

ESG Lending

Finance Working Paper N° 817/2022 November 2022 Sehoon Kim University of Florida

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ESG Lending

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Abstract

Sustainable lending has flourished amid widespread issuance of ESG-linked loans with spreads contingent on borrower ESG performance. These loans are issued between reputable firms and banks with superior ESG profiles that face greater stakeholder scrutiny, mostly as revolving credit facilities through banking relationships. Consistent with greenwashing concerns, ESG-linked loans vary widely in contractual disclosure quality, and borrower ESG scores deteriorate after the issuance of low disclosure quality ESG-linked loans. Stock markets exhibit vigilance against potential greenwashing, responding positively to ESG-linked loan issuance announcements only if disclosure quality is high. Our findings highlight the importance of transparency in sustainable financing.

Keywords: ESG, ESG Loans, ESG Lending, Sustainability-Linked Loans, Sustainable Finance, Bank Lending

JEL Classifications: G21, G32, M14

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ESG Lending

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Abstract

Sustainable lending has flourished amid widespread issuance of *ESG-linked* loans with spreads contingent on borrower ESG performance. These loans are issued between reputable firms and banks with superior ESG profiles that face greater stakeholder scrutiny, mostly as revolving credit facilities through banking relationships. Consistent with greenwashing concerns, ESG-linked loans vary widely in contractual disclosure quality, and borrower ESG scores deteriorate after the issuance of low disclosure quality ESG-linked loans. Stock markets exhibit vigilance against potential greenwashing, responding positively to ESG-linked loan issuance announcements only if disclosure quality is high. Our findings highlight the importance of transparency in sustainable financing.

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1 Introduction

Stakeholders increasingly demand that companies be vigilant about environmental, social, and governance (ESG) issues. Firms have responded to these demands by incorporating ESG considerations covering a broad range of issues such as environmental externalities, employee welfare, and social diversity and inclusion into their corporate policies. A nascent but growing body of finance literature examines how capital providers and financial contracts shape and influence firms' ESG policies. While the bulk of this literature has focused on equity and bonds, very little is known about the role of banks and loan contracts in the rapidly evolving ESG financing space.¹ This is especially surprising given that bank loans are the primary source of debt financing for firms around the world.² This paper fills this void by providing the first comprehensive analysis of ESG lending around the world and investigating the role of loan contracts in incentivizing borrower commitment to sustainability.

We define ESG loans as either general purpose loans whose terms are contractually tied to ESG performance (i.e., "ESG-linked loans", alternatively termed "sustainability-linked loans") or loans whose proceeds directly finance environmentally and socially conscious projects (i.e., "green loans"). Using Refinitiv DealScan data over the sample period from January 2016 to September 2021, we document that ESG lending activity around the world has grown exponentially—from \$6 billion in 2016 to \$322 billion in 2021—becoming an important segment of the global loan market and eclipsing the global green bond and sustainability-linked bond markets.³ ESG loans constituted more than 12% of global bank

¹For research highlighting how equity investors express ESG concerns, see Krueger, Sautner, and Starks (2020), Hartzmark and Sussman (2019), Dyck, Lins, Roth, and Wagner (2019), and Dimson, Karakas, and Li (2015). For research on green bonds, see Flammer (2021), Tang and Zhang (2020), Zerbib (2019), and Baker, Bergstresser, Serafeim, and Wurgler (2022).

²For instance, according to U.S. Flow of Funds data, bank loans constituted 59% of total nonfinancial business sector debt in the U.S. in 2020. The share is much larger for small businesses. Beck, Demirgüç-Kunt, and Maksimovic (2008) study firms in 48 countries and find that bank debt constitutes approximately 50% of total external financing.

³According to Flammer (2021), green bond issuance grew from \$5 billion in 2013 to \$96 billion in 2018. ESG-linked bonds, where bond terms are tied to issuer ESG performance, remain a niche market. Since 2020, ESG-linked loan issuance (around \$466 billion) has dwarfed ESG-linked bond issuance (around \$24 billion) (see *Wall Street Journal*, "Deluge of debt is tied to carbon emissions and diversity," May 4, 2021).

lending in 2021. Among all ESG lending activities in 2021, \$289 billion, or 90%, consisted of ESG-linked loans. The proliferation of these general purpose loans has allowed ESG lending to spread to a broader set of industries beyond utilities, where a greater portion of green loan and bond financing remains concentrated.⁴ These loans have also propagated globally, particularly across Western European and North American countries with stakeholder-oriented economies and well-developed credit markets.

What explains this growth, and why do borrowers and lenders engage in ESG-linked loan contracts? ESG-linked loans can enable borrowers to *credibly* signal their commitment to ESG issues to outside stakeholders. As investors and stakeholders increasingly require transparency on firms' ESG practices (see Krueger et al., 2020; Ilhan, Krueger, Sautner, and Starks, 2020), the ESG lending market may have evolved in equilibrium as a performance pricing market where borrowers more capable of maintaining high ESG standards willingly borrow from lenders equipped with the expertise to effectively coordinate ESG performance pricing contracts and monitor the borrower's ESG practices. Lenders also have incentives to utilize ESG-linked loan contracts. To the extent that good ESG practices provide protection against downside risks (see Albuquerque, Koskinen, Yang, and Zhang, 2020; Stroebel and Wurgler, 2021; Hoepner, Oikonomou, Sautner, Starks, and Zhou, 2020), it is natural to incorporate ESG performance contingencies into loan pricing. It is also possible that regulatory and governmental pressure on banks to improve the overall ESG profiles of their loan portfolios have pushed the supply of ESG-labeled loans.⁵ However, firms and banks may also engage in ESG-linked lending for "greenwashing" purposes, where the ESG-contingent contract terms are written to showcase an *empty* emphasis on ESG to stakeholders. We comprehensively examine these possibilities and provide evidence suggesting that borrowers

 $^{^{4}}$ Utilities account for 17% of the aggregate issuance amount of ESG-linked loans, in comparison to 59% and 32% of green loan and bond issuance, respectively.

⁵This conjecture is supported by the fact that ESG lending has grown in lockstep with heightened societal and regulatory pressure to combat climate change. For example, several central banks have implemented mandatory climate stress testing exams (e.g., Bank of England, European Central Bank). The U.S. Federal Reserve is also designing potential climate stress tests (see Jung, Engle, and Berner, 2022). The growth in ESG lending also coincides with an increase in national commitments to reduce carbon emissions, as illustrated in Figure A.1.

and lenders facing greater stakeholder demand self-select into ESG loan contracts. However, as we elaborate later, our findings also justify concerns about greenwashing practices and the lack of transparent disclosures regarding ESG contingencies in these loan contracts.

We begin our analysis by examining how ESG loans and their lending syndicates are structured, and how borrowers and lenders select into the ESG lending market. Conducting detailed analyses at the loan level, we find that ESG-linked loans are larger than non-ESG loans (i.e., average deal size of \$937.2 million vs. \$520.8 million), and are typically issued to larger, safer, and publicly listed borrowers. Our findings suggest that large and economically important firms that face greater public scrutiny have stronger incentives to signal ESGfriendly practices by obtaining ESG-linked loans. The results, however, do not support an alternative argument that banks under regulatory pressure may push small and financially constrained firms to accept ESG-linked loan terms as a last resort to access capital.

In matched sample analysis controlling for borrower and deal characteristics, we further find that ESG-linked loans are structured mainly as revolving credit facilities that are more likely to be tightly monitored by lenders (see Berger and Udell, 1995; Berlin, Nini, and Yu, 2020). These loans are also more likely to be issued by relationship banks. The two features, put together, could facilitate effective contracting around ESG commitments by setting contingencies that can be monitored, enforced, and renegotiated with ease. ESG loans also tend to be syndicated by larger groups of lenders, which are comprised mainly of the dominant global lenders with past ESG lending experience. In contrast, green loans are no larger than nongreen loans, issued mostly to non-investment-grade privately held borrowers, and are less likely to be originated by relationship banks.

To gain insights into whether there is a greenium in ESG loans, similar to what has been documented in other asset classes (see Bolton and Kacperczyk, 2021; Pastor, Stambaugh, and Taylor, 2022, among others), we examine loan spreads at issuance. Controlling for loan and borrower characteristics, we find that the initial spreads at issuance for ESG-linked loans are no different from those for non-ESG loans, suggesting that borrowers who meet ESG per-

formance targets in the future could enjoy lower spreads ex post pursuant to their ESG performance pricing contracts. On the other hand, green loans are issued at lower spreads. This contrasts with green bonds, which are priced no differently from nongreen bonds according to Flammer (2021), who suggests that the lack of differential pricing in green bonds could be because bond investors are not willing to trade off financial returns for other considerations. Our results suggest that large reputable banks, which are regulated by governmental agencies that serve stakeholder interests more broadly, may have incentives to make this trade-off.

To understand the real effects of ESG lending and to shed more light on greenwashing concerns, we examine borrowers' ex ante ESG profiles and ex post ESG performance. Using ESG performance information obtained from Refinitiv's Asset4 database, we find significant and positive associations between the likelihood of ESG lending and the ESG scores of both borrowers and lenders ex ante, indicating a selection in ESG lending among firms with better capabilities of making ESG commitments *prior* to loan issuance. However, in contrast to these commitments, we find within-borrower ex post deterioration in ESG scores *after* ESG loan issuance. To alleviate concerns about the measurement of ESG scores, we also use more sharply defined measures that focus on emissions or resource usage and find similar results.

Next, we conduct several additional analyses to help disentangle whether the observed ex post deterioration in borrower ESG performance is indicative of greenwashing. In these analyses, we relate the post-issuance outcomes to the credibility of the borrowers' ESG commitments, inferred from the quality of public disclosures regarding the ESG contingent features in the loan contracts. Specifically, we parse through loan disclosures provided by Refinitiv and supplement them with a manual search of media releases and corporate reports. Using this information, we classify ESG-linked loans as having poor or good disclosure quality. The two groups are similar in observable borrower characteristics prior to loan issuance. Based on this classification, we first document that the quality of disclosure regarding the contractual details of ESG-linked loans is generally poor. This is consistent with concerns among practitioners and the general public that it is difficult to verify ESG loan labels or gauge the real impact of ESG-linked loans in disciplining borrowers on sustainability issues.⁶.

Consistent with greenwashing concerns, we find that the expost deterioration in borrower ESG performance is concentrated among loans with poor disclosure quality. In contrast, borrowers of ESG-linked loans with good disclosure quality continue to maintain their superior ESG scores expost. This conditional evidence helps rule out alternative explanations for the observed real effects. For example, a mechanical mean reversion of borrower ESG scores around the issuance of ESG-linked loans is unlikely to drive these results as there is little reason that such mean reversion should be correlated with loan disclosure quality.

Finally, we examine how stock market investors perceive the issuance of ESG-linked loans. In an event study analysis, we find that stock markets react positively to public announcements of ESG-linked loan issuance *only* when the quality of disclosure regarding the contractual details is high. We find negative and statistically insignificant stock market reactions to the issuance of poor disclosure quality loans. These results are consistent with our findings and interpretation regarding the ex post deterioration in borrower ESG performance, and highlight stock market vigilance against potential greenwashing practices.

Overall, our results are consistent with large borrowers and global lenders, who face pressure from stakeholders, signalling their ESG commitments through explicit ESG loan contracting but not always following through with their commitments. These findings justify concerns raised by the media and practitioners about greenwashing in the ESG lending market. On the other hand, our findings regarding good disclosure quality loans and stock market vigilance suggest that ESG-linked loans have the potential to become an effective financing tool that allows lenders and borrowers to credibly commit to ESG-friendly policies.

Our study complements recent work on green bonds (see Flammer, 2021; Tang and Zhang, 2020; Zerbib, 2019; Baker et al., 2022). A key distinction of our paper in relation to this literature is that we document the widespread use of "general purpose" loans that are

⁶See *Bloomberg*, "Wall Street's ESG loans charge corporate America little for missed goals," September 8, 2021; *Bloomberg*, "Ethical label is hard to verify in secretive world of ESG loans," June 22, 2021; *Bloomberg*, "Leveraged loan market's ESG push offers window into opaque deals," February 3, 2020.

designed to incentivize firms across industries to improve their overall sustainability profiles rather than achieve narrower objectives that are tied to specific projects. This departure from use-of-proceeds-based ESG contracting helps *democratize* ESG-contingent financing. In contrast, the market for green bonds, which are issued for specific purposes and earmarked for green projects, is inevitably limited to a narrower set of industries.

More broadly, our study contributes to the burgeoning literature on ESG investing. Along the capital structure spectrum, much of the literature has focused on why equity investors value sustainable investments and how they monitor or influence corporate ESG performance.⁷ Our paper fills an important gap by documenting how lenders and firms contract on ESG-related issues in the vast bank lending market. Recent studies suggest that good ESG profiles provide firms with protection against downside risks associated with reputation, customer loyalty, or regulatory oversight.⁸ These risks have important implications for creditors who lend money to corporations (see Acharya, Amihud, and Litov, 2011; Houston, Lin, Lin, and Ma, 2010; Anginer, Hrazdil, Li, and Zhang, 2021; Correa, He, Herpfer, and Lel, 2021). While recent studies examine the role of corporate and lender ESG profiles in lending relationship matching (see Kacperczyk and Peydró, 2021; Houston and Shan, 2021; Shin, 2020; Hauptmann, 2017), our study is the first to directly examine how bank loans are structured to contract around and mitigate ESG-related risks.

