)") is the total volume of green (sustainable) loans issued by a firm two years ago divided by the firm's total assets carried forward in all subsequent years representing the long-term impact (2+ years). Standard errors are clustered at the firm level.

	Green loans			Sustainable loans		
	ESG Score	Controversies Score	Combined Score	ESG Score	Controversies Score	Combined Score
	(1)	(2)	(3)	(4)	(5)	(6)
Green loans (short-term, 1 year)	-0.124	-0.225	-0.054			
	(0.367)	(0.863)	(0.537)			
Green loans (long-term, 2+ years)	-0.055	-0.181	0.262			
	(0.377)	(1.852)	(0.607)			
Sustainable loans (short-term, 1 year)				0.145	0.366	0.251
				(0.162)	(0.458)	(0.216)
Sustainable loans (long-term, 2+ years)				0.483**	0.911***	0.658***
				(0.190)	(0.289)	(0.217)
Size	3.490***	-3.722	2.302	3.130**	-2.842	1.951
	(1.230)	(3.021)	(1.461)	(1.412)	(2.688)	(1.690)
Leverage	-0.454**	-1.226**	-0.824***	-0.263	0.394	-0.165
	(0.193)	(0.617)	(0.213)	(0.197)	(0.756)	(0.283)
Profitability	-4.159	-3.442	-10.689	1.102	-6.773	-5.669
	(7.438)	(18.576)	(8.501)	(7.942)	(22.019)	(10.393)
Book-to-market ratio	0.205	-2.280**	-0.497	-0.712	-4.468**	-2.094***
	(0.355)	(1.130)	(0.430)	(0.600)	(1.964)	(0.783)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry × year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country × year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2490	2490	2490	2144	2144	2144
Adjusted R-squared	0.866	0.445	0.696	0.840	0.494	0.649

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 17. Robustness: Three main pillar scores following the issuance of green and sustainable loans - with matched sample
This table reports how the three main pillar scores evolve following the issuance of green and sustainable loans for the matched sample. "Green loans (short-term, 1 year)" ("Sustainable loans (short-term, 1 year)") is the total volume of green (sustainable) loans issued by a firm in the previous year divided by the firm's total assets accounting for the short-term effect (1 year). "Green loans (long-term, 2+ years)" ("Sustainable loans (long-term, 2+ years)") is the total volume of green (sustainable) loans issued by a firm two years ago divided by the firm's total assets carried forward in all subsequent years representing the long-term impact (2+ years). Standard errors are clustered at the firm level.

	Green loans			Sustainable loans		
	Environmental Score	Social Score	Governance Score	Environmental Score	Social Score	Governance Score
	(1)	(2)	(3)	(4)	(5)	(6)
Green loans (short-term, 1 year)	0.370	-0.657	0.046			
	(0.394)	(0.442)	(0.391)			
Green loans (long-term, 2+ years)	0.743*	-0.947**	0.551			
	(0.451)	(0.481)	(0.555)			
Sustainable loans (short-term, 1 year)				0.142	0.274	-0.071
				(0.157)	(0.220)	(0.240)
Sustainable loans (long-term, 2+ years)				0.544***	0.216	0.770***
				(0.197)	(0.346)	(0.234)
Size	2.533*	4.868***	3.364*	5.077***	2.492	2.147
	(1.467)	(1.676)	(1.809)	(1.671)	(2.059)	(1.634)
Leverage	-0.681**	-0.522**	-0.111	-0.331	-0.156	-0.274
	(0.335)	(0.256)	(0.334)	(0.289)	(0.268)	(0.332)
Profitability	-5.885	-3.566	-0.300	8.515	0.529	6.628
	(10.239)	(8.653)	(12.914)	(11.888)	(12.082)	(12.137)
Book-to-market ratio	0.023	0.482	-0.122	-0.754	0.870	-2.627**
	(0.444)	(0.544)	(0.727)	(0.947)	(0.847)	(1.089)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry × year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country × year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2490	2490	2490	2144	2144	2144
Adjusted R-squared	0.875	0.831	0.710	0.824	0.818	0.709

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 18. Robustness: Cross sectional results

This table reports how firms' ESG combined score evolves following the issuance of green and sustainable loans for larger versus smaller loans and for loans with longer versus shorter maturities. "Green loans (short-term, 1 year)" ("Sustainable loans (short-term, 1 year)") is the total volume of green (sustainable) loans issued by a firm in the previous year divided by the firm's total assets accounting for the short-term effect (1 year). "Green loans (long-term, 2+ years)" ("Sustainable loans (long-term, 2+ years)") is the total volume of green (sustainable) loans issued by a firm two years ago divided by the firm's total assets carried forward in all subsequent years representing the long-term impact (2+ years). Standard errors are clustered at the firm level.

