Where Do Brown Companies Borrow From?*

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Abstract

We study cost and sources of debt for companies with poor ESG performance. We find that, while both loan and bond financing are costlier for borrowers with poor ESG performance, "brown" firms face a lower extra premium for borrowing from banks than "green" firms. In addition, companies with poorer ESG performance obtain larger bank loans and borrow smaller amounts from the public bond market, gradually shifting their debt structure towards more bank-loan-heavy. We discuss multiple explanations for our findings: brown borrowers' financial risk, banks' superior information about their borrowers, public debt holders' inherent preference for high ESG performance firms, and public debt holders being subject to stricter ESG regulation than banks.

Keywords: ESG performance, debt structure, cost of debt

JEL Codes: G12, G21, D62

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1 Introduction

Social activists and non-government organizations posit that one way to regulate firms' environmental, social, and governance (ESG) performance is to provide less debt funding for companies with poor ESG performance.[1] Regulators around the world consider directly regulating capital providers by mandatory disclosures of lending portfolio's greenness or climate stress testing.[2,3] Despite the growing attention to these proposals, we lack comprehensive evidence on debt conditions and the main debt providers of corporations with poor ESG performance. In this paper, we study the cost and sources of debt of brown companies.[4] Specifically, we ask if bank loans and public debt are more expensive for brown firms and if banks and bondholders finance the activities of firms with poor ESG performance.

The paper has two main findings. First, while firms with poor ESG performance face higher costs of both loans and public debt, the premium for borrowing from banks is lower for low-ESG-performance firms than for high-ESG-performance firms. Second, brown companies obtain larger loans and borrow less from the bond market. This suggests that brown firms' debt structure is tilted towards bank loans. The effects do not appear to be driven solely by the changed debt supply or by the firms' demand. We also argue that the potentially high financial risk of firms with poor ESG performance does not drive our results. We discuss potential explanations for our findings: banks' superior information, public debt holders' inherent preference for high ESG performance firms, and public debt holders being subject to stricter ESG regulation than banks.

We start by showing that companies with lower ESG scores (calculated using the number of negative ESG events such as oil spills, discriminations, etc.) face higher costs of both bank loans and bonds. However, simply comparing firms with high and low ESG

[1] Bloomberg, November 24, 2021. Wall Street's $22 Trillion Carbon Time Bomb.

[2] Financial Times, September 22, 2021. Costs of climate change far greater than green transition, as says ECB.

[3] Financial Times, March 31, 2022. Banks face new standards on carbon emissions disclosure.

[4] Throughout the paper, we use the terms "brown" and "green" to denote companies with low and high ESG performance, respectively.

performance is challenging. There are at least two identification concerns. The first is a reverse causality issue. It is possible that a debt provider finances a company first; the company invests in profitable yet ESG-unfavorable projects and becomes brown. The second issue may be that brown companies have unobservable characteristics that make them attract a specific type of debt or certain debt conditions. For example, green firms may be ruled by more liberal managers who are also more transparent, making a green company more attractive to debt providers in the public market.

To address these concerns, we employ an event study methodology, which allows us to isolate the effect of firms' ESG profiles on their debt financing. As a setting, we choose public announcements that a company violated one of the United Nations Global Compact (UNGC) principles.[5] The relevance assumption is that the violation of UNGC principles makes the firm more brown. We also assume that the events are random and are not driven by firms', banks', or loans' characteristics. We show that after the firms experience negative ESG events, the interest rates on their next loans increase, and the returns on bonds issued by these firms rise (implying lower prices). This suggests that brown firms' debt issuance is more costly than that of green firms'.

The event-study assumptions require the events to be random. In reality, some firms are more likely to violate UNGC principles than others. For example, firms in the oil industry are more likely to have an oil spill. To address the issue, we match the firms that experienced the events with similar firms that did not experience any adverse ESG events close to the same date. The variables used in matching include pre-event ESG ratings, balance sheet indicators, date, and industry. The exclusion restriction then requires that the variables not captured by the matching procedure do not impact the event.

We find that the costs of borrowing are higher for the firms that experience negative ESG events compared to the firms that do not. Specifically, the all-in-drawn spread of the next loan of the firm that experienced an adverse ESG event increases on average by 5.7 to 11.4 bps relative to the firm that did not experience any ESG events around

[5]https://www.unglobalcompact.org/what-is-gc/mission/principles

the same time. Bond financing also becomes more expensive – bond yields rise by 11.4 to 12.4 bps following the event.

Even though brown borrowers seem to face higher costs of both loans and public debt, the differential in these costs, in particular, the premium for borrowing from banks (Schwert (2020)), may be different for borrowers with poor ESG performance. We study this question using a credit pricing model as in Schwert (2020). Measuring differences in the cost of borrowing from two sources is complicated because loans and bonds have different seniorities, probabilities of default, and systemic risk exposure related to default. To overcome differences in default probabilities, we match loans and bonds issued by the same company on the same date with the same maturity and other characteristics. Next, to account for differences in seniority and, thus, recovery rates, we use Merton (1974) asset pricing model. We recover the asset volatility parameter using the market prices of companies' bonds and then plug in the recovered parameters to find the prices of these companies' loans as if they were traded on the market. The difference between actual loan spreads and the spreads suggested by the model is the premium (or the discount) that companies pay for borrowing from banks. We find that this premium is significantly smaller for firms with low ESG ratings (0.96%) than for high-ESG-rated firms (1.99%), suggesting that brown firms may find loans relatively more attractive than green firms.

Next, we ask whether companies with high and low ESG performance obtain different amounts of debt from banks and the public market. First, we conduct an event study and show that following a negative ESG event, the amount of bank loans rises for brown firms, whereas the bond financing declines. The event study has similar identification challenges here as in the analysis of costs of debt. We hence compare the firms that violated UNGC principles with their matched counterparts. We find that the bank loan amounts increase by 1.9 to 2.4% for firms that experienced negative ESG events relative to other firms, meaning that banks are financing brown companies' operations after the events. The bond financing declines by 1 to 6.7% following the negative ESG event for treated firms compared to the control firms. It means that either bondholders divest from the brown firms or that brown firms do not issue bonds since borrowing from the banks becomes relatively cheaper. Overall, brown firms' debt structure is tilted towards bank loan financing.

Our study documents three consistent patterns: firms with low ESG performance (1) face a larger cost of debt overall, (2) face a smaller premium for borrowing from banks, and (3) have more bank-loan-heavy debt structure than firms with high ESG performance. We then discuss potential mechanisms underlying our findings. First, we argue that our results cannot be driven solely by increased demand for debt from the firms. If the demand drives the results, then the amounts of borrowing and costs of credit should move in the same direction, i.e., more loans and bond issuance should also imply costlier debt. In our findings, this is only true for bank loans – they increase and become more expensive. However, bond issuance declines, at the same time becoming more costly. Our findings cannot be explained by changes in supply as well because, in that case, banks would charge lower loan rates to increase their supply.