Finally, we also contribute to the literature on ESG monitoring and reporting. Banks, much like institutional investors in equity markets, are uniquely positioned to effectively monitor firms' progress on ESG considerations. However, it is also possible that some banks

⁷See, among others, Azar, Duro, Kadach, and Ormazabal (2021), Bellon (2021a), Bolton and Kacperczyk (2021), Döttling and Kim (2021), Gibson, Krueger, and Mitali (2021), Heath, Macciocchi, Michaely, and Ringgenberg (2021), Naaraayanan, Sachdeva, and Sharma (2021), Pastor, Stambaugh, and Taylor (2021), Cao, Titman, Zhan, and Zhang (2020), Gibson, Glossner, Krueger, Matos, and Steffen (2020), Hoepner et al. (2020), Humphrey, Kogan, Sagi, and Starks (2020), Ilhan et al. (2020), Krueger et al. (2020), Oehmke and Opp (2020), Pedersen, Fitzgibbons, and Pomorski (2020), Dyck et al. (2019), Hartzmark and Sussman (2019), Barko, Cremers, and Renneboog (2018), and Dimson et al. (2015).

⁸See Hoepner et al. (2020), Albuquerque et al. (2020), Albuquerque, Koskinen, and Zhang (2019), Ding, Levine, Lin, and Xie (2020), and Lins, Servaes, and Tamayo (2017). In particular, see Bartram, Hou, and Kim (2022), Bellon (2021a,b), Stroebel and Wurgler (2021), Ivanov, Kruttli, and Watugala (2021), and Krueger et al. (2020) for evidence that climate regulations and legal liability pose important sources of risk for firms.

may instead engage in greenwashing practices, reflecting conflicts of interest in signaling ESG commitments. In fact, a recent literature highlights that metrics of ESG performance are often opaque or misleading, presenting a pervasive problem for stakeholders (see Berg, Fabisik, and Sautner, 2021; Berg, Kölbel, and Rigobon, 2022; Tang, Yan, and Yao, 2022). Studies have also shown that this entails risks that investors should be vigilant about (see Berg, Kölbel, Pavlova, and Rigobon, 2021; Serafeim and Yoon, 2021). Our findings complement these recent studies. We show that greenwashing is indeed a valid concern in the ESG lending market that investors are vigilant about. We also show that transparent disclosure regarding ESG-related contract terms alleviates such concerns. Overall, our findings contribute to a more complete picture of how ESG concerns are reflected in loan contracts, leading to a more holistic understanding of sustainable financing.

2 ESG Lending

We begin by providing an introduction to ESG loans. There are broadly two types of ESG loans: *ESG-linked loans* and *green loans*. ESG-linked loans are general purpose loans where loan pricing terms are tied to the ESG performance of the borrowing firm. These loans are also called *sustainability-linked loans*.⁹ The loan spreads on these loans are pegged explicitly to key performance indicators (KPIs) incorporating sustainability goals. These KPIs may be ESG scores assigned to borrowers by external rating agencies (e.g., Sustainalytics) or specific measures such as greenhouse gas (GHG) emissions or employee health and safety performance. The proceeds from sustainability-linked loans can be used to fund general operations without being tied to green projects. On the other hand, green loans, analogous to green bonds, are loans where the proceeds are earmarked to exclusively finance environmental and climate-friendly projects (e.g., renewable energy, biodiversity conservation, sustainable water, wastewater management, carbon capture).

⁹We use the terms ESG-linked loans and sustainability-linked loans interchangeably throughout the paper.

2.1 ESG-Linked Loans

The ESG-linked loan market has grown rapidly since 2017, when the first loan of this kind was issued. To understand how these newly introduced instruments work, consider the general purpose loan obtained by Crown Holdings Inc. (NYSE: CCK). The loan was originated in 2019 by a syndicate of lenders, with BNP Paribas as the sustainability agent overseeing and enforcing the ESG-contingent loan terms. The sustainability-related KPI in the loan agreement is a "sustainability rating" assigned by Sustainalytics, a leading independent ESG ratings provider (later acquired by Morninstar, Inc.), and the interest rate charged by the lender decreases (increases) when Crown's sustainability rating is higher (lower). An excerpt from the loan agreement details this arrangement, as shown below.

"Sustainability Rating" means the "Management Score" in respect of environment, social, and governance factors (the ESG score), as calculated and assigned to Crown Holdings from time to time by Sustainalytics B.V. and published in the most recently released ESG Score report thereof ... "Sustainability Rating Adjustment" means, with respect to the applicable Spread, an adjustment as follows:

(i) At any time the most recently published Sustainability Rating is 45 or higher (subject to clause (ii) below), the Spread will be reduced by 0.025%...

(ii) At any time the most recently published Sustainability Rating is 50 or higher...
 the Spread will be reduced by 0.05%...

(iii) At any time the most recently published Sustainability Rating is lower than
30 (subject to clause (iv) below), the Spread will be increased by 0.025%...

(iv) At any time the most recently published Sustainability Rating is 25 or lower, the Spread will be increased by 0.05%...

Although there is variation across deals, the example contract above, which exhibits a total spread change of 10 basis points based on sustainability performance, represents the typical deal in our sample when such pricing information is available. To put this in context, one can compare this spread change to the spread change in credit rating-based performance pricing contracts. For example, HP Inc. borrowed through a revolving credit facility in 2020 where the spread was set to increase by 12.5 basis points if its S&P credit rating was downgraded from A- to BBB+, a downgrade of one notch.

The terms of sustainability-linked loans need not be tied to third-party ESG ratings. ESG-linked loans also give borrowers and lenders the flexibility to tailor KPIs around more specific ESG objectives. For example, Johnson Controls International plc (NYSE: JCI) entered into a loan contract in 2019 where ING Capital LLC acted as the sustainability structuring agent. The loan pricing terms were tied to meeting specific targets regarding employee safety and greenhouse gas (GHG) emissions by 2025. The loan contract identified three measurable KPIs related to these objectives and the associated yearly targets, as follows.

- KPI#1: Total recordable incident rate (TRIR) a measure of the health and safety performance of Johnson Control's operations.
- KPI#2: *GHG savings* reduction in greenhouse gas emissions achieved by the company by implementing energy efficiency and renewable energy customer projects.
- KPI#3: GHG intensity target the company's GHG emissions scaled by revenues.

Clearly, Johnson Controls was able to commit to specific targets for a broad range of sustainability objectives through these KPIs. The loan margins were set to increase, decrease, or be maintained based on how the actual KPI metrics performed relative to the contractual targets, similarly to the Crown Holdings example described above.

These examples highlight unique features of ESG-linked loans that allow borrowers and lenders to engage in ESG-contingent contracting with flexibility in terms of both the purpose of the loan and commitments to specific sustainability objectives. These are marked departures from the conventionally available instruments for green financing, for example, use-of-proceeds-based green bonds where the capital raised could be used only for specific sustainable projects (e.g., renewable power plants, energy-efficient buildings).

To facilitate common industry standards for ESG-linked loans, the Sustainability Linked Loan Principles (SLLPs) were developed by an experienced group of representatives from leading financial institutions active in the global syndicated loan market. The SLLP set out a framework based on the following five components: (1) selection of KPIs that are relevant, core, and material to the borrower's sustainability and business strategy, (2) calibration of sustainability performance targets (SPTs) for each KPI in an ambitious manner, (3) loan characteristics (typically spreads) linked to meeting SPTs, (4) reporting of detailed SPT performance at least once a year and preferably publicly, and (5) independent and external verification of performance against SPTs, preferably made publicly available. The SLLPs are recommended guidelines to be voluntarily applied by market participants on a deal-by-deal basis depending on the underlying characteristics of the transaction.

2.2 Green Loans

While the green bond market has grown rapidly in the past decade (see Flammer, 2021; Tang and Zhang, 2020; Zerbib, 2019; Baker et al., 2022), a similar use-of-proceeds-based green financing market has also developed in the loan market. Green loans, unlike ESG-linked loans, are loans that fund specific projects with *explicit* sustainable features. At the core of a green loan are the Green Loan Principles, which provide a list of categories eligible for green projects based on the following four components: (1) the use of proceeds, (2) the process for project evaluation and selection, to be developed by borrowers and lenders, (3) process management, which includes a separate account that can be tracked by borrowers to maintain transparency, and (4) reporting, which is prepared internally and externally reviewed and verified by auditors or independent ESG rating providers.

For example, Spanish pulp mills operator Ence Energia (BME:ENC) announced a EUR 66 million green loan financing deal in 2018 to fund part of the construction of a new 46 MW

biomass power plant in Puertollano, central Spain, that was scheduled to become operational in 2020. The plant is designed to use mainly agroforestry residues from the surrounding area as fuel, making it a green project financed specifically by the loan. The green loan has a seven-year maturity. Banco Santander SA is the green agent for the loan facility.

In short, the growth of ESG lending has opened the door to general purpose debt tied to the borrower's ESG performance on a wide variety of measures and to green project finance lending that complements the market for green bonds. Using a global and comprehensive sample of loan-level data, we provide an early examination of the characteristics, distribution, and contracting incentives of ESG borrowing and lending. While we focus primarily on ESGlinked loans, we also examine green loans because they serve as useful comparisons to help us better understand ESG-linked loans and present a complete picture of the ESG lending space.

3 Data and Sample

Our loan-level data come from Refinitiv DealScan. For all loans in the database, DealScan assigns two market segment flags according to the definitions above: "ESG-linked loan" and "green loan." Refinitiv DealScan uses information from loan agreements, public media releases, and discussions with lenders and borrowers to confirm these loan features. Using the DealScan market segment table, we classify a loan facility as an ESG-linked or green loan. We identify 1,127 ESG-linked loans and 1,228 green loans that raised \$662 billion and \$191 billion in total, respectively, over the sample period from 2016 to 2021 (as of September).¹⁰ In all of our analyses, continuous variables are winsorized at the 1% and 99% levels. In this section, we provide a brief summary of these loans along several dimensions.

[Insert Table 1 here]

[Insert Figure 1 here]

¹⁰While we rely on DealScan because it provides the most comprehensive source of data on the contractual terms of loans, we cross-check the sample coverage with two additional sources, Bloomberg and Refinitiv Eikon, and confirm that they largely overlap with or are subsumed by DealScan.

Table 1 and Figure 1 describe the time-series of ESG-linked and green loan issuance. Global ESG lending activity totaled \$853 billion during the sample period, growing from less than 1% of global syndicated loan issuance (or \$6 billion) in 2016 to more than 12% (or \$322 billion) in 2021 as of September. Most of this lending consisted of ESG-linked loans, which amounted to \$662 billion in total (\$289 billion in 2021), outweighing the amount of green loans each year. ESG-linked loan issuance grew even more substantially after 2020 when the global economy and financial markets were disrupted by the COVID-19 pandemic. The green loan market, which raised a total of \$191 billion over our sample period, also grew rapidly from \$6 billion in 2016 to \$33 billion in 2021 as of September.

[Insert Table 2 here]

Table 2 reports the distribution of ESG-linked and green loans over the sample period across the Fama–French 17 industries of borrowers. The industry distribution of ESG-linked loan issuance is broad, in contrast to the concentration of use-of-proceeds–based green loan issuance within the utilities industry. Fifty-nine percent of green loan issuance is concentrated in the utilities industry, similar to what has been documented for green bonds by Flammer (2021). In contrast, only 17% of ESG-linked loans are issued to firms in the utilities industry. In fact, we find that the industrial distribution of ESG-linked loans is comparable to that of loans in the DealScan database in general. The widespread use of ESG-linked loans is consistent with the fact that the proceeds from these loans can be used for general purposes rather than for specific projects while the loan terms can be tied to a broad range of ESG objectives.

[Insert Table 3 here]

In Table 3, we report the breakdown of ESG lending activity by the borrower's country of incorporation. Notably, we find that borrowers from the United States and Western European countries are prevalent in the ESG-linked loan market in terms of aggregate proceeds. Sixteen of the top twenty countries in the list are also among the top twenty most sustainable countries according to Sustainalytics.¹¹ This suggests that ESG-linked loans are prevalent in places where stakeholders demand that firms incorporate ESG considerations into their corporate policies. Although the United States is the largest single country in terms of ESG-linked loan issuance, its global market share in the ESG-linked loan market (i.e., 18%) is significantly lower than its market share in the global syndicated loan market (i.e., 52%).¹² While Western economies also rank highly in terms of green loan issuance, other regions including Asia and Australia are more prominent in the green loan market than in the ESG-linked loan market.

[Insert Figure 2 here]

[Insert Figure 3 here]

In Figures 2 (time-series by region) and 3 (series of heat maps), we graphically summarize the evolution of this cross-country distribution over our sample period. These figures illustrate that ESG-linked loans started to emerge and grew since 2016 mainly across Western Europe. However, ESG-linked loans have spread rapidly to other parts of the world since 2020, growing more than threefold in the United States, making it the largest issuer of ESGlinked loans in 2021.¹³ While green loans have also propagated broadly around the world, they have done so with less concentration in Western economies and in smaller magnitudes.

We corroborate this geographical distribution by investigating cross-country determinants of ESG lending (see more details in Section A.1 of the Internet Appendix). We find that countries with common law origins exhibit significantly less ESG-linked loan issuance activity than civil law countries, consistent with Liang and Renneboog (2017) who document that civil law countries are more likely to support stakeholder-oriented economies and facilitate private contracts that induce commitments to such values. In contrast, we find no evidence

¹¹See the *Sustainalytics*, "Country research and ratings" data brochure.

 $^{^{12}\}mathrm{According}$ to the 2020 global syndicated loans review by Refinitiv.