	Size				Maturity			
	Green loans		Sustainable loans		Green loans		Sustainable loans	
	Larger loans	Smaller loans	Larger loans	Smaller loans	Longer maturity	Shorter maturity	Longer maturity	Shorter maturity
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Green loans (short-term, 1 year)	0.030	2.077			3.091	-0.097		
	(0.333)	(2.809)			(4.071)	(0.292)		
Green loans (long-term, 2+ years)	0.022	0.650			-0.277	-0.256		
	(0.268)	(3.250)			(4.191)	(0.356)		
Sustainable loans (short-term, 1 year)			0.118	0.903			-0.109	0.350**
			(0.180)	(0.870)			(0.222)	(0.145)
Sustainable loans (long-term, 2+ years)			0.470***	-0.602			0.296**	0.438
			(0.177)	(0.923)			(0.150)	(0.362)
Size	3.690***	3.671***	3.549***	3.592***	3.717***	3.681***	3.553***	3.511***
	(0.838)	(0.841)	(0.835)	(0.844)	(0.839)	(0.839)	(0.844)	(0.843)
Leverage	0.018	0.003	-0.005	-0.024	0.015	0.017	-0.019	-0.014
	(0.174)	(0.175)	(0.174)	(0.175)	(0.174)	(0.175)	(0.176)	(0.175)
Profitability	-3.633	-3.577	-3.448	-3.704	-3.683	-3.605	-3.187	-3.159
	(4.484)	(4.483)	(4.454)	(4.530)	(4.482)	(4.481)	(4.517)	(4.489)
Book-to-market ratio	-0.687**	-0.660*	-0.592*	-0.667*	-0.717**	-0.708**	-0.560	-0.591*
	(0.345)	(0.344)	(0.342)	(0.343)	(0.346)	(0.343)	(0.343)	(0.342)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry × year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country × year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7170	7189	7139	7134	7147	7179	7054	7052
Adjusted R-squared	0.764	0.763	0.764	0.762	0.763	0.763	0.764	0.764

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendix

Table A1. Robustness: The subscores underlying the environmental score following the issuance of green and sustainable loans - with matched sample

This table reports how the subscores underlying the environmental score evolve following the issuance of green and sustainable loans for the matched sample. "Green loans (short-term, 1 year)" ("Sustainable loans (short-term, 1 year)") is the total volume of green (sustainable) loans issued by a firm in the previous year divided by the firm's total assets accounting for the short-term effect (1 year). "Green loans (long-term, 2+ years)" ("Sustainable loans (long-term, 2+ years)") is the total volume of green (sustainable) loans issued by a firm two years ago divided by the firm's total assets carried forward in all subsequent years representing the long-term impact (2+ years). Standard errors are clustered at the firm level.

	Green loans			Sustainable loans		
	Resource Use Score	Emissions Score	Environmental Innovation Score	Resource Use Score	Emissions Score	Environmental Innovation Score
	(1)	(2)	(3)	(4)	(5)	(6)
Green loans (short-term, 1 year)	0.479	-0.063	0.597			
	(0.424)	(0.251)	(0.910)			
Green loans (long-term, 2+ years)	0.336	1.543***	-0.071			
	(0.607)	(0.421)	(1.343)			
Sustainable loans (short-term, 1 year)				0.320	-0.264	0.393*
				(0.301)	(0.177)	(0.225)
Sustainable loans (long-term, 2+ years)				0.765**	0.443**	0.391
				(0.374)	(0.181)	(0.402)
Size	3.413*	4.939**	0.790	4.298*	5.609***	6.537*
	(1.822)	(2.031)	(2.727)	(2.244)	(2.108)	(3.332)
Leverage	-0.377	-0.945**	-0.565	-0.122	-0.690*	-0.589
	(0.378)	(0.476)	(0.510)	(0.286)	(0.385)	(0.452)
Profitability	-3.394	4.815	-32.784**	4.974	-4.688	21.353
	(14.077)	(11.882)	(15.105)	(15.078)	(12.234)	(21.687)
Book-to-market ratio	-0.183	-0.248	0.463	-0.263	-1.457	-1.195
	(0.667)	(0.628)	(0.811)	(1.019)	(1.108)	(1.486)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry × year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country × year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2490	2490	2490	2144	2144	2144
Adjusted R-squared	0.812	0.837	0.836	0.791	0.787	0.803

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2. Robustness: The subscores underlying the social score following the issuance of green and sustainable loans - with matched sample

This table reports how the subscores underlying the social score evolve following the issuance of green and sustainable loans for the matched sample. "Green loans (short-term, 1 year)" ("Sustainable loans (short-term, 1 year)") is the total volume of green (sustainable) loans issued by a firm in the previous year divided by the firm's total assets accounting for the short-term effect (1 year). "Green loans (long-term, 2+ years)" ("Sustainable loans (long-term, 2+ years)") is the total volume of green (sustainable) loans issued by a firm two years ago divided by the firm's total assets carried forward in all subsequent years representing the long-term impact (2+ years). Standard errors are clustered at the firm level.