Next, we explore potential explanations for why loans are relatively cheap for brown borrowers and why banks choose to provide financing to firms with poor ESG performance while bondholders do not. We first discuss if the results can be driven by the elevated financial risk of brown borrowers. We argue that this mechanism cannot explain why banks would increase financing to such borrowers while public bondholders would decrease financing. The increased financial risk is a supply-side mechanism, and as we discussed before if credit supply shifts such that the interest rate increases, the amount of credit should be reduced. We find this result for public debt providers but not for banks.

We then propose three potential explanations. The first is banks' exclusive knowledge about their borrowers. Banks invest resources in screening (Ramakrishnan and Thakor (1984); Allen (1990)) and monitoring (Diamond (1984); Winton (1995)) their borrowers and consequently obtain a lot of information, including soft information about borrowers' businesses (Bhattacharya and Chiesa (1995); Yosha (1995)). We conjecture that banks' expertise makes it easier for them to interpret the consequences of the borrowers' low ESG performance for the borrowers' cash flows and solvency. Bondholders, who are more distant from their borrowers, do not have such an informational advantage and are more uncertain about what poor ESG performance implies for their cash flows. As a result, banks charge a lower premium for being brown compared to public debt holders.

The second explanation for our findings may be that public debt holders may simply have different ESG preferences than banks. If bondholders inherently value their borrowers' ESG performance, they may require a higher premium as financial compensation for the unsatisfactory non-financial parameter. The taste-based explanation also rationalizes why bondholders divest from brown firms. When some investors value ESG performance, and others do not, in equilibrium, the former will invest more in green companies and the latter more in brown companies (Friedman and Heinle (2016)).

The last theory we consider is that investors in bonds are subject to stricter ESG-related regulations than banks. Public bondholders mostly consist of large institutional investors that face increasing regulatory scrutiny and public pressure to divest from poor ESG-performing corporations. As a result, it is possible that when some firms violate UNGC principles, bondholders face pressure to stop buying their bonds, consistent with our findings. In contrast, the US banks are not (yet) regulated as heavily with respect to the greenness of their investment portfolios. The majority of ESG initiatives for banks are voluntary and not subject to external verification. It means that banks are not scrutinized for originating loans to brown borrowers, which, according to our results, they do following negative ESG events.

This paper does not consider equity financing. The evidence in the literature indicates that the cost of capital does not change for brown firms (Berk and van Binsbergen (2022)). We also find evidence that the negative stock market reaction to non-financial companies' adverse ESG events does not persist in the long run. A possible conclusion is that equity financing does not become considerably more expensive for firms with poor ESG performance and can be used to finance their operations.

Our paper contributes to several strands of the literature. First, we contribute to the literature on banks and their borrowers' ESG performance. Banks generally charge higher rates for companies that pollute the environment, i.e., firms with high carbon emissions and fossil fuels (Goss and Roberts (2011); Delis, Hasan, and Ongena (2020); Chen, Hasan, Lin, and Nguyen (2021); Degryse, Karapetyan, and Karmakar (2021); Ehlers, Packer, and de Greiff (2022)). Several papers claim that such firms also get fewer loans (Nguyen and Phan (2020); Reghezza, Altunbas, Marques-Ibanez, d'Acri, and Spaggiari (2021); Kacperczyk and Peydro (2022)) unless they have relationships with the lender (Houston and Shan (2022)). In this paper, we focus not only on carbon emissions but on all components of ESG and show how the debt structure of brown firms changes when they experience adverse ESG events and whether banks consider ESG performance when they originate loans.

We also contribute to the growing literature on ESG and climate finance.[6] This research suggests that investors value firms' ESG performance and demand premium from brown companies (Chava (2014); Engle, Giglio, Kelly, Lee, and Stroebel (2020); Choi, Gao, and Jiang (2020); Bolton and Kacperczyk (2021); Friedman, Heinle, and Luneva (2021)).[7] Analogously, corporate bonds are subject to ESG risk and tend to yield less for brown firms (Huynh and Xia (2021); Seltzer, Starks, and Zhu (2022)). Finally, Pástor, Stambaugh, and Taylor (2022) show that green stocks have lower expected return. We answer this question for the debt market and test potential explanations for different investors' financing choices.

Finally, we contribute to the literature on debt structure, lending, and, more broadly, banking. There are several theories on how firms choose between private and public credit (Diamond (1991); Rajan (1992); Chemmanur and Fulghieri (1994);

[6]See Giglio, Kelly, and Stroebel (2021) for a review.

[7]One of the largest group of investors who choose their holdings based on ESG performance are institutions (Krueger, Sautner, and Starks (2020)).

Bolton and Scharfstein (1996)), as well as empirical studies discussing cross-sectional and time series variations in bank and bond financing (Faulkender and Petersen (2006); Rauh and Sufi (2010); Becker and Ivashina (2014); Crouzet (2018); Schwert (2020); Crouzet (2021)). Multiple papers study patterns in bank lending, including relationship borrowing and bank-borrower matching (Ivashina (2009); Schwert (2018); Houston and Shan (2022)). We analyze the debt structure of firms with low ESG performance and show that they tend to borrow more from banks since loans are relatively cheaper for them than bonds.

The rest of the paper is organized as follows. Section 2 describes our main data sources, summary statistics, and empirical strategy. Section 3 provides the results on the cost of debt of brown companies. Section 4 shows the results on the amount of debt of brown companies. Section 5 discussed the underlying channels driving our findings. Section 6 concludes.

2 Data and empirical strategy

Since we compare different debt sources of firms, we construct a novel dataset that combines loans originated by banks and bonds issued by corporations. We first describe our main data sources and then we discuss the identification strategy.