¹³Consistent with borrowers and lenders responding to heightened stakeholder pressure, ESG lending has increased dramatically in the U.S. after the renewal of its national commitment to reduce carbon emissions following the 2020 presidential election.

that legal origins matter for the development of green loan markets, which are primarily project financing deals. For both ESG-linked and green loans, however, we find that robust private credit markets are essential for the development of rich ESG lending markets. This is consistent with the notion that well-developed credit markets with effective institutions to support them foster innovations in financial markets. Last, we find that ESG-linked and green loans both flourish under stricter environmental regulations, consistent with the idea that these loans arise as lenders and borrowers respond to heightened stakeholder pressure.

In short, the overall ESG loan market and ESG-linked loans in particular have grown rapidly in the past several years, spreading globally across diverse industries in stakeholderoriented economies with well-developed credit markets.

4 Empirical Results

Given the widespread growth of ESG lending, it is important to understand the incentives of borrowers and lenders who participate in this market. As hypothesized earlier, there are a number of potential explanations. Borrowers may aim to credibly signal their commitment to ESG issues, while lenders may supply ESG loans in response to pressure from regulators and stakeholders to improve the ESG profiles of their loan portfolios. However, borrowers and lenders may also issue ESG loans to showcase an empty emphasis on ESG to their stakeholders as a form of greenwashing. To investigate these possibilities, we first examine the structure of ESG loans and the lending syndicates, as well as the pricing of these loans. We then analyze the real effects of ESG lending on borrower ESG performance and the stock market's response to loan issuance announcements. In these analyses, we carefully examine the role of contractual transparency in disciplining the participants in the ESG lending market.

4.1 Borrower and Lender Reputations and ESG Loan Structure

Borrower and Loan Characteristics

To gain insights into the incentives of borrowers for issuing ESG loans, we start our analysis by examining borrower and loan characteristics. In Table 4, we report unconditional and matched-sample comparisons of these characteristics between ESG-linked or green loans and control loans without ESG-contingent features.

[Insert Table 4 here]

Panel A reports the unconditional comparisons. The control group contains non-ESG loans issued during our sample period from 2016 to 2021 (as of September). We exclude non-ESG loans issued in countries with no ESG lending activity during our sample period. We find that ESG-linked loan borrowers are significantly larger than non-ESG borrowers as measured by their sales as of the time of deal closure (i.e., average of \$10.8 billion vs. \$6.6 billion). ESG-linked loan borrowers are also more likely to be publicly listed than non-ESG borrowers: 52% of ESG-linked loan borrowers are publicly listed firms, whereas only 21% of control loan borrowers are. Correspondingly, the average facility amount of ESG-linked loans is substantially larger than that of non-ESG loans (i.e., \$533.3 million vs. \$245.5 million). While ESG-linked loans have marginally shorter maturities, there is no significant difference in maturity when controlling for other loan characteristics.¹⁴

ESG-linked loan facilities are substantially more likely to be revolving credit facilities than the loans in the control sample (i.e., 55% vs. 37%). Revolving credit facilities, unlike term loans, are typically held by relationship lenders, which facilitates effective contracting around commitments by setting contingencies that can be monitored, enforced, and renegotiated with ease (see Berger and Udell, 1995; Berlin et al., 2020). We provide more evidence on lender–borrower relationships in our analysis of the syndicate structure of ESG lenders.

We also find that ESG-linked loans are issued by firms with high credit quality: these

¹⁴See Table A.2 in the Internet Appendix for a multivariate regression analysis.

loans are more likely to be rated investment grade and are less likely to be leveraged loans. This contradicts the "constraint argument" according to which firms reluctantly borrow on ESG-contingent terms to alleviate borrowing constraints. Our results indicate that, in contrast, ESG-linked borrowers are likely to be *less* credit constrained than other borrowers.

On the other hand, green loan borrowers tend to be smaller in terms of sales (i.e., \$5.1 billion vs. \$6.4 billion) and less likely to be publicly listed (i.e., 10% vs. 21%) than control loan borrowers. Unlike ESG-linked loans, green loan facilities are smaller than control loan facilities (i.e., \$155.2 million vs. \$241.7 million), and are less likely to be issued as revolving credit facilities than control loans (i.e., 18% vs. 36%). As green loan borrowers are typically small and privately held, these loans are also less likely to be investment grade.

In Panel B of Table 4, we conduct a matched sample analysis to confirm our findings regarding the package composition of ESG loans. Since the package structure of loans could systematically vary with deal size and other borrower characteristics, we match each ESG-linked or green loan package to a control non-ESG loan package issued in the same year and country as the ESG loan. We also match on the borrower's industry and listing status (privately held or publicly listed). Finally, we retain the control loan package closest in deal size to the ESG loan package. Our matched sample contains 694 (625) ESG-linked (green) loan packages and 734 (641) matched packages.¹⁵

Our analysis of loan package composition indicates that ESG-linked (green) loan packages are almost exclusively comprised of ESG-linked (green) loan facilities (i.e., 97% and 96%, respectively). Consistent with the findings from the unconditional analysis, the results show that ESG-linked loans are significantly more likely to consist of revolving credit facilities than term loans. More than half of all ESG-linked packages are composed entirely of revolvers (i.e., 54%). Additionally, consistent again with the unconditional analysis, we find that green loan packages are mostly comprised of term loans (i.e., 43% of them consist only of term loans).

Overall, our examination of the borrowers, deals, and facilities in ESG lending con-

 $^{^{15}{\}rm The}$ sample includes a few *one-to-many* matches when there are multiple control packages with the same closest deal amount.

tracts reveals that ESG-linked loans are large and borrowed by economically important and reputable firms. Such firms are likely to have incentives to signal their commitments to ESG-friendly practices given their visibility and demand from stakeholders.¹⁶ ESG-linked loans consist mostly of general purpose revolving credit facilities. The distinctly high proportion of revolvers in ESG-linked loans suggests that they may arise often from preexisting lending relationships (see Berger and Udell, 1995), which we investigate further below.

Lending Syndicate Structure

Next, we explore the syndicate structure of ESG-linked and green loans and provide insights into the incentives of the lenders participating in the ESG lending market. Since lending syndicates are determined at the loan facility level, we conduct a matched analysis at the facility level, extending our package-level matching in Panel B of Table 4. Specifically, we match each ESG-linked or green loan facility to a non-ESG control loan facility based on country, industry, year, borrower public/private status, and closest facility size. We retrieve information on lenders for each loan facility from Refinitiv. For each facility, we identify all lead arrangers in the syndicate following Cai, Eidam, Saunders, and Steffen (2018) and Houston, Lee, and Suntheim (2018). We are able to find information on 11,164 (9,902) lead arrangers for 1,035 (1,208) ESG-linked (green) loan facilities and 1,352 (1,526) non-ESG matched facilities.

For these lead arrangers, we study lender characteristics that are likely to be crucial to ESG lending at a global scale. First, we examine lenders' experience in the ESG market. To the extent that this novel loan product requires expertise in formulating, coordinating, and monitoring contract terms, banks with prior experience in ESG loan issuance could have an advantage over other banks in executing these complex loan contracts. Second, we examine the lender's status as a prominent global bank (i.e., reputable lender). Stakeholder demand for ESG commitment is likely to be greater for large global banks that are usually under tighter regulatory scrutiny, thereby affecting their incentives to engage in ESG lending. In

¹⁶Ninety percent of the ESG-linked borrowers in our sample are among the top 10% in terms of market capitalization in their respective countries of domicile, indicating that these firms are "national champions".

addition, the global status of such banks could help with the certification role of bank loans (see James, 1987) and could signal the lender's confidence regarding the borrower's commitment to ESG-related issues. Third, we investigate the lender's domicile in relation to the borrower's domicile (i.e., foreign lender). Cross-country frictions—financial, regulatory, physical, or cultural—are known to create lending home bias (see Carey and Nini, 2007; Giannetti and Laeven, 2012b,a; De Haas and Van Horen, 2013; Popov and Van Horen, 2015; Houston et al., 2018). Assessing whether ESG borrowers overcome such frictions to obtain ESG loans from globally reputed and experienced banks can give useful insights regarding the ESG lending process and the future growth of this market. Lenders from countries with a strong ESG culture, for example, may be more capable of acting as a coordinating agent in ESG-linked loan contracts. Finally, we investigate the lender's banking relationship with the borrower (i.e., relationship lender), as relationship lending is an important factor for effective contracting and financing (see Berger and Udell, 1995; Petersen and Rajan, 1994; Dahiya, Saunders, and Srinivasan, 2003; Schenone, 2004; Acharya and Johnson, 2007; Bharath, Dahiya, Saunders, and Srinivasan, 2007). For instance, a lender with a previous lending relationship with the borrower may be more capable of designing an ESG-linked loan that is better tailored for the borrower. On the other hand, relationship banking may also foster mutually beneficial greenwashing arrangements between the borrower and lender at the expense of other stakeholders.

To explore these agendas, we classify lenders into groups. For each loan, we classify lead arrangers with prior ESG lending history as *ESG-experienced lenders*. We define *reputable lenders* as the top 5% of lenders in terms of total lending amount over the five years prior to the loan's origination. We identify *foreign lenders* as lead arrangers from countries other than the borrower's country of incorporation. Finally, we designate a lead bank as a *relationship lender* if it had any prior lending relationship (as a lead arranger) with the borrower over the five years prior to the initiation of a loan. Based on these definitions, we report the number and fraction of specific types of lenders comprising the syndicate of ESG-linked or green loans and compare them to their counterparts in the matched non-ESG sample.

[Insert Table 5 here]

Table 5 presents these results. The average ESG-linked (green) loan is syndicated by a significantly larger group of lenders than the average non-ESG loan (i.e., 5.57 (4.68) vs. 3.99 (2.78) lenders). This is possibly due to the need for a dedicated "sustainability agent" to handle ESG contingencies in loan contracts. It is also possible that there is a greater demand from lenders (and their stakeholders) to co-lead such deals. Next, we examine the different types of lenders comprising the lending syndicate. For each type, we report both the average number of lenders and the average fraction of lenders comprising the syndicate (in brackets). Both ESG-linked and green loans are significantly more likely to have a larger number and higher fraction of ESG-experienced lenders, reputable lenders, and foreign lenders as part of the syndicate. In other words, ESG-linked and green loans alike have larger syndicate sizes and tend to attract reputable global banks seeking and procuring repeated business in ESG loan origination. From a loan contracting point of view, this is consistent with the complexity of ESG loans requiring specialized lenders to handle ESG-specific contract features. From a bank stakeholder-demand point of view, this is also consistent with a large number of reputable global banks seeking to actively participate in a limited number of "hot" ESG loans.

Importantly, Table 5 shows that relationship lending plays a distinctively critical role in facilitating ESG-linked loan issuance. Fifty-nine percent of all ESG-linked loan lead arrangers have previous lending relationships with borrowers, in comparison to 52% of non-ESG matched loans. In sharp contrast, only 16% of green loan lead arrangers are relationship lenders, in comparison to 34% of nongreen matched loans. The importance of lending relationships permeates all other lender categories: There are significantly more relationship ESG-experienced lenders, relationship reputable lenders, and relationship foreign lenders in the syndicates of ESG-linked loans, whereas the opposite is true for green loans. This is also consistent with our earlier finding that ESG-linked loans are more likely to be structured as revolving credit facilities, which are typically relationship based. A potential interpretation of this finding is that lending relationships facilitate more effective tailoring and monitoring of ESG commitments specific to the borrower. Another interpretation could be that it is substantially easier for banks to label the revolving credit lines of their existing relationship borrowers' as ESG-linked loans when they renew or roll over these general purpose loans that are not tied to a specific project (in the spirit of greenwashing). We further delineate these possibilities in our analysis of ESG performance around ESG loan issuance.¹⁷

ESG Loan Pricing

Do banks price ESG-linked loans and green loans differently from other, comparable loans? To the extent that ESG lending is driven partly by increased demand from creditors, ESG loan borrowers could potentially raise financing at a lower spread. Additionally, good ESG profiles can protect firms against downside risks (see Albuquerque et al., 2020; Stroebel and Wurgler, 2021; Hoepner et al., 2020), which could translate into lower spreads at issuance. On the other hand, there are implicit and explicit costs of ESG loans. Structuring and monitoring the ESG terms of such loans entails additional costs, some of which could be incorporated into the loan spread. More importantly, firms could potentially engage in ESG activities to cater to some key stakeholders even when it is not value enhancing for the firm. Such practices could again increase loan spreads at issuance.

To investigate this question empirically, we follow Berg, Saunders, Steffen, and Streitz (2017) and examine all-in-spread-drawn (AISD) differences between ESG and non-ESG loans by estimating the following regression specification:

$$AISD_{i,j} = \alpha + \beta_1 \cdot ESG_{i,j} + \beta_2 \cdot X_j + \beta_3 \cdot Z_i + \mathbf{I}(Country \times FF17 \times Year) + \epsilon_{i,j}$$
(1)

The dependent variable, $AISD_{i,j}$, is the spread over LIBOR for loan facility j issued by borrower i. We perform separate analyses for ESG-linked and green loans. $ESG_{i,j}$ is a dummy variable equal to one if the loan is ESG linked or green and zero otherwise. X_j controls for facility characteristics such as facility amount, maturity, security and loan type.

¹⁷We also reconfirm our univariate findings in multivariate regressions, reported in Table A.2.

 Z_i controls for borrower characteristics such as rating and public listing status.