	Green loans				Sustainable loans			
	Workforce Score	Human Rights Score	Community Score	Product Responsibility Score	Workforce Score	Human Rights Score	Community Score	Product Responsibility Score
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Green loans (short-term, 1 year)	0.459	-0.394	-2.255**	-0.765**				
	(0.380)	(0.540)	(0.891)	(0.373)				
Green loans (long-term, 2+ years)	1.113**	-0.849	-2.277**	-1.804***				
	(0.529)	(0.865)	(0.887)	(0.516)				
Sustainable loans (short-term, 1 year)					0.050	0.304	0.229	0.701**
					(0.127)	(0.711)	(0.197)	(0.273)
Sustainable loans (long-term, 2+ years)					-0.069	1.224	-0.082	0.841**
					(0.196)	(0.850)	(0.358)	(0.393)
Size	5.625***	8.553***	-0.095	2.131	5.592***	5.004	-2.200	0.305
	(2.013)	(3.101)	(2.097)	(2.819)	(2.120)	(3.354)	(2.742)	(3.013)
Leverage	-0.527*	-1.155**	-0.418	-0.195	0.039	-0.457	-0.269	0.155
	(0.285)	(0.512)	(0.373)	(0.453)	(0.264)	(0.576)	(0.331)	(0.488)
Profitability	23.793**	-6.504	-22.811	-20.979	19.744	-4.025	-30.163*	23.442
	(9.483)	(15.366)	(14.120)	(18.180)	(15.746)	(18.778)	(17.244)	(22.324)
Book-to-market ratio	0.398	1.050	0.160	0.102	0.673	-0.493	-0.668	4.537***
	(0.588)	(1.057)	(0.922)	(0.917)	(1.218)	(1.595)	(1.250)	(1.639)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry × year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country × year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2490	2490	2490	2490	2144	2144	2144	2144
Adjusted R-squared	0.802	0.741	0.750	0.757	0.737	0.714	0.779	0.760

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A3. Robustness: The subscores underlying the governance score following the issuance of green and sustainable loans - with matched sample

This table reports how the subscores underlying the governance score evolve following the issuance of green and sustainable loans for the matched sample. "Green loans (short-term, 1 year)" ("Sustainable loans (short-term, 1 year)") is the total volume of green (sustainable) loans issued by a firm in the previous year divided by the firm's total assets accounting for the short-term effect (1 year). "Green loans (long-term, 2+ years)" ("Sustainable loans (long-term, 2+ years)") is the total volume of green (sustainable) loans issued by a firm two years ago divided by the firm's total assets carried forward in all subsequent years representing the long-term impact (2+ years). Standard errors are clustered at the firm level.

	Green loans			Sustainable loans		
	Management Score	Shareholders Score	CSR Strategy Score	Management Score	Shareholders Score	CSR Strategy Score
	(1)	(2)	(3)	(4)	(5)	(6)
Green loans (short-term, 1 year)	-0.188	0.773	0.129			
	(0.475)	(0.966)	(0.588)			
Green loans (long-term, 2+ years)	0.657	0.771	-0.310			
	(0.711)	(1.250)	(0.798)			
Sustainable loans (short-term, 1 year)				-0.225	0.032	0.547**
				(0.256)	(0.469)	(0.261)
Sustainable loans (long-term, 2+ years)				0.772**	0.771**	0.756**
				(0.315)	(0.364)	(0.344)
Size	3.613	0.807	5.953**	4.858**	-6.397**	1.408
	(2.338)	(3.099)	(2.447)	(2.458)	(2.490)	(2.571)
Leverage	0.087	-0.448	-0.595	-0.328	-0.349	0.112
	(0.412)	(0.488)	(0.364)	(0.427)	(0.513)	(0.437)
Profitability	-1.846	7.025	-3.559	12.902	-30.490*	30.934
	(18.121)	(21.467)	(14.775)	(17.663)	(18.394)	(18.917)
Book-to-market ratio	-0.482	1.371	-0.562	-4.010***	0.963	-1.099
	(0.945)	(1.431)	(0.883)	(1.401)	(2.193)	(1.394)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry × year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country × year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2490	2490	2490	2144	2144	2144
Adjusted R-squared	0.669	0.602	0.759	0.670	0.628	0.773

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$