2.1 Data

We collect data on syndicated loans originated in the US from 2001 to 2021 from the Thompson Reuters DealScan. Following the literature, we remove financial and utilities borrowers (SIC codes 49, 60-69, 90-99). We keep only the lead lender as she is the one responsible for the deal. We keep only US dollar-denominated loans. We remove loans that are originated for acquisitions, takeovers, or leverage buyouts, even if those reasons are mentioned as secondary. We remove sponsored loans to alleviate the concerns that our results are driven by such events. We keep only loans that are priced relative to

LIBOR. Finally, we keep only revolving loan facilities (revolvers, lines of credit) and term loans of all types.[8] Our final DealScan sample contains 19,664 observations. For each loan facility, we observe an all-in-drawn spread (relative to LIBOR), date of origination, maturity, seniority, and loan amount. We merge the loan pricing data with balance sheet data on lenders and borrowers from Compustat using linking files provided by Chava and Roberts (2008) and Schwert (2020).[9]

We collect bond issuance data from Mergent FISD. The data specifies the issue date and amount for each bond. The sample contains 454,405 observations from 1984 to current. We merge FISD to DealScan using CUSIP and lender file kindly provided by Schwert (2020). We collect bond prices from TRACE and merge each loan facility with data on bond prices. The data is transaction-level, i.e., it records the price of the bond at dates when transactions were made. We match loans and bonds by the date of origination/issuance and maturity. We keep only senior unsecured bonds following Schwert (2020).

Finally, we add risk-free rates and debt structure data. We collect LIBOR data from Bloomberg and use it as a measure of risk-free rate mainly because loans in our sample are prices relative to LIBOR. We further compute bond spreads by maturity-matching LIBOR to make the base consistent with loans. Finally, we collect debt structure data from Capital IQ. We define senior debt as a sum of total bank debt and capital leases. The rest of the debt is junior. Our final bond sample contains 715,216 observations. We add ESG ratings from RepRisk to the data since our goal is to compare relative credit prices for brown and green companies. The RepRisk ESG ratings are based on the number of negative ESG events (e.g., oil spill), so unlike many other measures of ESG scores, our indicator is ex-post.

[8]Some term loans are securitized. We are not concerned about it since we specifically look at lead lenders. DealScan includes CLOs as participants in the syndicate.

[9]We thank Sudheer Chava, Michael Roberts, and Michael Schwert for making their data available.

2.2 Empirical strategy

We start by testing if firms with different ESG ratings have different prices and quantities of debt. Specifically, we estimate the following regression:

$$Y_{ibt} = \beta ESG_{it} + \gamma X_{ibt} + \alpha_i + \kappa_b + \theta_t + \varepsilon_{ibt} \tag{1}$$

where Y_{ibt} is either the price of debt or the log quantity of debt originated by bank b to firm i at time t, ESG_{it} is an ESG rating of firm i as of time t, X_{ibt} is a set of controls (including Altman z-score, a dummy for secured debt, and balance sheet variables), α_i is borrower FEs, κ_b is bank FEs, and θ_t is time FEs.

Despite the fact that ESG ratings from RepRisk are not ex-ante evaluations of companies' greenness but rather ex-post numbers of negative ESG events, there are potential confounders. For example, firms that have many negative ESG events can be different from those that do not in ways that also impact loan rates and debt amounts. We implement an event study to address the identification concern. We use data on violations of UNGC principles from RepRisk. When a serious violation takes place, it is usually covered in mass media. Then, it appears in the RepRisk database. The database contains information about the event – description and date. The description mentions which principle has been violated. UNGC specifies ten principles: 2 of them are related to human rights, 4 – to labor, 3 – to the environment, and 1 – to anti-corruption. The original RepRisk sample covers 37,164,374 events, many of which are duplicates (e.g. if the event was covered by multiple media outlets), so we drop them.

The events are used to calculate the ESG score of the borrowers. We further assume that the events are not impacted by the debt terms such as interest rates and that the events are not correlated with the error term in (1). In other words, we assume that the events are exogenous. We then run the following regression:

$$Y_{ibt} = \beta Post_{it} + \gamma X_{ibt} + \alpha_i + \kappa_b + +\theta_t + \varepsilon_{ibt} \tag{2}$$

where $Post_{it}$ is a dummy equal to 1 for firm i after it violates one of the UNGC principles. We define the post-period as a year after the event. We specifically look at the *next* debt contract. For example, if the event happened before the end date of the existing loan, the loan will not be treated as the post-event debt.

To further mitigate the concerns that the events are not random (for example, because firms in some industries are more likely to violate the UNGC principles), we match the firms in our sample (treatment group) to the firms that did not violate UNGC principles (control group) using the caliper nearest neighbor matching. We match based on balance sheet variables (assets, liabilities, non-tangibles), date, industry, and ESG rating prior to the event. For each firm-event pair, we find a match from Compustat. Our final matched data contains 135,818 observations. We then merge the matched data with bank and bond data to estimate the following regression:

$$Y_{ibt} = \beta Post_{it} \cdot Treat_i + \gamma X_{ibt} + \alpha_i + \kappa_b + \varepsilon_{ibt} \tag{3}$$

where $Treat_{it}$ is a dummy equal to 1 for the firms that experience an event around time t.[10]

Our final database contains data for treated and control firms on their balance sheets, loan amounts, issued bonds, prices of loans and bonds, ESG ratings, and dates of the events. Table 1 provides summary statistics for the matched sample. The variables used in matching are fairly close for treatment and control groups, as the procedure requires. Moreover, our matching technique does well for out-of-procedure variables. For example, average all-in-drawn spreads are 128 and 159 bps for the firms in treatment and control groups, respectively.

[10]Most firms experience multiple events. For example, if Apple Inc. experiences an event in August 2002 and July 2020, its $Treat_{it}$ will be equal to 1 for the third quarter of 2002 and the third quarter of 2020. Apple Inc. can still be matched as a non-event firm for other quarters.

Table 1: Summary Statistics: Matched Sample

	All firms		Treatment		Control	
	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
Panel A: Loan characteristic (DealScan)						
Bank loan amount (th. $)	3,448	3,878	4,154	3,554	2,536	4,083
All-in-drawn spread (b.p.)	145	63	128	58	159	63
Panel B: Bond characteristics (TRACE & FISD)						
Bond return (%)	5.88	44.53	4.61	27.35	8.96	70.45
Bond amount (th. $)	1,105	2,863	1,057	1,722	1,191	4,202
Panel C: Borrower characteristics (Compustat & RepRisk)						
Total assets (bill. $)	46	104	50	64	40	140
Total liabilities (bill. $)	32	90	32	52	31	123
Altman z-score	2.34	1.60	2.51	1.50	2.09	1.70
ESG score (demeaned)	1.10	1.27	1.75	1.03	0.25	1.04

Note: This table provides descriptive statistics for the data used in the main analysis of the paper. Panel A provides summary statistics for loan characteristics from DealScan. Panel B contains summary statistics for bond characteristics for TRACE and FISD. Panel C provides statistics for borrowers' characteristics from Compustat and RepRisk. The columns represent the groups – the first two show means and standard deviations for the full sample, and columns 3-6 provide means and standard deviations separately for treatment and control groups, respectively. The treatment group is the group where firms experienced negative ESG events.