[Insert Table 6 here]

The results are reported in Table 6. ESG-linked loans do not seem to be priced differently from non-ESG loans at issuance. While ESG loans pay 98 basis points less than non-ESG loans from the same country and industry issued in the same year (see Column 1), the discount largely disappears when we control for firm and loan characteristics. This suggests that borrowers do not enjoy pricing benefits at issuance from obtaining ESG-linked loans. However, given that ESG-linked loans feature performance pricing linked to meeting KPI targets, the insignificant spread difference at issuance is also consistent with lower spreads on ESG-linked loans for borrowers who meet their targets in the future.

On the other hand, green loans are issued at a lower spread. Our most stringent specification, which controls for loan and borrower characteristics, suggests that green loans have AISDs that are 56 basis points lower than those of comparable nongreen loans. As these are use-of-proceeds loans and do not have ESG-related performance pricing, our results suggest that creditors are clearly willing to reduce spreads for green loans. This is in contrast to the result of Flammer (2021), who finds no difference in spreads for green and nongreen bonds. Flammer (2021) notes that the typical bond investor may not be willing to trade off financial returns for other considerations. It is possible that large reputable banks, which are regulated by governmental agencies that serve stakeholder interests more broadly, are incentivized to make this trade-off. Our result is consistent with a greenium that is documented in the literature for other asset classes (see Bolton and Kacperczyk, 2021; Pastor et al., 2022).

4.2 Transparency and Real Effects of ESG Lending

Our results thus far show that visible borrowers and lenders who plausibly face greater scrutiny from stakeholders engage in ESG lending. However, these findings do not tell whether these arrangements reflect genuine ESG commitments or an empty emphasis to placate stakeholders. In this section, we examine the real effects of ESG lending in the context of their effects on borrower ESG performance. To further disentangle whether these real effects are indicative of greenwashing or not, we relate them to the credibility of borrower ESG commitments inferred from the quality of disclosures regarding the ESG contingent features of the loan contracts. We first characterize the disclosure quality of ESG-linked loans and then examine post-issuance borrower ESG performance.

Disclosure Quality of KPIs in ESG-Linked Loans

To gauge the credibility of ESG commitments signified by the issuance of ESG-linked loans, investors must rely on information regarding the contractual details, such as what the specific KPIs are and how they are tied to the loan terms. However, in the absence of regulations or disclosure requirements in the emerging ESG lending market, this information is voluntarily and selectively disclosed by borrowers and lenders. A common criticism among practitioners is that the availability of this information is limited, making it difficult to verify the validity of ESG loan labels and navigate the opaque market. The lack of detail or quality of such disclosures is in turn skeptically viewed as an indication of greenwashing. It is therefore important to examine the quality of KPI information disclosures in ESG-linked loans.

We classify ESG-linked loans for which we do not find any public information about their KPI metrics or how they are tied to loan terms as "poor disclosure" loans. On the other hand, "good disclosure" loans have loan terms linked to some metric of ESG performance (e.g., CO2 emissions per tonne of transported cargo per nautical mile, percent of woman in workforce, Sustainalytics score). While it is not straightforward to collect all publicly available information regarding loan contract details in the absence of standardized reporting rules, we document KPI disclosure quality by fully utilizing the information that can be obtained through Refinitiv DealScan. Refinitiv exploits a vast array of public information sources, such as company business reports, earnings calls, media releases, and direct interactions with lenders and borrowers. We read through all information provided by Refinitiv

pertaining to the ESG-related KPIs and pricing grids of ESG-linked loans, supplementing them with a manual search of media releases and corporate sustainability reports to classify ESG-linked loans according to their disclosure quality.

The statistics on disclosure quality are summarized in Table 7. Roughly half of the ESGlinked loans in our sample are classified as poor disclosure loans (i.e., 510 poor disclosure loans out of 1,127 loans). Between good and poor disclosure quality loans, we find no significant difference in the characteristics of borrowers (e.g., pre-issuance sales, ESG scores, or legal origins of their countries of domicile).

[Insert Table 7 here]

Among good disclosure ESG-linked loans that disclose specific KPIs, the vast majority, 85%, tie their loan spreads to an environmental KPI (e.g., greenhouse gas emissions). 32% use both environmental and social KPIs (e.g., emissions, labor safety, workforce diversity). 21% of these loans disclose that the KPI is based on a third-party ESG rating (e.g., MSCI rating or Sustainalytics ESG score). Interestingly, firms asymmetrically disclose the rewards and penalties to be applied to loan spreads conditional on ESG performance. 22% of good disclosure loans disclose the spread rewards conditional on meeting ESG performance targets, whereas only 13% disclose the penalties should the borrower miss the target.

Overall, our findings suggest that disclosure quality in ESG-linked loans is generally low and that there is considerable heterogeneity in the amount of contractual detail disclosed. We next exploit this heterogeneity in our ESG performance analysis to further delineate potential incentives in ESG-linked loan contracting.

Loan Issuance and ESG Performance

A natural and important question to ask to narrow down the number of plausible interpretations of ESG lending is whether borrowers and lenders previously committed to ESG issues are more likely to engage in ESG-contingent loan contracting and whether such explicit and contractual commitments impact their ESG performance ex post. In this section, we investigate this issue using firm-level ESG scores from the Refinitiv Asset4 database.

Refinitiv Asset4 gathers ESG performance data for a large set of firms around the world, most of which are publicly listed. The database provides this information for ten ESGrelated subcategories under three major categories: environmental (resource use, emissions, innovation), social (workforce, human rights, community, product responsibility), and governance (management, shareholders, CSR strategy). Within each category, values are assigned by aggregating various indicator variables that capture specific aspects related to the category. These values are in turn converted to cross-sectional percentile rank scores. The scores for each of the ten categories are combined into an overall ESG score for each firm, which indicates the company's overall ESG performance.

We focus on ESG-linked loans in this analysis, as green loan borrowers tend to be small and privately held firms that are generally not covered in ESG performance databases. Given that we will examine how ex post borrower ESG performance is related to the heterogeneity in loan disclosure quality, it is natural to focus exclusively on ESG-linked loans as disclosure quality regarding ESG-contingent pricing can only be defined for these loans. After manually matching our loan sample with the Asset4 database on borrower and lender company names, we retain 689 ESG-linked and non-ESG matched loans associated with 424 borrowers and 273 lenders.¹⁸ Our analysis of this sample is reported in Table 8.¹⁹

[Insert Table 8 here]

We begin by examining whether borrowers and lenders previously committed to ESG issues, as measured by their Asset4 ESG scores in the year prior to loan issuance, are more likely to engage in ESG-contingent loan contracting. We conduct univariate comparisons of ex ante ESG profiles between ESG-linked and non-ESG loans for both borrowers and

¹⁸Our matched sample covers 70% and 63% of publicly listed borrowers and lenders in our original sample, which is comparable to the matching yield of green bond issuers (70%) in the analysis of Flammer (2021).

¹⁹In untabulated analysis, we also find qualitatively consistent results based on ESG performance data from Sustainalytics. The Sustainalytics database accessible through WRDS extends only up to 2019, limiting coverage of participants in the ESG lending market that has grown substantially afterwards.

lenders, where the lender ESG score is measured as the average score of all lead arrangers in the syndicate of the loan. The results are reported in Panel A of Table 8. We find that both borrowers and lenders of ESG loans have significantly higher ex ante ESG scores than those of matched non-ESG loans. This is consistent with our earlier finding that large and reputable firms that face greater scrutiny from stakeholders regarding their ESG practices tend to issue ESG-linked loans. Our results are also consistent with recent findings that borrowers and lenders with similarly high ESG ratings tend to form lending relationships (see Kacperczyk and Peydró, 2021; Houston and Shan, 2021; Hauptmann, 2017).

The fact that ESG-linked loans tend to be issued to borrowers that already have superior ESG profiles raises the question of whether these contractual commitment devices are associated with better ex post ESG performance. If ESG-linked loans serve as *credible* signals to commitment to ESG-friendly practices, one would expect the superior ex ante ESG profiles to further improve or at a minimum be sustained after ESG-linked loan issuance. On the other hand, a deterioration of ESG performance ex post could be indicative of greenwashing around ESG-linked loan issuance. We investigate the effects of ESG-linked loan issuance on future borrower ESG performance by estimating a panel regression specification as follows.

$$ESG \ Score_{i,t} = \alpha + \beta_1 \cdot ESG \ Borrower_i \times PostLoanIssuance_{i,t} + \beta_2 \cdot ESG \ Borrower_i + \beta_3 \cdot PostLoanIssuance_{i,t} + \mathbf{I}(Firm) + \mathbf{I}(Country \times Year) + \mathbf{I}(Industry \times Year) + \epsilon_{i,t}$$
(2)

The dependent variable is one of the following ESG performance metrics of the borrower: the overall Asset4 ESG score; the ES score defined as the average of the environmental and social scores separately reported in Asset4; the E score which captures environmental performance; or components of the E score such as the emission score (reflecting efforts to reduce environmental emissions), the resource score (reflecting efforts to reduce usage of materials, energy, or water), and the innovation score (reflecting efforts to develop environmentally friendly products or abatement technologies). *PostLoanIssuance_{i,t}* is an indicator variable for whether the borrower had obtained an ESG-linked loan during or before the given year. ESG Borrower_i is a cross-sectional dummy variable indicating whether the borrower obtains an ESG-linked loan at any time throughout the entire sample period. We further include firm and country-by-industry-by-year fixed effects. The coefficient, β_1 , captures a quasi difference-in-differences estimator that tests whether ESG borrowers experience differential changes in their ESG scores after obtaining an ESG-linked loan in comparison to non-ESG borrowers. To estimate this model, we construct a firm-year panel dataset consisting of 4,044 borrower-year observations. We retain the time series of ESG scores collected from Asset4 for ESG and control borrowers in our sample during the period from 2010 to 2020.

In Panel B of Table 8, the regressions are run on the full matched sample of borrowers. The dependent variable in columns (1) and (2) is the overall Asset4 ESG score. The dependent variable in columns (3) and (4) is the ES score defined as the average of the environmental and social scores separately reported in Asset4. The dependent variable in columns (5) and (6) is the E score, which captures environmental performance. The signs on the coefficients for $ESG Borrower_i \times PostLoanIssuance_{i,t}$ are negative in all six specifications. Much of the difference in ESG performance between ESG and non-ESG loan borrowers is explained by their preissuance level difference. The coefficients on $ESG Borrower_i$ in columns (1), (3), and (5) show that on average ESG borrowers have 10.79, 13.09, and 13.93 higher ESG, ES, and E scores, respectively, than non-ESG borrowers, consistent with the univariate results reported in Panel A. However, the negative relationship between ESG lending and borrower ESG performance becomes economically and statistically significant after we include firm fixed effects, which subsume $ESG \ Borrower_i$. Within firms, all ESG performance metrics deteriorate after ESG-linked loan issuance. The magnitude of the decline in ESG scores of ESG borrowers relative to the scores of non-ESG borrowers ranges from 4.3 to 6.2 points. which is economically meaningful and corresponds to half of the preissuance level differences between ESG and non-ESG borrowers.

Market participants, media, and academics have all raised concerns about the subjective

nature and inconsistency of some third-party ESG scores (see Berg et al., 2021, 2022; Tang et al., 2022). Acknowledging these concerns, we further dig into the components of Asset4 scores to isolate measures that are plausibly more objective. Specifically, we use the three components of the E score: (i) the *emission* reduction score, which measures a company's commitment to and effectiveness in reducing environmental emissions; (ii) the *resource* use score, which measures a company's capacity to reduce usage of materials, energy, or water; and (iii) the *innovation* score, which reflects a company's capacity to reduce environmental costs for its customers. In particular, the emission and resource scores are likely to be more objectively measured. Consistent with the results in the earlier columns, we find that borrowers' emission and resource scores fall after ESG-linked loan issuance.

To further delineate whether the ex post within-firm deterioration in ESG performance is consistent with greenwashing, we exploit the cross-sectional heterogeneity across ESG-linked loans in the quality of their disclosures regarding how the loan terms are tied to specific KPIs. In Panel C of Table 8, quasi difference-in-differences regressions with firm and country-byindustry-by-year fixed effects are run on subsamples consisting of borrowers obtaining ESGlinked loans with good or poor KPI disclosure quality and their matched non-ESG counterparts. The results paint an interesting picture. ESG-linked loans with good disclosure quality are not associated with postissuance decline in borrower ESG scores. Such borrowers, who have high ESG scores to begin with, continue to maintain their superior ESG scores. On the other hand, consistent with a greenwashing hypothesis, we find a sharp deterioration in ESG performance following the issuance of ESG-linked loans with lower KPI disclosure quality.

Taken together, these results are consistent with the notion that large borrowers with high ESG scores seek to signal their commitment to sustainability by obtaining ESG-linked loans from reputable ESG-experienced global lenders. However, we find that ESG loan issuance itself has no positive impact on ex post borrower ESG performance but in fact is followed by within-borrower deterioration in ESG performance. This ex post deterioration is driven by ESG-linked loans with poor KPI disclosure quality, raising concerns about greenwashing. There is no deterioration in ESG scores following the issuance of loans with high disclosure quality, suggesting greater commitments to high ESG standards among such borrowers.

Stock Market Reactions around ESG Loan Issuance

In this section, we examine how stock markets respond to public announcements of ESGlinked loan issuance. On the one hand, given that investors value ESG commitments (see Flammer, 2021; Albuquerque et al., 2020; Ding et al., 2020; Hartzmark and Sussman, 2019), one should expect a positive market reaction to ESG-linked loan issuance. On the other hand, investors need to be vigilant to indications of greenwashing. To investigate whether investors value the ESG initiatives of firms while being mindful of misleading or hollow claims by firms about their ESG commitments, we examine whether loan announcement returns vary depending on how opaque the loan's ESG-linked contractual details are.