3 Cost of debt of brown companies

In this section, we analyze the costs of bank and bond financing of brown firms relative to green firms. We first show that bank loans are more expensive for brown firms. Then, we test if the yields of bonds issued by brown companies are higher than the yields of those issued by green companies. Finally, we build and estimate the model to compare bank loans to bonds as if they were traded.

Table 2: Impact of ESG Rating on the Loan Spread

$$r^{\ell}_{ibt} = \beta ESG_{it} + \gamma X_{ibt} + \alpha_i + \kappa_b + \varepsilon_{ibt}$$

	Dependent variable:		
	All-in-drawn spread		
	(1)	(2)	(3)
ESG rating	-3.276^{**}	-8.588^{***}	-10.061^{***}
	(1.527)	(1.001)	(2.105)
Bank FE	Yes	Yes	No
Borrower FE	Yes	No	No
Controls	Yes	Yes	Yes
Observations	5,537	5,537	5,537
R^2	0.962	0.866	0.628

Note: This table provides results of the estimation of equation (1) where the dependent variable is all-in-drawn spreads. ESG ratings are based on a number of negative ESG events calculated by RepRisk. The ratings are demeaned. Bank and borrower fixed effects are included. Standard errors are clustered at the borrower level and displayed in parentheses. *,**, and *** correspond to 10-, 5-, and 1% significance level, respectively.

3.1 Cost of bank loans

We start by testing if loan spreads (loan rates minus LIBOR) are higher for firms with lower ESG ratings. Table 2 shows the results. Generally, loan spreads are lower for high-ESG-rates firms, i.e., greener firms. The result persists even after including bank and borrower fixed effects. The finding implies that banks charge a premium when they lend to a brown firm. It could be either because banks commit to greener loan portfolios or because they expect the financial indicators of brown firms to be worse than those of green firms. To partly rule out the financial explanation (although such an explanation is still consistent with our hypotheses), we control for Altman z-scores (Altman (1968)), a dummy for secured loans, and loan amounts.

The results in Table 2 do not necessarily imply that ESG performance causally impacts loan spreads. It can be the case that there are confounders that impact both ESG rating and loan spread of the firm. To address the concern, we conduct an event study using the announcements of the violations of the UNCG principles by borrowers. The relevance assumption is that the violation of UNGC principles makes the firm more

Table 3: Impact of ESG Rating on the Loan Spread: Event Study and Matching

$$r^{\ell}_{ibt} = \beta Post_{it} \cdot Treat_{it} + \gamma X_{ibt} + \alpha_i + \kappa_b + \varepsilon_{ibt}$$

	Dependent variable:			
	All-in-drawn spread			
	(1)	(2)	(3)	(4)
Post	1.477**	3.872***	−3.383***	−6.825***
	(0.667)	(0.817)	(0.403)	(0.698)
Treat			145.107***	−20.099***
			(3.189)	(0.805)
Post · Treat			5.664***	11.372***
			(0.764)	(1.070)
Matching	No	No	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Borrower FE	Yes	No	Yes	No
Controls	Yes	Yes	Yes	Yes
Observations	16,612	16,612	36,440	36,440
R^2	0.925	0.867	0.958	0.899

Note: This table provides results of the estimation of equations (2) and (3) where the dependent variable is all-in-drawn spread. The first two columns correspond to the event-study results. The events are violations of the UNGC principles. Columns 3-4 are based on nearest-neighbor caliper matching. The variables used in matching include pre-event ESG ratings, balance sheet indicators, date, and industry. Bank and borrower fixed effects are included. Standard errors are clustered at the borrower level and displayed in parentheses. *,** , and *** correspond to 10-, 5-, and 1% significance level, respectively.

brown. We also assume that the events are random and are not driven by firms', banks', or loans' characteristics.

Columns 1 and 2 of Table 3 show the results. Negative ESG events increase loan spreads charged by banks. An average event increases the all-in-drawn spread of the next loan to the borrower by 1.5 to 3.9 bps. This implies that banks consider ESG performance when they decide on loan spreads.

The event-study assumptions require the events to be random. In reality, some firms are more likely to violate UNGC principles than others. For example, firms in the oil industry are more likely to have an oil spill. To address the issue, we match the firms that experienced the events with similar firms that did not experience any adverse ESG events close to the same date. The variables used in matching include pre-event ESG ratings, balance sheet indicators, date, and industry. The exclusion restriction then requires that the variables not captured by the matching procedure do not impact the event. In the Online Appendix,[11] we also show that there are no pre-trends – the firms in the treatment and control groups have similar debt prices before the events.

Columns 3-4 of Table 3 show the results of matching. The all-in-drawn spread of the next loan of the firm that experienced an adverse ESG event increases on average by 5.7 to 11.4 bps relative to the firm that did not experience any ESG events around the same time. The results imply that negative ESG events, which make the borrower more brown, increase the cost of their bank loans.

3.2 Cost of bonds

Next, we test how ESG ratings impact bond yields, defined as the returns on bonds. If the yield is high, the price is low, so by hypothesis, the bond yields of brown companies should be higher than those of green companies. Table 4 shows the results. Bond yields are higher for companies with lower ESG ratings; hence, brown companies sell their bonds at lower prices. The results are even stronger if we account for time and firm fixed effects to control for unobservable variation in bond issuers and the year of the issuance.

Changes in ESG performance are generally correlated with other characteristics which can also impact bond yields. For example, firms in the electric car production industry usually have better ESG ratings, but they might also be perceived as more risky, and hence, their bond yields can be higher. To address the issue, we conduct an event study utilizing the violations of the UNGC principles by the firm. The assumption is that the bond yields of the firm change in a one-year window around the negative ESG event only because of the event.

Columns 1-2 of Table 9 show the event-study results. Bond yields change on average

[11] Available upon request.

Table 4: Impact of ESG Rating on the Bond Yields
$r^b_{it} = \beta ESG_{it} + \gamma X_{it} + \alpha_i + \theta_t + \varepsilon_{it}$

	Dependent variable:		
	Bond yield		
	(1)	(2)	(3)
ESG rating	-1.729^{***}	-0.335^{***}	-0.993^{***}
	(0.099)	(0.045)	(0.024)
Time FE	Yes	Yes	No
Firm FE	Yes	No	No
Observations	47,118	47,118	47,118
R^2	0.709	0.686	0.031

Note: This table provides results of the estimation of equation (1) where the dependent variable is bond yield. ESG ratings are based on a number of negative ESG events calculated by RepRisk. The ratings are demeaned. Time and firm fixed effects are included. Standard errors are clustered at the firm level and displayed in parentheses. *,**, and *** correspond to 10-, 5-, and 1% significance level, respectively.

by 1.8 to 2.1 bps after the event, implying that the bond prices decline for firms that become more brown. This is in line with the hypothesis that all else equal, borrowing from public markets is more expensive for brown firms than for green firms.

The event study implicitly assumes that all changes to bond yields around the event are attributed to the event. However, other changes can also impact bond yields. For example, financial crises or changes in the regulation of certain industries can impact bond yields around the events. To address the issue, we match the firms that experienced the events with similar firms that did not experience any adverse ESG events close to the same date, following the same procedure as before. The variables used in matching include pre-event ESG ratings, balance sheet indicators, date, and industry. The exclusion restriction then requires that the variables not captured by the matching procedure do not impact the event.

Columns 3-4 of Table 9 show the matching results. Bond yields increase for the firms that experienced negative ESG events relative to the firms that did not after the event. Bond yields rise by 11.4 to 12.4 bps in a one-year window around the violation of the UNGC principle, confirming that brown firms have more costly borrowing sources.

Table 5: Impact of ESG Rating on the Bond Yields: Event Study and Matching

$$r^b_{ibt} = \beta Post_{it} \cdot Treat_{it} + \gamma X_{ibt} + \alpha_i + \theta_t + \varepsilon_{ibt}$$

	Dependent variable:			
	Bond yield			
	(1)	(2)	(3)	(4)
Post	1.795***	2.110***	−8.680***	−10.557***
	(0.043)	(0.050)	(0.173)	(0.195)
Treat			−11.453***	−12.582***
			(0.295)	(0.321)
Post · Treat			11.435***	12.408***
			(0.186)	(0.206)
Matching	No	No	Yes	Yes
Time FE	Yes	No	Yes	No
Firm FE	Yes	Yes	Yes	Yes
Observations	1,346,068	1,346,068	1,901,216	1,901,216
R^2	0.167	0.155	0.053	0.047

Note: This table provides results of the estimation of equations (2) and (3) where the dependent variable is bond yields. The first two columns correspond to the event-study results. The events are violations of the UNGC principles. Columns 3-4 are based on nearest-neighbor caliper matching. The variables used in matching include pre-event ESG ratings, balance sheet indicators, date, and industry. Time and firm fixed effects are included. Standard errors are clustered at the firm level and displayed in parentheses. *,** , and *** correspond to 10-, 5-, and 1% significance level, respectively.

An increase in bond yields is larger than an increase in loan spreads for an average firm. This is also in line with the theory that bank credit is *relatively* cheaper for brown firms than for green firms. To formally test this, we need to compare loans and bonds of the *same* firm. The comparison is not straightforward since bonds are traded while loans are not. We discuss how to compare bonds and loans in the next subsection.

3.3 Model of loan and bond pricing

Comparing loans and bonds is challenging because bonds are trading whereas loans are originated by banks. Bonds and loans also have different maturities and different seniority. To be able to evaluate the differences between bond and loan spreads, we need to estimate the loan premium as if loans were exchange-traded. To compare prices of two sources of debt for high- and low-ESG companies, we use the approach developed by Schwert (2020). The approach allows us to get valuations of firms' loans as if these loans were traded on the public bond market.

3.3.1 Model set-up

Prices that a company pays for borrowing from the loan and the bond market are inherently difficult to compare. Bonds and loans differ in probabilities and expected times of default, expected recoveries in case of a default, and systematic risk exposures of recovery rates and default probabilities.

In the first step, we match bonds and loans issued by the same company on the same date. Since for two debts issued on the same date, timing and probability of default, as well as systematic risk exposure with respect to default, are the same, differences in prices for these loan-bond pairs are solely driven by expected recoveries in case of a default (Schwert (2020)).

In the second step, we account for differences in expected recoveries, or seniorities, of bonds and loans by using a structural model of credit risk. The model is an extension of the model developed by Merton (1974) with two classes of debt. The firm value is assumed to follow a geometric Brownian motion under the risk-neutral measure:

$$dlnV_t = \left(r - \frac{1}{2}\sigma^2\right) dt + \sigma dW_t^Q, \tag{4}$$

where r is a risk-free rate and σ^2 is the asset volatility parameter.

Suppose a firm has two types of zero-coupon debt: a senior loan with face value K_S and a junior bond with face value K_J. The loan and the bond mature on the same date, T. The payoff of a senior debt holder is equivalent to a portfolio consisting of a risk-free bond and a short put option struck at K_S. The junior debt holder's payoff is equivalent to a portfolio of a long call option struck at K_S and a short call option struck at $K_S + K_J$.

With these assumptions, the value of the senior debt is

$$D_S = V - \left(V\Phi(d_{1,S}) - K_S e^{-rT}\Phi(d_{2,S})\right), \tag{5}$$

where

$$d_{1,S} = \frac{ln(V/K_S) + \left(r + \frac{1}{2}\sigma^2\right)T}{\sigma\sqrt{T}}, \quad d_{2,S} = d_{1,S} - \sigma\sqrt{T}, \tag{6}$$

and the value of the junior debt is

$$D_J = \left(V\Phi(d_{1,S}) - K_S e^{-rT}\Phi(d_{2,S})\right) - \left(V\Phi(d_1) - (K_S + K_J)e^{-rT}\Phi(d_2)\right), \tag{7}$$

where

$$d_1 = \frac{ln(V/(K_S + K_J)) + \left(r + \frac{1}{2}\sigma^2\right)T}{\sigma\sqrt{T}}, \quad d_2 = d_1 - \sigma\sqrt{T}. \tag{8}$$

Since the loan and the bond have zero coupons, their yields are $y_S = \frac{1}{T}ln(K_S/D_S)$ and $y_J = \frac{1}{T}ln(K_J/D_J)$, respectively.

We use the model to obtain market prices of loans as follows. First, we use the equation for the valuation of junior debt (7) to solve for the asset volatility parameter, σ^2. Next, we plug in the recovered parameter σ^2 into the valuation equation for senior debt (5) and obtain the price of the loan as if it were traded on the public bond market.

3.3.2 Model data

To estimate the model we collect data on loan and bond prices. We use LPC DealScan for loan rates. DealScan provides data on syndicated loans, i.e., loans that involve several parties. The main decision is usually made by the lead lender (Ivashina (2009); Schwert (2018, 2020)); hence, for each loan facility, we keep only the lead lender. We remove borrowers from the financial and utilities industries. We remove loans originated for acquisitions, mergers, takeovers, or leveraged buyouts. We keep only US dollar-denominated loans priced relative to LIBOR. Finally, we keep only unsponsored term loans or revolving lines of credit. For each facility, we observe the all-in-drawn spread, date of origination, maturity, seniority, and loan amount. As before, we match the loan pricing data with balance sheet data on lenders and borrowers from Compustat using linking files provided by Chava and Roberts (2008) and Schwert (2020).