[Insert Table 9 here]

Table 9 reports the average cumulative abnormal stock returns (CARs) of borrowers around public announcements of ESG-linked loan issuance. The sample consists of 412 ESG-linked loan issuance events for which announcement dates can be identified through Factiva news search and borrowers are publicly listed.²⁰ CARs are computed from a market model using the MSCI All Country World Equity Index as the benchmark. We report average CARs for subsamples of ESG-linked loans with good (N=264) or poor (N=148) KPI disclosure quality and report the difference of means between the two subamples. Standard errors of the average CARs are adjusted for clustering at the borrower level.

The event study indicates that the average CAR is positive for ESG-linked loans with good disclosure quality but negligible or negative for poor disclosure loans. The difference in

²⁰As detailed in Table 9, we choose ESG-linked loan announcement dates from Factiva searches of keywords ("ESG" or "environmental" or "social" or "governance" or "sustainability" or "green") and ("credit" or "loan" or "borrow"). We retain news dates that correspond to the period between 6 months before and 2 months after the facility start date in DealScan (see Maskara and Mullineaux, 2011). We manually narrow down these search results based on borrower company names and the content of the news articles. We finally select announcement dates as the news dates of the earliest articles where the reported loan terms (e.g., loan facility amount, maturity) match those recorded in DealScan or the earliest news date reporting the issuance of a sustainability loan if detailed loan terms are not reported.

CARs between good and poor disclosure loans is also sizable. This result qualitatively holds for a variety of daily event windows (i.e., [-5, 10], [-1, 10], [-1, 3], [1, 3], and [1, 10]), with varying statistical significance. The CARs in other intervals outside the event windows are small and insignificant, nor is there any difference between the two groups of loans, indicating that the results are not due to spurious trends around the loan announcement dates.

Overall, our results are consistent with those of previous studies on investor ESG preference but also highlight that investors are vigilant against potential greenwashing practices. Consistent with our findings regarding postissuance borrower ESG performance, stock market reactions suggest that investors welcome ESG-linked loan issuance, but only when there is enough informational detail about the ESG-linked aspect of the loan contract (i.e., the nature of the associated KPIs and their link to the loan terms).

5 Discussion

Overall, our findings are consistent with the idea that firms and banks respond to heightened stakeholder demand for ESG-conscious practices. ESG lending provides a contractual mechanism to potentially ensure that the borrowing firm commits to societally acceptable standards. However, our evidence suggests that some firms may exploit this market to engage in a form of greenwashing. Given that the ESG performance of borrowers deteriorates after they issue ESG loans with poor disclosure quality, and that markets respond negatively to such loan issuances, an open question is how greenwashing benefits these firms and banks.

One possibility is that some stakeholders are not fully equipped to identify greenwashing and might incorrectly approve of hollow corporate commitments. It is also possible that despite the possibility of greenwashing, some stakeholders are content with the apparent labeling of ESG loans as a commitment signal. For example, ESG-committed institutions may knowingly invest in greenwashing firms, consistent with recent concerns raised by the SEC regarding ESG funds.²¹ Moreover, markets may also not be fully able to spot greenwashing,

 $^{^{21}}$ See *Barrons*, "SEC's Gensler is targeting greenwashing of ESG funds", March 1, 2022.

leaving firms with an incentive to engage in this behavior to pool with truly committed firms. Last, in the rapidly evolving market environment, it is also possible that greenwashing firms may not yet be cognizant of the market's increasing vigilance toward such practices. While lenders may be complicit in greenwashing behavior to maintain long-term business relationships with their borrowers, it is also plausible that these loans are contracted efficiently in the face of a mixed pool of truly committed and greenwashing borrowers that banks with limited information strive to separate via contingent pricing loan contracts.

While many of these possibilities open the door to future research as the ESG lending market evolves and matures from its infancy, our evidence on investor vigilance against greenwashing suggests that the market has the potential to effectively serve as a central platform of ESG-contingent financing. However, this will require increased regulatory scrutiny to ensure the transparent disclosure of contractual terms related to sustainability-linked pricing grids and the formulation and monitoring of KPIs.

6 Conclusion

In this paper, we provide the first comprehensive characterization of the ESG lending market, which has grown exponentially within the past six years. ESG-linked (or equivalently termed sustainability-linked) loans are general purpose loans with loan terms that are contractually tied to the borrower's ESG performance. This unique feature of ESG-linked loans sets them apart from project-specific green bonds, a debt instrument that has received relatively more attention from academics and practitioners in recent years. Contracts similar to green bonds have developed in the lending market as well, namely, green loans, whose proceeds are specifically earmarked for use in designated green projects.

We show that the growth of ESG lending has been driven primarily by the rise of ESGlinked loans, which has become one of the most important segments in the global sustainable debt market. Consistent with the general purpose nature of ESG-linked loans, they are relatively widespread across a variety of industries in comparison to use-of-proceeds– based green loans (or bonds). ESG-linked loans have propagated globally, particularly across Western European and North American countries with stakeholder-oriented economies and well-developed credit markets.

We find that borrowers and lenders that face greater scrutiny from stakeholders – and therefore have greater incentives to signal good ESG practices – are more likely to participate in the ESG-linked loan market. These loans are generally issued to large publicly listed borrowers and have large syndicates comprised of reputable global banks. Given the contractual complexities and the need for frequent monitoring of ESG-linked loans, they are structured mainly as revolving credit facilities and are distinctly likely to be originated by banks with whom borrowers have previous lending relationships. In contrast, green loans are typically smaller term loans issued to privately held firms.

While borrowers and lenders who have superior ESG profiles ex ante are more likely to self-select into ESG loan contracts, we find no evidence that the issuance of such loans positively affects borrowers' or lenders' ESG performance ex post. In contrast, we find that borrower ESG scores deteriorate after ESG loan issuance when the quality of disclosure regarding the contractual details of the ESG-related KPI is poor, suggestive of potential greenwashing practices. Consistent with investor vigilance to such practices, we find that stock markets react positively to public announcements of ESG-linked loan issuance only when KPI disclosure quality is high.

Overall, our paper contributes to the burgeoning literature on how investors and firms contract on their financing agreements in ways that increasingly take into account stakeholder values. Our novel findings shed light on the relatively unexplored credit market and show how the vast global syndicated loan market has developed mechanisms that internalize ESG-related concerns among borrowers and lenders. However, our findings raise concerns about the transparency and effectiveness of such contracts in facilitating real and positive improvements in corporate ESG practices. There remains much room for richer and deeper analyses of this nascent but burgeoning segment of global banking.

Appendix

Variable	Definition	Data Source
Abnormal ESG-linked	$\frac{ESG\ facility\ amount\ (Country)}{ESG\ facility\ amount\ (World)} - \frac{Non-ESG\ facility\ amount\ (Country)}{Non-ESG\ facility\ amount\ (World)}$	DealScan
(green) loan snares	where the facility amounts are the sum over the period of 2016 to 2020 at the country level.	
Common law	An indicator variable equal to one if the country's legal system is of English- origin and zero otherwise.	Djankov, McLiesh, and Shleifer, 2007
Private credit	Domestic credit to private sector as a percentage of GDP	World Bank Open Data
Creditor right index	A categorical variable ranging from 0 to 4 depending on how many of the following regulations exist in the country, as of 2002: (1) No automatic stay on assets; (2) secured creditors are paid first; (3) restrictions on going into reorganization; (4) management does not stay in reorganization.	Djankov et al. 2007
Stringency of environ- mental regulation	From 1 (very lax) to 7 (very stringent).	World Economic Forum
All-in-spread drawn (AISD, %)	Loan spread over LIBOR.	DealScan
Log(FacilityAmount)	The natural logarithm of the facility amount in \$ million.	DealScan
Maturity 3-6yr	Dummy variable indicating whether loan maturity is between 3-6 years	DealScan
Maturity $> 6yr$	Dummy variable indicating whether loan maturity is greater than 6 years	DealScan
Secured	Dummy variable for whether loan is secured	DealScan
Term loan	Dummy variable for whether the loan is a term loan	DealScan
Bridge loan	Dummy variable for whether the loan is a bridge loan	DealScan
Other loan	Dummy variable for whether the loan is other type of loan	DealScan
Investment grade loan	Dummy variable for whether the loan is investment grade	DealScan
Leveraged loan	Dummy variable for whether the loan is a leveraged loan	DealScan
Publicly listed	Dummy variable for whether the borrower is publicly listed	DealScan
PostLoanIssuance	An indicator variable equal to one if the borrower (lender) had originated an ESG-linked loan during or prior to the given year, and zero otherwise.	DealScan
ESG Borrower (ESG Lender)	A cross-sectional dummy variable equal to one if the borrower or lender orig- inates an ESG-linked loan at any time throughout the entire sample period.	Asset4

Variable definitions

(continued)

Variable definitions	(continued)
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Variable	Definition	Data Source
Log(Maturity)	The natural logarithm of the maturity in months.	DealScan
Revolver	An indicator variable equal to one if the facility type is one of the follow- ing: "364-Day Facility", "Revolver/Line<1 Yr.", "Revolver/Line>= 1 Yr.", "Revolver/Term Loan", "Demand Loan", or "Limited Line".	DealScan
Log(# LeadArranger)	The natural logarithm of the number of lead arrangers in the syndicate. A lender is designated a lead arranger if in DealScan the lender name is included in "LEAD_ARRANGER", or if the "PRIMARY_ROLE" or "ADDI-TIONAL_ROLES" variables include one of the following strings: "Admin agent", "Agent", "Arranger", "Bookrunner", "Coordinating arranger", "Lead arranger", "Lead bank", "Lead manager", "Mandated arranger", or "Mandated Lead arranger" (see Cai et al., 2018).	DealScan
RelationshipLender	The number of relationship lead arrangers The total number of lead arrangers in the syndicate	DealScan
	The fraction of lenders in the syndicate with previous lending relationships with the borrower over the previous five years.	

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Figure 1. ESG-linked and green loan issuance over time

This figure illustrates the annual issuance of ESG-linked and green loans during the sample period from 2016 to September 2021. The samples consists of 1,127 ESG-linked and 1,228 green loan facilities from Refinitiv DealScan (DealScan, hereafter). In each bar, the dark and light areas indicate ESG-linked and green loan issuance amounts as a fraction of all loans, respectively (left y-axis). The dashed line indicates the total issuance amount of ESG-linked and green loans combined (right y-axis).



Figure 2. Annual issuance of ESG-linked and green loans by region

This figure presents the annual issuance amounts of ESG-linked and green loans by region from 2016 to September 2021. The sample consists of 1,127 ESG-linked and 1,228 green loan facilities in DealScan. For each year, the dark, medium, and light blue bars indicate the total issuance amounts of ESG-linked and green loan facilities issued in Europe, North America, and the rest of the world, respectively.



Figure 3. Evolution of ESG lending around the world

This figure presents cross-country heat maps of annual ESG-linked (Panel A) and green (Panel B) loan issuance around the world from 2016 to September 2021. The samples consist of 1,127 ESG-linked and 1,228 green loan facilities in DealScan. The color density indicates the magnitude of issuance amount during each two-year period: Lightest (none), light (up to \$1 billion), medium (up to \$5 billion), dark (up to \$10 billion), and darkest (up to \$100 billion). The issuance amount in 2021 is re-scaled by 12/9 due to data availability up to September in 2021. The two-year periods are noted in the top left corner of each map.

Panel A: ESG-linked loans







Figure 3. Evolution of ESG lending around the world (continued)

Table 1. ESG lendin	g over time
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This table reports the total issuance amount and the number of ESG-linked and green loan facilities issued from 2016 to September 2021. The sample consists of 1,127 ESG-linked loans and 1,228 green loans obtained from DealScan. In 2021, the numbers are reported up to September.