We match each loan facility with data on bond prices from TRACE. The data is transaction-level, i.e., it records the price of the bond at dates when transactions were made. We match loans and bonds by the date of origination/issuance and maturity. We keep only senior unsecured bonds following Schwert (2020).

Finally, we add risk-free rates and debt structure data necessary for the estimation of the model. We collect LIBOR data from Bloomberg and use it as a measure of risk-free rate mainly because loans in our sample are prices relative to LIBOR. We further compute bond spreads by maturity-matching LIBOR to make the base consistent with loans. Finally, we collect debt structure data from Capital IQ. We define senior debt as a sum of total bank debt and capital leases. The rest of the debt is junior. Our final sample contains 117 loan facilities from 2009 to 2016. We add ESG ratings from RepRisk to the data since our goal is to compare relative prices of credit for brown and green companies.

3.3.3 Estimation results

Results of the model estimation are presented in Table 6. The average bond spread is 2.05%, whereas the average loan spread is 1.65%. However, once we account for maturity, seniority, and debt amounts, it becomes clear that bank borrowers pay a premium for the loan – model-implied loan spreads are, on average, 0.33%. The results in consistent with findings in Schwert (2020) and show that borrowing from banks is more expensive than borrowing from the market.

Next, we compute *loan premiums*, i.e., differences between observed and recovered loan spreads for all borrowers and separately for green and brown borrowers. We define green borrowers as firms that have ESG RepRisk ratings of 'A,' 'AA,' or 'AAA' on the date of origination/issuance. We define brown borrowers as firms with ESG ratings of

Table 6: Structural Estimation Results

	Mean (1)	Std. dev. (2)
Bond spread	2.05	3.11
Bond yield	3.86	3.19
Loan spread (data)	1.65	1.27
Loan spread (model)	0.33	1.75
Observations	117	117

Note: This table provides results of the structural estimation of the credit pricing model. Column 1 shows means, and column 2 shows the standard deviations of respective variables. The first two rows show empirical corporate bond spreads relative to maturity-matched LIBOR and bond yields, respectively. The third row presents empirical loan spreads from DealScan. Finally, the fourth row presents recovered loan spreads from the model, i.e., loan prices relative to LIBOR as if loans were traded on the market. All numbers are in percentages.

'BBB' or lower on the date of origination/issuance. Recall that RepRisk ratings are based on events that happened to the firm, so classic concerns of measurement error in ESG ratings (Berg et al. (2022)) are mitigated in our analysis.

Premiums and t-values from the Welch tests are presented in Table 7. Firms in the full sample pay, on average 1.29% premium for borrowing from banks. The reasons underlying the premium include better terms offered by banks, possible negotiations and relationships, etc.[12] Green firms also pay a significant premium for loans – 1.99%. Finally, brown firms pay a 0.96% premium for borrowing from banks.

Next, we test if brown firms pay a lower premium than green firms. t-test leads us to the conclusion that green firms pay a 1.03% premium on top of the premium that brown firms pay. The number is both statistically and economically significant, which implies that loans are relatively cheaper for brown firms than for green firms.

Our model estimation shows that bank credit is relatively cheaper for brown borrowers

[12] For more detail, see Schwert (2020).

Table 7: Estimated Loan Premiums for Green and Brown borrowers

	All firms	Green firms	Brown firms
	(1)	(2)	(3)
Loan premium	1.29***	1.99***	0.96***
	(6.84)	(5.63)	(4.34)
Observations	117	39	78

Note: This table provides estimated loan premiums, i.e., differences between observed loan spreads and spreads recovered from the credit pricing model. Column 1 shows the premium for all firms. Column 2 presents the premium for firms that have ESG RepRisk ratings of 'A,' 'AA,' or 'AAA' on the date of origination/issuance. Column 3 shows the premium for firms with ESG ratings of 'BBB' or lower on the date of origination/issuance. t-values from the Welch t-test are in parentheses. All premiums are in percentage points.

than for green firms. It implies that when firms with poor ESG performance need credit, they are likely to demand it from banks and not from public markets. In the next section, we aim to understand how debt structure changes for brown firms.

4 Green and brown companies' debt structure

In the previous section, we found that bank loans are relatively cheaper for brown firms than for green firms compared to bond financing. It implies that brown firms should *demand* more bank loans than bond financing after the negative ESG events. In this section, we test what happens to firms' bank loan and bond issuance amounts after the events.

We utilize the same identification strategy as before to answer the questions. Specifically, we first exploit UNGC violations that make the firm more brown. We assume that the probabilities of the violations are exogenous, i.e., firms' debt decisions do not impact the violation, as well as any unobservables that can influence loan and bond amounts. Second, we match the firms that violated UNGC principles with similar firms that did not violate UNGC principles. The matching strategy allows us to address the concern that the events are impacted by firms' fundamentals.

Table 8 presents results for the sizes of loans obtained by companies. Columns 1 and 2 show the results of an event study. Following a UNGC violation, an average firm increases its loan amounts by 2.5 to 3.3%. The result implies that firms obtain more bank loans after their ESG performance deteriorates. It is still possible that the ESG performance does not cause an increase in bank loans. To overcome the challenge, we present the caliper matching results in Columns 3 and 4. The results show that the bank loan amounts increase by 1.9 to 2.4% for firms that experienced negative ESG events relative to other firms. The results are just barely statistically significant. However, at the very least, we are able to conclude that banks do not divest from brown firms, and brown firms borrow greater amounts from banks despite increased interest rates. We discuss potential economic mechanisms for our findings in detail in the next section.

Table 9 presents results for the amount of bond financing obtained by the companies. Columns 1 and 2 show the results of an event study. Following a negative ESG event, an average firm reduces its bond issuance by 5 to 4.3%. The result implies that firms obtain less bond financing after their ESG performance deteriorates. The matching results produce similar conclusions – bond financing declines by 1 to 6.7% following the negative ESG event for treated firms compared to the control firms. It means that either bondholders divest from the brown firms or that brown firms do not issue bonds, since borrowing from the banks becomes relatively cheaper.