	ESG-linke	d+Green loans	ESG-linked loans		Gree	n loans
Year	\$ billion	# facility	\$ billion	# facility	\$ billion	# facility
2016	6.23	105			6.23	105
2017	12.02	106	2.56	5	9.46	101
2018	71.93	196	50.00	66	21.93	130
2019	189.38	513	143.10	250	46.28	263
2020	251.39	848	177.21	372	74.18	476
2021 (up to Sep)	322.18	587	288.92	434	33.26	153
Total	853.13	2,355	661.79	$1,\!127$	191.34	1,228

	ESG-1	inked + Gree	en loans	Ë	SG-linked lo	ans		Green loans	
Industry	\$ billion	% to total	# facility	\$ billion	% to total	# facility	\$ billion	% to total	# facility
Utilities	224.59	26.33	894	112.17	16.95	117	112.42	58.75	777
Banks, Insurance Companies, and Other Financials	171.34	20.08	486	130.69	19.75	255	40.65	21.24	231
Other	139.23	16.32	333	125.76	19.00	245	13.47	7.04	88
Oil and Petroleum Products	51.77	6.07	41	50.16	7.58	29	1.61	0.84	12
Machinery and Business Equipment	50.55	5.93	104	45.59	6.89	26	4.96	2.59	28
Food	44.05	5.16	109	42.76	6.46	100	1.29	0.67	6
Transportation	40.6	4.76	108	34.32	5.19	68	6.28	3.28	40
Construction and Construction Materials	29.16	3.42	70	21.34	3.22	52	7.82	4.09	18
Retail Stores	23.98	2.81	45	23.62	3.57	37	0.36	0.19	×
Drugs, Soap, Perfumes, Tobacco	17.06	2.00	18	17.06	2.58	18			
Chemicals	16.89	1.98	35	16.7	2.52	34	0.19	0.10	1
Automobiles	12.85	1.51	33	10.99	1.66	22	1.86	0.97	11
Steel Works Etc	11.95	1.40	20	11.93	1.80	19	0.02	0.01	1
Consumer Durables	7.66	0.90	17	7.66	1.16	17			
Mining and Minerals	5.77	0.68	15	5.36	0.81	11	0.41	0.21	4
Fabricated Products	4.27	0.50	10	4.27	0.65	10			
Textiles, Apparel & Footwear	1.41	0.17	17	1.41	0.21	17			
Total	853.13	100.00	2,355	661.79	100.00	1,127	191.34	100.00	1,228

Table 2. ESG lending by industry

This table reports the total issuance amount and the number of ESG-linked and green loan facilities issued in each borrower industry, defined using Fama-French 17 industry classifications. The sample consists of 1,127 ESG-linked loans and 1,228 green loans issued from 2016 to September 2021. %

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ESG-linked +	Green loans	3	ESG-link	ed loans		Green loans			
Country	# facility	\$ billion	Country	# facility	\$ billion	Country	# facility	\$ billion	
United States	286	145.75	United States	104	118.91	United Kingdom	90	27.56	
France	156	97.34	France	104	85.02	United States	182	26.84	
United Kingdom	173	79.08	Spain	189	58.13	Japan	249	15.18	
Spain	293	73.29	Italy	59	56.98	Spain	104	15.16	
Italy	106	62.54	United Kingdom	83	51.52	Singapore	67	12.80	
Germany	125	53.16	Germany	86	46.68	France	52	12.32	
Netherlands	63	47.10	Netherlands	48	45.86	Australia	66	11.50	
Singapore	128	35.23	Singapore	61	22.43	Taiwan	33	9.90	
Japan	293	25.15	Sweden	23	20.35	Hong Kong	37	7.55	
Sweden	49	24.14	Belgium	14	16.83	Germany	39	6.48	
Australia	106	19.39	Norway	13	13.55	Italy	47	5.56	
Belgium	27	18.84	Denmark	4	10.20	Saudi Arabia	4	4.44	
Hong Kong	67	14.42	Finland	24	9.98	United Arab Emirates	12	3.84	
Norway	19	14.08	Japan	44	9.97	Sweden	26	3.79	
Taiwan	44	11.78	Luxembourg	9	8.83	India	30	3.76	
Finland	32	11.77	Mexico	8	8.18	Portugal	6	2.90	
Denmark	6	10.31	Australia	40	7.89	Canada	17	2.51	
Luxembourg	20	10.27	Ireland	6	7.80	Belgium	13	2.01	
Canada	29	10.11	Canada	12	7.60	Finland	8	1.79	
Mexico	11	8.78	Hong Kong	30	6.87	Tanzania	4	1.64	
Ireland	9	8.54	Russian Federation	18	6.40	Luxembourg	11	1.44	
United Arab Emirates	17	7.78	Turkey	23	6.22	Netherlands	15	1.24	
Turkey	26	6.68	Switzerland	12	5.52	China	6	1.04	
Russian Federation	19	6.53	United Arab Emirates	5	3.94	Chile	11	0.94	
Switzerland	13	5.67	Brazil	6	3.13	Vietnam	15	0.91	
India	32	4.76	Austria	16	2.65	Ireland	3	0.74	
Portugal	16	4.62	Taiwan	11	1.88	Mexico	3	0.60	
Saudi Arabia	4	4.44	Portugal	10	1.72	Cyprus	1	0.54	
Brazil	19	3.57	Iceland	4	1.54	Norway	6	0.53	
Austria	21	3.00	Cyprus	2	1.48	Hungary	1	0.50	
Cyprus	3	2.02	Thailand	8	1.48	Indonesia	1	0.50	
Thailand	13	1.81	Cayman Islands	ĩ	1.25	Argentina	5	0.47	
China	11	1.78	Indonesia	4	1.16	Turkey	3	0.46	
Indonesia	5	1.66	Bermuda	6	1.02	Brazil	13	0.44	
Tanzania	4	1.64	India	2	1.00	Austria	5	0.35	
Iceland	4	1.54	South Africa	2	0.94	Qatar	$\overset{\circ}{2}$	0.34	
Cayman Islands	1	1.25	Malaysia	7	0.91	Thailand	5	0.33	
Pakistan	3	1 10	Pakistan	2	0.80	Myanmar	2	0.31	
South Africa	3	1.09	Mauritius	1	0.75	Pakistan	1	0.30	
Chile	13	1.08	China	5	0.74	Peru	6	0.23	
Others	86	10.04	Others	21	3.68	Others	27	1.60	
Total	2,355	853.13	Total	1,127	661.79	Total	1,228	191.34	

 Table 3. ESG lending by country

 This table reports the total issuance amount and the number of ESG-linked and green loan facilities by

borrowers' country of incorporation. The sample consists of 1,127 ESG-linked loans and 1,228 green loans

issued from 2016 to September 2021. Data are obtained from DealScan.

Table 4. ESG loan characteristics

This table presents univariate comparisons of ESG loans (ESG-linked or green) and non-ESG loans. In Panel A, we report unconditional comparisons. We exclude from our sample loans issued in countries with no ESG lending activity during our sample period. Control facilities are newly issued loans that do not convert to ESG loans and comprise loan packages exclusively consisting of non-ESG facilities. The sample consists of 1,122 ESG-linked (1,227 green) facilities and 71,436 (86,485) non-ESG control facilities. Panel A reports the number of ESG-linked, green, and control packages and facilities (i.e., # package and # facility), the average sales of borrowers in each facility group at the time of closing of the loan deal (i.e., Sales at close (\$ million)), the fraction of publicly listed borrowers in each facility group (i.e., Public firms), the average deal size of each facility group (i.e., Deal size (\$ million)), the average dollar amount of facilities in each group (i.e., Facility amount (\$ million)), the average maturity of facilities in each group (i.e., Maturity (months)), the fraction of term loan A facilities (i.e., Term loan A), the fraction of institutional term loans (i.e., Institutional term loan), the fraction of revolving credit facilities (i.e., Revolver), the fraction of leveraged loan facilities (i.e., Leveraged), the fraction of investment grade facilities (i.e., Investment grade), and the mean differences between ESG-linked (green) facilities and non-ESG (non-green) control facilities as well as their associated p-values (i.e., Mean difference and P-value). In Panel B, we match each ESG-linked or green loan package to control packages that (1) are issued in the same country, industry, and year, (2) are issued to borrowers with the same public-private status, and (3) have the closest deal size. The matched sample consists of 694 ESG-linked (625 green) packages and 734 (641) non-ESG packages in the control group. For this matched set of loan packages, Panel B reports the number of packages in each group (i.e., # package), the average sales of borrowers in each deal group at the time of deal closing (i.e., Sales at close (\$ million)), the average deal size of each group (i.e., Deal size (\$ million)), the fraction of ESG loans (ESG-linked or green) within the package, the fraction of revolving credit facilities within the package, the fraction of term loan A facilities within the package, the fraction of packages that are comprised entirely of term loans (i.e., Only term loan A), entirely of revolving credit facilities (i.e., Only revolver), of both term loans and revolvers (i.e., Term loan A + Revolver), or of facilities other than term loans or revolvers (i.e., Others). Where applicable, we further report differences between ESG-linked (green) and control packages as well as their p-values (i.e., Mean difference and P-value). *, **, and *** denote significance levels of 10%, 5%, and 1%, respectively.

Panel A: Unconditional comparisons									
		ESG-link	ked loans			Green loans			
	ESG-linked	Control	Mean difference	P-value	Green	Control	Mean difference	P-value	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
# package	756	40,394			637	48,376			
# facility	1,122	$71,\!436$			1,227	$86,\!485$			
Borrowers									
Sales at close (\$ million)	10,835.23	6,569.47	4,265.76***	0.00	$5,\!124.67$	6,444.38	-1,319.71*	0.06	
Public firm	0.52	0.21	0.31^{***}	0.00	0.10	0.21	-0.11***	0.00	
Loan size and maturity									
Deal size (\$ million)	937.15	520.81	416.34^{***}	0.00	536.44	513.70	22.74	0.34	
Facility amount (\$ million)	533.29	245.47	287.82^{***}	0.00	155.17	241.71	-86.55***	0.00	
Maturity (months)	54.61	60.79	-6.18***	0.00	106.81	61.19	45.62^{***}	0.00	
Facility type									
Term loan A	0.27	0.42	-0.15***	0.00	0.54	0.43	0.11^{***}	0.00	
Institutional term loan	0.04	0.09	-0.05***	0.00	0.00	0.08	-0.08***	0.00	
Revolver	0.55	0.37	0.18^{***}	0.00	0.18	0.36	-0.18***	0.00	
Credit quality									
Leveraged	0.12	0.29	-0.18***	0.00	0.02	0.29	-0.27***	0.00	
Investment grade	0.48	0.12	0.36***	0.00	0.06	0.12	-0.06***	0.00	

(continued)

Table 4. ESG loan characteristics (continued)

Panel B: Package-level matching by deal size, country, industry, year, and public-private status										
		ESG-link	ed loans			Green loans				
	ESG-linked	Matched	Mean difference	P-value	Green	Matched	Mean difference	P-value		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)		
# Package	694	734			625	641				
Sales at close (\$ million)	10,735.44	7,423.42	3,312.03***	0.01	4,982.91	3,621.73	1,361.18	0.25		
Deal size (\$ million)	854.85	743.43	111.42**	0.05	322.70	312.84	9.86	0.69		
Fraction of ESG loan within package	0.97	0.00			0.96	0.00				
Fraction of revolver	0.62	0.41	0.21^{***}	0.00	0.20	0.34	-0.14***	0.00		
Fraction of term loan A	0.24	0.35	-0.11***	0.00	0.57	0.45	0.12^{***}	0.00		
Packages composed of										
Only term loan A	15.71%	23.98%			43.04%	33.70%				
Only revolver	54.03%	31.47%			14.88%	25.43%				
Term loan $A + Revolver$	12.97%	15.80%			12.96%	16.07%				
Others	17.29%	28.75%			29.12%	24.80%				

Table 5. Structure of ESG loan syndicates

This table documents the syndicate structure of ESG-linked and green loans, in comparison to the syndicate structure of control non-ESG loans matched on country, industry, year, borrower public-private status, and facility size. For each group, the table reports the average number of lead arrangers in the loan syndicate (i.e., # lead arranger). The table further breaks down the lead arrangers into various categories, reporting the average number of lenders belonging to each category along with the corresponding share within the syndicate (in brackets). The categories include lenders who are lenders with prior ESG lending history (i.e., ESG-experienced lender), who are in the top 5% of lenders in terms of total lending amount over the previous five years from loan issuance (i.e., Reputable lender), who are from countries that are not the borrower's country of incorporation (i.e., Relationship lender), who are relationship ESG-experienced lenders, relationship reputable lenders, or relationship foreign lenders. The table also reports the differences between ESG-linked (or green) facilities and their matched counterparts, along with the associated p-values (i.e., Mean difference and P-value). *, **, and *** denote significance levels of 10%, 5%, and 1%, respectively.

	ESG-linked loans					Green loans			
	ESG-linked	Matched	Mean difference	P-value	Green	Matched	Mean difference	P-value	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
# lead arranger	5.57	3.99	1.58***	0.00	4.68	2.78	1.90***	0.00	
ESG-experienced lender	5.37	3.56	1.81***	0.00	4.29	2.19	2.10***	0.00	
	[0.96]	[0.87]	0.09^{***}	0.00	[0.90]	[0.75]	0.15^{***}	0.00	
Reputable lender	4.93	3.32	1.61***	0.00	3.74	2.06	1.68***	0.00	
	[0.87]	[0.80]	0.07^{***}	0.00	[0.80]	[0.71]	0.09^{***}	0.00	
Foreign lender	3.56	2.05	1.52***	0.00	3.34	1.35	1.99***	0.00	
	[0.50]	[0.40]	0.11^{***}	0.00	[0.56]	[0.39]	0.17^{***}	0.00	
Relationship lender	3.61	2.28	1.33***	0.00	0.70	0.98	-0.28***	0.00	
	[0.59]	[0.52]	0.07^{***}	0.00	[0.16]	[0.34]	-0.17***	0.00	
Relationship ESG-experienced lender	3.51	2.13	1.38***	0.00	0.62	0.80	-0.18***	0.01	
	[0.58]	[0.48]	0.10^{***}	0.00	[0.15]	[0.26]	-0.12^{***}	0.00	
Relationship reputable lender	3.28	2.04	1.24***	0.00	0.63	0.80	-0.18***	0.01	
	[0.53]	[0.46]	0.07^{***}	0.00	[0.15]	[0.27]	-0.12***	0.00	
Relationship foreign lender	2.22	1.12	1.10***	0.00	0.45	0.39	0.06	0.22	
- ~	[0.28]	[0.19]	0.09^{***}	0.00	[0.09]	[0.10]	-0.01	0.27	
Number of facilities	1,035	1,352			1,208	1,526			

Table 6. ESG loan pricing

In this table, we report results from cross-sectional regressions of all-in-spread-drawn (AISD) on loan characteristics, in the spirit of Berg et al. (2017). The dependent variable $AISD_{i,j}$ is the spread over LIBOR for loan facility j issued by borrower i. $ESG_{i,j}$ is a dummy variable that takes a value of one if the loan is ESG-linked or green, and zero otherwise. We perform separate analysis for ESG-linked and green loans. Control variables include log facility amount, dummy variables indicating whether loan maturity is between 3-6 years or greater than 6 years, dummy variable for whether loan is secured, dummy variables for whether the loan is a term loan, bridge loan, or other type of loan, dummy variables for whether the loan is investment grade or leveraged loan, and a dummy variable for whether the borrower is publicly listed. We also control for country-by-industry-by-year fixed effects. Standard errors are adjusted for clustering at the firm level. *, **, and *** denote significance levels of 10%, 5%, and 1%, respectively.

	Dependent variable: All-in-spread drawn (AISD, %)					
-	ESG-link	red loans	Green	loans		
	(1)	(2)	(3)	(4)		
ESG	-0.977***	-0.068	-0.542***	-0.563***		
	(0.124)	(0.091)	(0.175)	(0.170)		
Log(FacilityAmount)		-0.292***		-0.292***		
		(0.009)		(0.008)		
Maturity 3–6yr		-0.024		-0.027		
		(0.029)		(0.027)		
Maturity $> 6yr$		0.621***		0.624***		
		(0.039)		(0.036)		
Secured		0.597***		0.593***		
		(0.028)		(0.026)		
Term loan		0.639***		0.661***		
		(0.020)		(0.018)		
Bridge loan		1.062***		1.103***		
		(0.094)		(0.086)		
Other loan		0.495^{***}		0.532***		
		(0.049)		(0.046)		
Investment grade loan		0.144^{***}		0.131***		
		(0.037)		(0.035)		
Leveraged loan		1.222***		1.232***		
		(0.033)		(0.031)		
Publicly listed		-0.388***		-0.388***		
		(0.033)		(0.031)		
Country \times Industry \times Year FE	Υ	Υ	Υ	Υ		
N	29,825	29,825	36,024	36,024		
Adj. K ²	0.201	0.537	0.196	0.528		

Table 7. Disclosure quality of ESG-linked loan terms

This table reports the disclosure quality of contractual terms across ESG-linked loans, based on information available in the market segment, performance pricing remark, deal remark, tranche remark, and loan purpose remark fields in the Refinitiv DealScan database, supplemented with a manual search of media releases and corporate sustainability reports. We classify ESG-linked loans that are not associated with any publicly verifiable information about their KPI metrics or how they are tied to loan terms as "poor disclosure" loans. On the other hand, "good disclosure" loans have loan terms linked to some metric of ESG performance. For each disclosure quality group, we report the number of loan facilities, as well as the average borrower's sales when the loan was originated, the borrower's Asset4 ESG score prior to the loan issuance, and the fraction of loans that are obtained by borrowers domiciled in civil law countries. Among good disclosure loans that list specific KPIs in the loan contract descriptions, we also report the fraction of loans that use environmental KPIs or both environmental and social KPIs, the fraction of loans that disclose the use of a third party ESG rating as the KPI, and the fraction of loans that report the reward (penalty) on the loan spread conditional on good (poor) ESG performance.

	Good disclosure	Poor disclosure	Difference (p-value)
# facility	617	510	
Borrower attributes			
Sales at close (\$ billion)	12.03	10.01	0.25
Ex ante ESG score	64.56	62.23	0.16
Civil law	0.67	0.66	0.86
Disclosed contract features			
Environmental KPI	0.85	-	
Environmental/Social KPI	0.32	-	
Third party ESG rating	0.21	-	
Reward on loan spread	0.22	-	
Penalty on loan spread	0.13	-	

Borrower Lender	Table 8. ESG lending and corporate ESG performance
ESG Loan Control Diff t-statistic ESG Loan Control Diff t-statistic	is table analyzes corporate ESG performance around ESG lending. The sample consists of 689 loan facilities comprised of ESG-linked loans and an ESG facilities issued to borrowerly and the pert prior to loan issuance. Lender ESG score is the server the syndicate of the loan. Panels B and C roport results from quasi differences in clifferences in the grange score of all lead arrangers in the syndicate of the loan. Panels B and C roport results from quasi differences in clifferences in the grange score of all lead arrangers in the syndicate of the loan. Panels B and C roport results from quasi differences in clifferences in the syndicate of the loan borrower has et a B C - linked loan during the full sample borrower Asset4 ESG scores on a firm-invariant indicator variable equal to one if the current year is after the ESC-linked loan during the full sample with an angression of and zero otherwise (i.e., ESG Borrower), an indicator variable equal to one if the borrower obtains an ESC-linked loan borrower × at a do isuantes were the borrower of 100 all start are states are in the intersection of DataScan and Asset4. The and bis unacted is the ES (Environment and social) score, which is further broken down into the emission score reflecting the mise flores to reduce unvironmental and social scores orted in Asset4. The third dependent variable is the ES (Environment score associated with the firm's efforts to reduce use of the borrower in a given are flores up to reduce nvironmental environmental models are the orticle of the scored dependent variable is the regressions are run on the full matched sample of borrowers. In Panel S, when the firm's efforts to reduce use of borrowers in the strenge of the environmental and social scores or shore the environment is set or the environment in the intersection of borrower in a given and strenge the indicator score associated with the firm's efforts to reduce use of borrowers in the longers or co-friendly products (Innovation). In Panel B, the regressions are run on the full ma
	is table analyzes corporate ESG performance around ESG lending. The sample consists of 689 loan facilities comparison of ESG-linked loans and n-ESG facilities issued to borrowers who are matched to the Asset4 database. Panel A reports univariate comparisons of ex ante borrower/lender G profiles between ESG-linked and non-ESG facilities, measured by Asset4 ESG scores in the year prior to loan issuance. Lender ESG scores on a firm-invariant indicator variable equal to one if the borrower obtains an ESG-linked loan during the full sample borrower Asset4 ESG scores on a firm-invariant indicator variable equal to one if the borrower weal is state: the ESG-linked loan during the full sample roid and zero otherwise (i.e., ESG Borrower), an indicator variable equal to one if the current year is after the ESG-linked loan during the full sample roid and zero otherwise (i.e., ESG Borrower), an indicator variable equal to one if the current year is after the ESG-linked loan during the full sample roid and zero otherwise (i.e., ESG Borrower), an indicator variable equal to one if the current year is after the ESG-linked loan strongent and is stance year for matched loan borrowers) and zero otherwise (i.e., postLoandsuanes), as well as their interaction term (i.e., ESG Borrower). The samples consist of 4,044 borrower-year observations where the borrowers are in the intersection of DealScan and Asset4. The mple period is from 2010 to 2020. Six dependent variables are used: The first dependent variable is the overall ESG score of the environmental and social scores orted in Asset4. The third dependent variable is the E (Environment score, which is further broken down into the emission score reflecting the mis efforts to reduce environmental environmental externalities by developing abatement the logic or eco-friendly products (Innovation). In Panel B, the regressions are run on the full matched annel-ESG counterparts. Firm and country-by-industy-by-year fixed effects are included. Firm (StP) disclosure ality and their matched
Panel A: Ex ante ESG profiles	is table analyzes comorate ESG nerformance around ESG lending. The sample consists of 680 loan facilities commised of ESG-linked loans and

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			Par	tel B: Ex po	st ESG perfe	ormance (Full	sample)					
Dependent variable:	н	SG score			ES score		E sco	re		E score c	omponents	
	(1)		(2)	(3)	U	(4)	(5)	(9)	Emissio (7)	n Reso	surce (8)	[nnovation (9)
ESG Borrower × PostLoanIssuance FSG Borrower	$\begin{array}{c} -0.305 \\ (2.534) \\ 10.787** \end{array}$	4~	$.254^{**}$ (1.662)	-1.916 (3.033) 13.094**	-5.3	68*** 947)	-2.230 (3.628) 13.932***	-6.188^{***} (2.370)	-9.057^{**} (3.234)	** -7.5) (3.1	37** 166)	-2.435 (3.315)
PostLoanIssuance	$\begin{array}{c} (1.835) \\ (1.835) \\ 6.364^{***} \\ (2.440) \end{array}$	3.	599^{***} 1.362)	$\begin{array}{c} (2.073) \\ (2.073) \\ 6.770^{**} \\ (2.833) \end{array}$	4.07 (1.	76*** 574)	(2.523) 5.626^{*} (3.277)	3.981^{**} (1.835)	5.875^{**} (2.473)	* 4.9) (2.7	98* 707)	2.297 (2.912)
Firm FE Country × Industry × Year FE N Adj. \mathbb{R}^2	N Y 4,044 0.295		Y Y 4,044 0.865	N Y 4,044 0.356	,4 0	Y Y 044 881	N Y 4,044 0.339	Y Y 4,044 0.870	Y Y 4,044 0.831	4,(Y Y 344 333	Y Y 4,044 0.809
	P_{ϵ}	mel C: Ex	post ESG ₁	oerformance	(ESG-linke	d loan KPI di	isclosure qualit	y subsamples)				
Dependent variable:	ESG score	ES score	Good di E score	isclosure E s	core compor	lents	ESG score	ES score	Poor dis E score	sclosure E sc	sore compone	nts
	(1)	(2)	(3)	Emission (4)	Resource (5)	Innovation (6)	(2)	(8)	(6)	Emission (10)	Resource (11)	Innovation (12)
ESG Borrower × PostLoanIssuance PostLoanIssuance	$\begin{array}{c} -0.180 \\ (2.288) \\ 1.663 \\ (1.743) \end{array}$	-1.287 (2.484) 1.948 (1.835)	$\begin{array}{c} -3.676\\ (2.844)\\ 3.120\\ (2.228)\end{array}$	$\begin{array}{c} -3.928\\ (3.508)\\ 2.703\\ (3.025)\end{array}$	-4.768 (3.897) 3.672 (3.405)	$\begin{array}{c} -3.087\\ -3.087\\ (3.963)\\ 4.511\\ (3.172)\end{array}$	-7.521^{***} (2.367) 5.349^{***} (2.001)	-10.036^{***} (3.099) 6.927^{***} (2.569)	-9.196^{**} (3.974) 5.769* (3.009)	-15.411^{***} (5.286) 8.460** (4.030)	-10.336^{**} (4.797) 6.348 (4.392)	-0.622 (4.708) 0.473 (4.760)
Firm FE Country \times Industry \times Year FE N Adj. R ²	Y Y 2,420 0.879	${}^{\rm Y}_{\rm Y}_{2,420}_{0.888}$	Y Y 2,420 0.870	Y Y 2,420 0.827	${f Y} {f Y} {f Y} {f 2,420} {f 0.853}$	Y Y 2,420 0.811	Y Y 2,022 0.862	Y Y 2,022 0.879	$\begin{array}{c} Y \\ Y \\ 2,022 \\ 0.865 \end{array}$	Y Y 2,022 0.825	Y Y 2,022 0.814	${f Y} {f Y} {f Y} {f 2,022} {f 0.805}$

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Table 9. Borrower stock returns around loan announcements

This table reports average cumulative abnormal stock returns (CARs) of borrowers for different time windows around public announcements of ESG-linked loan issuance. The sample consists of 412 ESG-linked loan issuance events for which loan announcement dates can be identified through Factiva news search and borrowers have publicly traded stock. We choose ESG-linked loan announcement dates from Factiva searches of keywords ("ESG" or "environmental" or "social" or "governance" or "sustainability" or "green") and ("credit" or "loan" or "borrow"). We retain news dates that correspond to between 6 months before and 2 months after the facility start date in DealScan (see Maskara and Mullineaux, 2011). We manually narrow down these search results based on borrower company names and the content of the news articles. We finally select announcement dates as the news dates of articles where the reported loan terms (e.g., loan facility amount, maturity) match those recorded in DealScan, or the earliest news date reporting the issuance of a sustainability loan if detailed loan terms are not reported. CARs are computed from a market model using the MSCI All Country World Equity Index as the market benchmark. We report average CARs around different event windows for subsamples of ESG-linked loans with good (N=264) or poor (N=148) key performance indicator (KPI) disclosure quality, and report the difference of means between the two subamples as well as the associated P-values. Standard errors of the average CARs are adjusted for clustering at the borrower level. *, **, and *** denote significance levels of 10%, 5%, and 1%, respectively.

Event window	Good disclos	sure $(N=264)$	Poor disclos	ure (N= 148)	Difference	P-value
	CAR (%)	Std. Err.	CAR (%)	Std. Err.		
[-10, -6]	-0.148	0.234	-0.246	0.524	0.098	0.865
[-10, -2]	-0.286	0.342	0.127	0.846	-0.413	0.651
[-5, 10]	0.680	0.515	-0.436	1.104	1.116	0.361
[-1, 10]	0.818^{*}	0.482	-0.809	0.776	1.627^{*}	0.076
[-1,3]	0.281	0.252	-0.340	0.440	0.621	0.222
[1,3]	0.615^{***}	0.214	-0.069	0.282	0.684^{*}	0.055
[1, 10]	1.152**	0.447	-0.538	0.621	1.690**	0.026
[11, 20]	0.300	0.311	0.664	1.894	-0.364	0.850

Internet Appendix

for "ESG Lending"

A.1 Cross-Country Determinants of ESG Lending

We systematically corroborate the geographical distribution of the ESG lending market reported in Section 3 by investigating cross-country determinants of ESG lending. To avoid confounding differences in general banking sector activities across countries, we compute the abnormal ESG-linked (green) loan share at the country level by taking the difference between the country's aggregate ESG-linked (green) loan issuance over our sample period as a fraction of worldwide ESG-linked (green) loan issuance and the country's non-ESG loan issuance as a fraction of worldwide non-ESG loan issuance. The variable captures the intensity of ESG-linked (green) loan issuance in a country in excess of the country's normal lending activity during our sample period.