The results in this section imply that brown firms increase their loan amounts and decrease bond issuance after adverse ESG events. Therefore, brown firms' debt structure tilts towards bank loans, consistent with the result that bank loans become relatively cheaper for brown firms than for green firms compared to bond financing. Our results can have multiple interpretations and various mechanisms can drive our findings. For example, are brown firms demanding more bank loans and fewer bonds, or do banks increase their supply of loans while bondholders divest? What are the underlying mechanisms for an increased bank loan supply and reduced bond issuance? We discuss these

Table 8: Impact of ESG Rating on the Loan Amount: Event Study and Matching

$$log(Loan \quad Amt)^{\ell}_{ibt} = \beta Post_{it} \cdot Treat_{it} + \gamma X_{ibt} + \alpha_i + \kappa_b + \varepsilon_{ibt}$$

	Dependent variable:			
	Log (Loan Amount)			
	(1)	(2)	(3)	(4)
Post	0.025***	0.033***	−0.002	−0.001
	(0.007)	(0.009)	(0.009)	(0.0.011)
Treat			2.774***	−0.097***
			(0.167)	(0.010)
Post · Event			0.019	0.024*
			(0.011)	(0.014)
Matching	No	No	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Borrower FE	Yes	No	Yes	No
Controls	Yes	Yes	Yes	Yes
Observations	29,711	29,711	50,874	50,874
R^2	0.997	0.995	0.997	0.994

Note: This table provides results of the estimation of equations (2) and (3) where the dependent variable is the logarithm of the bank loan amount. The first two columns correspond to the event-study results. The events are violations of the UNGC principles. Columns 3-4 are based on nearest-neighbor caliper matching. The variables used in matching include pre-event ESG ratings, balance sheet indicators, date, and industry. Bank and borrower fixed effects are included. Standard errors are clustered at the borrower level and displayed in parentheses. *,** , and *** correspond to 10-, 5-, and 1% significance level, respectively.

questions in the next section.

5 Mechanisms for brown companies' unique debt conditions and debt structure

Our study has documented three consistent patterns: firms with low ESG performance (1) face a larger cost of debt overall, (2) face a smaller premium for borrowing from banks, and (3) have more bank-loan-heavy debt structure than firms with high ESG performance. We have not yet offered any mechanisms that can explain these results.

Table 9: Impact of ESG Rating on the Bond Financing Amount: Event Study and Matching

$$log(Bond\quad Amt)_{ibt} = \beta Post_{it} \cdot Treat_{it} + \gamma X_{ibt} + \alpha_i + \theta_t + \varepsilon_{ibt}$$

	Dependent variable:			
	Log(Bond Financing Amount)			
	(1)	(2)	(3)	(4)
Post	-0.050^{***}	-0.043^{***}	-0.036^{***}	0.047^{***}
	(0.003)	(0.004)	(0.007)	(0.007)
Treat			13.556^{***}	13.464^{***}
			(0.081)	(0.012)
Post · Treat			-0.010	-0.067^{***}
			(0.008)	(0.008)
Matching	No	No	Yes	Yes
Time FE	Yes	No	Yes	No
Firm FE	Yes	Yes	Yes	Yes
Observations	115,803	115,803	162,708	162,708
R^2	0.998	0.998	0.998	0.997

Note: This table provides results of the estimation of equations (2) and (3) where the dependent variable is bond yields. The first two columns correspond to the event-study results. The events are violations of the UNGC principles. Columns 3-4 are based on nearest-neighbor caliper matching. The variables used in matching include pre-event ESG ratings, balance sheet indicators, date, and industry. Time and firm fixed effects are included. Standard errors are clustered at the firm level and displayed in parentheses. *,**, and *** correspond to 10-, 5-, and 1% significance level, respectively.

In this section, we discuss two broad explanations for brown companies' unique debt conditions and structure. First, we discuss if the results can be solely driven by an increased demand for credit from brown firms because any adverse event might require more debt to finance the costs. Second, we discuss the opposite force – whether the results can be solely driven by increased supply from the banks and reduced supply from the bondholders. We then discuss four potential mechanisms for our results – increased financial risks of brown companies, banks' superior information about their borrowers, banks' and bondholders' different tastes, and regulatory environments in which banks and bondholders operate.

5.1 Demand-driven and supply-driven explanations

The usual way to separate demand and supply explanations would be to use location-time fixed effects (Mian and Sufi (2009); Khwaja and Mian (2008)). Unfortunately, our loan and bond data is firm-bank-time level. Instead, we separate supply and demand by observing both changes in debt amounts and changes in the cost of borrowing.

When firms violate one of the UNGC principles, they might need more credit to compensate for losses and costs. The firms then may demand more bank loans and more bond financing. If the demand drives the results, then the amounts of borrowing and costs of credit should move in the same direction, i.e., more loans and bond issuance should also imply costlier debt. In our findings, this is only true for bank loans – they increase and become more expensive. However, bond issuance declines, at the same time becoming more costly. Even bank loan increase in some specifications is not significant, implying that the demand alone cannot explain our results.

After firms become more brown, it is possible that their debt providers would want to divest. It could be because they think that the firm is financially riskier and less likely to repay the debt, or the debtholders can be concerned about potential reputation damages. If the supply drives our results, then the credit amounts and the costs should move in different directions, i.e., larger loan amounts and bond issuance should also imply a reduction in interest rates. This is true for bond issuance – bond amounts decline and bond returns rise after negative ESG events, implying that bondholders divested from the firm. However, bank loans increase along with loan rates, which means that changes in loan financing cannot be purely supply-driven.

Overall, our results suggest that brown firms demand more credit to finance their costly operations. At the same time, debt holders (at least bondholders) divest from brown firms after adverse ESG events. An increase in bank loans likely implies both – firms demand more loans, and banks fill the gap created by leaving bondholders. Such actions are reflected in increased loan rates, potentially suggesting higher bargaining power of the banks. In other words, since both loans and bonds become more expensive for brown borrowers, but loans are relatively cheaper, their debt structure tilts towards bank credit. We discuss underlying mechanisms next.

5.2 Financial risk

One explanation for the results we find can be that borrowers who are more brown are also financially riskier. For example, if the borrower has an oil spill (a violation of one of the UNGC principles), then their cash flows can also decline. Hence, the probability of future defaults increases. In that case, firms could only borrow at higher interest rates.

We believe that this explanation is unlikely. First, it is not clear why a simple increase in the borrower's financial risk would differently affect its borrowing costs from the two types of debt providers. If the borrower becomes riskier, then both banks and bondholders should be concerned that their debt might not be repaid, so we could expect a similar reaction. We see the opposite for banks – they originate more loans at a relatively lower price to brown firms after the events.

Second, this mechanism cannot explain why banks would increase financing to such borrowers while public bondholders would decrease financing. The increased financial risk is a supply-side mechanism, and as we discussed before if credit supply shifts such that the interest rate increases, the amount of credit should be reduced. We find this result for public debt providers but not for banks.