To explain abnormal loan shares, we conduct a cross-sectional analysis in the spirit of Djankov et al. (2007), where we consider institutional differences across countries such as legal origins, private credit provision, the strength of creditor rights, and stringency of environmental regulation. Private credit provision is obtained from World Bank Open Data. We adopt the data on common law origin status and the creditor rights index from Djankov et al. (2007). Following Ben-David, Jang, Kleimeier, and Viehs (2021), we collect information on the stringency of environmental regulation from the World Economic Forum. The regression is a cross-sectional model with one observation for each country. All explanatory variables are as of the most recent year available before our sample period.

[Insert Table A.1 here]

We find that countries with common law origins exhibit significantly less ESG-linked loan issuance activity than civil law countries, consistent with Liang and Renneboog (2017) who document that civil law countries are more likely to support stakeholder-oriented economies and facilitate private contracts that induce commitments to such values. In contrast, we find no evidence that legal origins matter for the development of green loan markets, which are primarily project financing deals that are less indicative of a commitment to broader ESG agendas. For both ESG-linked and green loans, however, we find that robust private credit markets are essential for the development of rich ESG lending markets. This is consistent with the notion that well-developed credit markets with effective institutions to support them foster innovations in financial markets. Last, we find that ESG-linked and green loans both flourish under stricter environmental regulations, consistent with the idea that these loans arise as lenders and borrowers respond to heightened stakeholder pressure.

A.2 Additional Figures and Tables

Figure A.1. Nationally Determined Contributions (NDCs) and ESG lending

Panel A plots global aggregate trends in the outstanding number of Nationally Determined Contributions (NDC) by countries to the United Nations Framework Convention on Climate Change (UNFCCC) and global ESG lending volume as a fraction of total lending after 2016. Panel B plots average country level ESG lending as a fraction of total lending in the five quarters before and after their NDC submissions.



Panel A: Global aggregate trends

Panel B: Average country level ESG lending around NDC submissions



us table reports country-rew G-linked (green) loan shares raction of worldwide ESG-lin mmon law is an indicator v edit to the private sector, no w many of the following cre going into reorganization; ()7. Stringency of environme ressions are cross-sectional n ndard errors are reported in	" regressions " is the differed wheed (green) la ariable equal rmalized as a ditor protecti (4) manageme (14) mana	on excess E.O.G I ence between the Dan issuance, and to one if the cou percentage of the ions the country ions the country in ranges from 1 a observation foi *, **, and *** d	ending activity country's aggre- the country's legal systems he country's GI has: (1) no au ' in reorganizat (very lax) to 7 r each country. lenote significar	on various c egate ESG lim non-ESG loar stem is of En SP. Creditor itomatic stay itomatic stay itomatic stay itomatic stay and tomatic stay itomatic stay and tomatic stay itomatic stay	ountry cnarac ked (green) lo r issuance as a glish-origin, a: glish index is on assets; (2) in the credito in the credito in th, and is obt s variables are 0%, 5%, and 1	teristics. The an issuance act fraction of wor an integer ran) secured credi r right index a ained from the winsorized at %, respectively	dependent var tivity over the s :ldwide non-ES rise. Private cr ging from 0 to ging from 0 to thors first paid, us of 2002 from the 1% and 99' the 1% and 99'	able "abnormal sample period as G loan issuance. edit is domestic 4, which counts (3) restrictions (3) restrictions (4) restrictions (3) restrictions (4) restrictions (3) restrictions (3) restrictions (3) restrictions (3) restrictions (3) restrictions (3) restrictions (4) restrictions (3) restrictions (3) restrictions (4) restrictions (4) restrictions (5) restr
Dependent variable:	(1)	Abnormal ESG-li (2)	nked loan share (3)	(4)	(5)	Abnormal gre (6)	en loan share (7)	(8)
Common law	-0.384^{**} (0.184)				0.082 (0.219)			
Private credit		0.739^{**} (0.351)				0.867^{**} (0.372)		
Creditor right index			0.044 (0.102)				0.127 (0.114)	
Stringency of environmental regulation				0.243^{*} (0.146)				0.307^{**} (0.132)
m NR2	176 0.018	158 0.040	134 0.001	138 0.026	176 0.001	158 0.084	134 0.011	138 0.049

Table A.1. Cross-country determinants of ESG lending activity

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Table A.2. Multivariate regressions: Determinants of ESG lending

This table reports estimates from cross-sectional ordinary least squares (OLS) regressions at the loan facility level. The sample consists of 1,122 (1,227) ESG-linked (green) loan facilities and 71,436 (86,485) matched non-ESG (non-green) loan facilities. We regress an indicator variable for whether the loan facility is an ESG-linked (Panel A) or green (Panel B) loan, on explanatory variables including the natural logarithm of one plus the dollar amount issued in the loan facility (i.e., Log(FacilityAmount)), the natural logarithm of one plus the loan facility's maturity in months (i.e., Log(Maturity)), a dummy variable indicating whether the loan facility is a revolving credit facility (i.e., Revolver), the natural logarithm of the number of lead arrangers in the loan syndicate (i.e., Log(# LeadArranger)), and the ratio of the number of relationship lenders to the total number of lead arrangers in the syndicate (i.e., RelationshipLender). Country-by-industry-by-year fixed effects are included in every regression, where industry grouping is based on the Fama-French 17 industry classifications. Country-by-industry clustered standard errors are reported in parentheses. *, **, and *** denote significance levels of 10%, 5%, and 1%, respectively.

Dependent variable:		I(ESG-lir	iked loan)			I(Gre	en loan)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(FacilityAmount)	$ 0.005^{***} \\ (0.001) $	0.005^{***} (0.001)	0.005^{***} (0.001)	$\begin{array}{c} 0.004^{***} \\ (0.001) \end{array}$	-0.000 (0.001)	$0.000 \\ (0.001)$	-0.001 (0.000)	-0.001 (0.000)
Log(Maturity)	0.002^{*} (0.001)	0.002^{*} (0.001)	$0.002 \\ (0.001)$	0.002^{**} (0.001)	0.007^{**} (0.003)	$\begin{array}{c} 0.007^{***} \\ (0.003) \end{array}$	0.004^{**} (0.002)	0.004^{**} (0.002)
Revolver	$\begin{array}{c} 0.016^{***} \\ (0.003) \end{array}$	$\begin{array}{c} 0.015^{***} \\ (0.003) \end{array}$	$\begin{array}{c} 0.015^{***} \\ (0.003) \end{array}$	$\begin{array}{c} 0.015^{***} \\ (0.003) \end{array}$	-0.002 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.002 (0.002)
Log(# LeadArranger)	0.004^{**} (0.002)	$\begin{array}{c} 0.005^{***} \\ (0.002) \end{array}$	0.004^{*} (0.002)	0.004^{**} (0.002)	0.007^{**} (0.003)	0.008^{***} (0.003)	0.007^{**} (0.003)	0.007^{**} (0.003)
RelationshipLender	$\begin{array}{c} 0.010^{***} \\ (0.002) \end{array}$	$\begin{array}{c} 0.009^{***} \\ (0.002) \end{array}$	$\begin{array}{c} 0.008^{***} \\ (0.002) \end{array}$	$\begin{array}{c} 0.007^{***} \\ (0.002) \end{array}$	-0.011^{**} (0.005)	-0.010^{**} (0.005)	-0.007^{***} (0.003)	-0.008^{***} (0.003)
Country FE	Υ				Υ			
Industry FE	Υ				Υ			
Year FE	Υ				Υ			
Country \times Year FE		Υ				Υ		
Industry \times Year FE		Υ				Y		
Country \times Industry \times Year FE			Y				Y	
$Country \times Industry \times Year \times Public FE$				Y				Y
N	72,558	72,558	72,558	72,558	87,712	87,712	87,712	87,712
Adjusted R^2	0.060	0.105	0.149	0.190	0.073	0.106	0.190	0.192

Tab	le A.3.	Effects	of ESG	lendin	g on su	bsequer	it lender	· ESG p	erform	ance		
This table reports results fron to one if the lender originate to one if the current year is PostLoanIssuance), as well a where the lenders are in the i dependent variable is the ove which is defined as the averag which is further broken down associated with the firm's eff efforts to reduce environment are run on the full matched sa good or poor key performanc are included. Firm clustered	m quasi diff ss an ESG- after the] as their inte ntersection arall ESG s ge of the en n into the orts to red tal external umple of len standard e standard e	erence-in linked loa ESG-linke rraction té of DealS core of th vironmen emission uce usage ities by d ders. In F ders. In F rrors are rrors are	difference in during od loan iss srm (i.e., can and A te lender i tal and sc score reffe score reffe eveloping Panel B, tl isclosure reported i	es panel re the full se suance yea ESG Lenc estat. Th in a given ocial scores ecting the ials, energ abatemen he regressi quality an in parenth	gressions at (or pse ler \times Pos e sample I year. Tha s reported firm's effe thrm's effe thrm's effe d their m eses. *, *>	of lender A iod and ze udo issuar tLoanIssua period is fr e second di in Asset4. orts to red yr (Resour ogies or ecc n on subsa atched nor *, and ***	sset4 ESG tro otherwii nee year fo unce). The om 2010 to opendent v The third luce enviro ce), and en o-friendly r mples cons denote sig denote sig	scores on se (i.e., ES r matched samples c o 2020. Six ariable is ¹ dependen nmental en vironment roducts (I isting of le: nterparts. nificance le	a firm-inv SG Lenden loan lend onsist of dependen the ES (F t variable missions (al innova nnovatior nders orig Firm and yvels of 10	ariant inc ariant inc ders) and ders) and 1,137 lenc at variable nvironme is the E ((Emission tion score tion score 1). In Pan jinating E , i country-)%, 5%, a	iicator var icator var zero othe ler-year o eler-year o ber and so mt and so reflecting del A, the SG-linked by-year fi nd 1%, re	iable equal iable equal rwise (i.e., servations I: The first ent) score, ent) score, the firm's regressions loans with xed effects spectively.
				Ρ	anel A: Full si	ample						
Dependent variable:		ESG score		ES	score		E score	Ι		E score co.	mponents	
	(1)		(2)	(3)	(4)	J	(5)	(9)	Emission (7)	Resor (8)	Irce	anovation (9)
ESG Lender \times PostLoanIssuance	-1.95(5.38)) (6	-9.235 (5.753)	-0.083 (7.993)	-6.66 (6.015	0) (12	.223 231)	-5.688 (7.775)	-17.289*(9.107)	-12.9 (8.61)	36 5)	-0.437 (9.094)
ESG Lender	14.378 (3.57)	*** 4)		$18.143^{***} (4.627)$		22.3 (6.	381^{***} .121)					
PostLoanIssuance	5.08 (5.28)) (6	6.533 (5.386)	2.352 (8.142)	4.027 (5.782)	7 -0 3) (12	(.153)	3.345 (7.329)	11.093 (8.589)	11.8 (8.60)	94 16)	-1.027 (8.183)
Firm FE Country × Year FE N Adj. R ²	N Y 1,13 0.48	2 0	Y Y 1,137 0.875	N Y 1,137 0.520	${}^{ m Y}_{ m Y}_{ m 0.895}_{ m 0.895}$, 1 0.	N Y ,137 ,450	Y Y 1,137 0.866	$\begin{matrix}\mathrm{Y}\\\mathrm{Y}\\1,137\\0.830\end{matrix}$	Y Y 1,13 0.83	5 3	Y Y 1,137 0.820
			Panel B:	ESG-linked 1	oan KPI disc	losure quality	subsamples		د ۲	-		
Dependent variable:	ESG score	ES score	E score	Esc	compone	ants	ESG score	ES score	E score	sclosure E sc	ore compone	nts
	(1)	(2)	(3)	Emission (4)	Resource (5)	Innovation (6)	(2)	(8)	(6)	Emission (10)	Resource (11)	Innovation (12)
ESG Lender \times PostLoanIssuance	-0.122 (3.920)	4.080 (2.747)	6.651 (4.083)	-0.499 (6.781)	3.825 (4.549)	10.010^{*} (5.700)	-9.374 (6.381)	-8.857 (5.877)	-8.110 (7.817)	-19.319^{*} (9.833)	-16.360^{*} (8.425)	-3.234 (9.463)
PostLoanIssuance	-0.161 (3.691)	-1.848 (2.049)	-0.878 (3.321)	0.821 (6.105)	-0.224 (4.136)	-2.039 (4.449)	7.367 (6.031)	6.107 (5.400)	4.222 (6.901)	15.562 (9.383)	16.749^{*} (8.603)	-1.782 (7.761)
$\begin{array}{l} \mbox{Firm FE}\\ \mbox{Country}\times\mbox{Year FE}\\ \mbox{N}\\ \mbox{Adj. }\mathbb{R}^2 \end{array}$	$\begin{array}{c} \Upsilon\\ Y\\ 911\\ 0.881 \end{array}$	Y Y 911 0.917	$\begin{array}{c} \mathrm{Y} \\ \mathrm{Y} \\ 911 \\ 0.892 \end{array}$	$\begin{array}{c} \mathrm{Y} \\ \mathrm{Y} \\ 911 \\ 0.853 \end{array}$	Y Y 911 0.870	$\begin{smallmatrix} Y\\ Y\\ 911\\ 0.850 \end{smallmatrix}$	Y Y 986 0.867	Y Y 986 0.891	Y Y 986 0.854	$ \begin{array}{c} \mathrm{Y} \\ \mathrm{Y} \\ 986 \\ 0.834 \end{array} $	Y Y 986 0.826	Y Y 986 0.805

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