We do not argue that financial considerations are not influencing our results. We, however, claim that financial risk alone cannot capture our findings because firms' fundamentals and riskiness matter for both banks and public bondholders. This suggests that there is something different in banks' debt origination decisions, making them more willing to finance brown companies. We next consider three potential explanations for this. First, we discuss the possibility that banks have more superior information about the borrowers' cash flow. That is, banks can differentiate between ESG events, which increase borrowers' financial risk, and ESG events, which do not make the firm riskier. Second, we consider the possibility that banks and bondholders have different taste functions – while bondholders want to divest from socially irresponsible firms, banks fill in the gap. Finally, we discuss differential regulatory environments in which banks and bondholders operate.

5.3 Banks' superior information

The next explanation we consider is banks' superior information about their borrowers. In contrast to public debt or equity holders, banks are known to invest a lot of resources in screening (Ramakrishnan and Thakor (1984), Allen (1990)) and monitoring (Diamond (1984), Winton (1995)) their borrowers. This close relationship allows banks to obtain a lot of information, often soft information that other investors do not possess (Bhattacharya and Chiesa (1995), Yosha (1995)). It is possible, then, that banks can differentiate between the events that affect borrowers' future cash flows and the events that do not influence the borrowers' riskiness.

We suggest that this information about firms also helps banks better understand their borrowers' ESG risks. If banks are less uncertain than bondholders about the financial consequences of borrowers' ESG risks, banks can charge a lower ESG risk premium than bondholders. In other words, banks can still continue providing credit to firms with unaffected cash flows, whereas bondholders do not separate such firms from those that become riskier after negative ESG events. Under this explanation, one would see exactly what we find in the data: both bank loans and bonds are more expensive for brown firms, but the differential between bank interest and bond yield is smaller for a brown firm than for a green firm. This mechanism implies that interest rates are set by debt providers first, and then brown borrowers adjust their capital structure such that bank debt is more prevalent.

5.4 Taste for green investments

Our next explanation is that banks and public bondholders simply have different tastes for green investments. Specifically, public debt holders may inherently value their companies' high ESG performance, presumably because public debt holders' investors value ESG (Krueger, Sautner, and Starks (2020); Bauer, Ruof, and Smeets (2021)), either due to the warm-glow-giving utility they obtain from investing in socially responsible firms or due to them caring about financial performance in the more distant future. This would create incentives for bondholders to divest from the firms that become more brown, as we see in the data.

In contrast, banks, or banks' shareholders, might not substantially value their corporate clients' ESG profile. So even if banks' borrowers violate UNGC principles, banks continue investing in them, and they are even able to make profits by charging higher loan spreads. Consistent with this explanation, our results suggest that the amount of bank loans increases for brown firms while loan rates rise.

When some investors inherently value ESG performance, and others do not, in equilibrium, the former will invest more in green companies and the latter more in brown companies (Friedman and Heinle (2016)). Interest rates, while being generally higher for brown companies, would be more favorable for investors who do not value ESG performance. The reasons for increased interest rates might be different. Bondholders increase interest rates because they reduce the supply of debt. Banks, in turn, increase loan rates because they have more bargaining power – borrowers demand more loans since bondholders divest.

5.5 Different regulatory environments

The final explanation we propose is different regulatory environments for banks and public debt holders, which impact their decisions to finance brown companies. Public bondholders mostly consist of large institutional investors that face increasing regulatory scrutiny and public pressure to divest from poor ESG-performing corporations. In particular, the Securities and Exchange Commission has recently adopted a rule implying that an investment fund can only use an ESG-themed name if at least 80% of its portfolio aligns with the stated ESG goals.[13] The Commission also has increased scrutiny over financial investors' commitment to their stated policies[14] and improper disclosure.[15] As a result, it is possible that when some firms violate UNGC principles, bondholders face pressure to stop buying their bonds. This is consistent with our findings.

In contrast, the US banks are not (yet) regulated as heavily with respect to the greenness of their investment portfolios. The majority of ESG initiatives for banks are voluntary and not subject to external verification. It means that banks are not scrutinized for originating loans to brown borrowers, which, according to our results, they do following negative ESG events.

Overall, in this section, we discuss potential underlying mechanisms driving our main findings. We first argue that our results cannot be fully accounted for by increased demand for credit from brown firms or by changes in the supply of credit from debt holders. We suggest that our findings are driven by increased demand from brown firms, bondholders' divestment from brown investments, and banks' will and ability to finance brown companies. We next argue that there are at least three potential explanations – increased financial risks of brown companies, banks' superior information about firms' fundamentals, a differential taste of banks compared to bondholders, and regulatory environments in which banks and bondholders operate.

6 Conclusion

This study investigates credit conditions faced by corporations with poor Environmental, Social, and Governance performance. We document multiple robust, thought-provoking patterns: companies with poor ESG performance (1) face a larger cost of debt overall, however, (2) a smaller premium for borrowing from banks, and (3) borrow larger amounts from banks and smaller from the bond market. These findings collectively

[13]See the SEC's press release on September 20, 2023.
[14]See the SEC's press release on November 22, 2022.
[15]See the SEC's press release on May 23, 2022.

suggest that growing debt providers for brown companies are banks and not the public market.

Why would banks charge brown borrowers a lower premium than public bondholders, and why would banks prefer to lend to brown firms while bondholders would not? We discuss multiple mechanisms that can explain our findings. Firstly, we refute completely supply-driven and completely demand-driven explanations because observed changes in debt amounts and borrowing costs are inconsistent with a single-sided mechanism. Next, we argue that just an increase in borrowers' financial risk after an adverse ESG event also cannot explain our results.

We propose three mechanisms that align with all our findings. The first mechanism is banks' superior knowledge of their borrowers. Because banks have closer relationships with the borrowing companies, they might be better skilled than public investors at assessing the implications of borrowers' poor ESG performance for future cash flows. As a result, if banks are less uncertain about the borrower's risk, they can afford a more preferable interest rate. The second mechanism is the different tastes that banks and public bondholders have. We argue that bondholders may simply value their holdings' ESG performance higher than banks do, and thus only be ready to lend to brown borrowers at a higher premium. The final mechanism we propose is the regulatory environment in which banks and public investors operate. We discuss that investment funds face increasing regulatory scrutiny and their ESG investments are already heavily regulated in the U.S., while banks are not yet subject to any formal regulations.

Our study contributes to the public debate on whether and how socially irresponsible corporations should be regulated. Multiple calls have been made to affect companies' actions indirectly through their debt providers. However, to our knowledge, so far there existed limited large-sample evidence on who is the main debt provider for brown companies and whether these companies already face adverse borrowing conditions. We fill this void and show that brown companies tilt towards bank debt and, even though face overall tougher credit conditions, find borrowing from banks more favorable than an average green company.

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