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Do debt investors care about ESG Ratings?

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Abstract

We study how institutional investors in corporate debt markets respond to ESG-related concerns. Exploiting an exogenous, methodology-driven ESG rating change, we show that ESG downgraded firms face higher loan spreads than non-downgraded peers in the secondary loan market. This increase is not explained by changes in firms' fundamental credit risk but reflects an excess ESG premium demanded by debt investors. ESG-conscious lenders are also more likely to sell downgraded loans. Finally, the effects extend to the primary loan market, where downgraded firms face higher borrowing costs, highlighting that ESG ratings influence firms' cost of debt beyond underlying credit fundamentals.

JEL classification: E44, G20, G23, G24

Keywords: ESG ratings, Debt investors, Loan spreads, CLO

Non-Technical Summary

Investors increasingly consider environmental, social, and governance (ESG) issues when making investment decisions. By 2030, global ESG assets are projected to surpass $40 trillion and the sustainable finance debt market already accounts for roughly 11 percent of the global bond market (BIS, 2023; Bloomberg Intelligence, 2024). However, little is known about the extent to which debt investors incorporate ESG ratings into their investment and the implications this has for a firm's cost of debt. In this paper, we focus on institutional investors who buy and sell corporate loans after they have been issued in the secondary loan market and investigate how they respond to changes in ESG ratings by two of the leading ESG rating providers: Refinitiv ESG and Sustainalytics ESG.

The secondary syndicated loan market provides an ideal setting to study this question. The majority of loans traded in the secondary market are leveraged loans issued in the primary syndicated loan market, which represents one of the most important sources of financing for non-financial firms (Chodorow-Reich, 2014; Cerutti, Hale, and Minoiu, 2015). The annual trading volume in the secondary market grew from USD 100 billion in 2000 to USD 821 billion in 2024 (LSTA, 2025). Importantly, secondary market quotes for corporate loans are available on a daily frequency and thus we can track investor behavior in real time. Moreover, these prices are less likely to be affected by shifts in the composition of issuers in the primary market over time.

For our identification strategy, we exploit a methodology-driven rewriting of Refinitiv ESG ratings on April 6, 2020, which resulted in adjustments to virtually all ESG scores in its database (Refinitiv, 2020). To isolate the effect of the methodology change, we compare ESG ratings immediately before and after the rewriting, using data downloaded on April 4, 2020 and April 6, 2020. This narrow window minimizes the influence of changes in firm fundamentals and other confounding events. We classify firms in the bottom tercile of the score change distribution—i.e., firms with the largest negative rewriting—as ESG-downgraded firms, and compare them to firms above the lowest tercile. To measure firms' cost of debt, we follow Saunders, Spina, Steffen, and Streitz (2024) and construct daily loan-market-based credit spreads using secondary market prices.

We find that secondary market loan spreads for downgraded firms increase by 9.7 percent following the methodology change, relative to firms in the same industry, credit-rating category, and month that did not experience a downgrade. The effect persists for several months before gradually dissipating, suggesting that institutional debt investors view ESG downgrades as informative signals about firms. Our findings are not limited to a single ESG ratings provider; we observe similar results in the context of the methodology change by Sustainalytics. The results are also robust to a wide range of tests designed to account for the Covid-19 pandemic and other sources of financial market uncertainty.

When we decompose the loan spreads, we find that the effect is driven by an ESG-related premium demanded by debt investors rather than changes in firms' underlying credit risk. We further show that CLOs, the dominant investors in the leveraged loan market, are more likely to sell loans of downgraded firms following the methodology change, with the effect being strongest among ESG-conscious CLO managers. Finally, we show that the effects carry over to the primary market. ESG-downgraded firms face higher borrowing costs when issuing new loans, highlighting that ESG ratings influence firms' cost of debt beyond secondary market trading.

Overall, our paper shows that lightly regulated investors consider sustainability ratings when pricing and trading loans. As ESG considerations become more important for investors, firms with weak ESG ratings may face higher financing costs and reduced access to debt financing.

"We believe that, in the long term, there really will be a differentiation of a borrower's capacity to access capital or cheaper capital, depending on its ESG performance."

LGT European Capital, 2019[1]

1. Introduction

Environmental, social, and corporate governance (ESG) considerations have become an integral part of investment analysis. Despite heightened geopolitical and macroeconomic uncertainty, global ESG assets are projected to surpass $40 trillion by 2030, highlighting the growing importance of incorporating ESG factors into investment decisions of investors and institutions (Bloomberg Intelligence, 2024). This growth is also reflected in sustainable finance debt markets, in which ESG-related bond issuances exceeded already $1 trillion in 2021, accounting for roughly 11 percent of the global bond market (BIS, 2023). Despite a burgeoning literature on the pricing of ESG risks in equity and bond markets (Bolton and Kacperczyk, 2021; Flammer, 2021), little is known about how debt investors incorporate ESG ratings into their investment decisions and the resulting implications for firms' cost of debt.[2] In that spirit, Starks (2023) has also pointed out that substantial work remains to be done on ESG issues and asset classes beyond equities such as corporate loans, particularly with regard to incorporating ESG-related risks into asset prices. To address this gap, we examine the effect of ESG rating changes on loan prices in the secondary corporate loan market in the U.S.

Studying the effect of ESG rating changes on firms' cost of debt is challenging for at least two reasons. First, it is typically difficult to isolate the effect of ESG rating changes from changes in credit ratings or other changes in firm fundamentals. Second, in primary syndicated loan markets, loan issuances occur at a low frequency, making it harder to differentiate between demand and supply-side factors. We address these challenges exploiting a sudden and purely methodology-driven change in ESG ratings and study its effects on daily loan spreads in the secondary corporate loan market. Combined with a stringent set of fixed effects, we find that ESG rating downgrades lead to significantly

[1] See UN PRI, "Spotlight on responsible investment in private debt."

[2] Note that we use the terms ESG rating and ESG score interchangeably throughout the paper. Refinitiv ESG scores are defined on a 0–100 scale, allowing for a precise measurement of downgrades.

higher daily loan spreads for a given firm within the *same industry*, *same credit rating category*, and *same month*.

The secondary syndicated loan market provides an ideal setting for several reasons. First, the majority of loans traded in the secondary market are leveraged loans issued in the primary syndicated loan market, which represents one of the most important sources of financing for non-financial firms (Chodorow-Reich, 2014; Cerutti et al., 2015). The annual trading volume in the secondary market increased from $100 billion in 2000 to $821 billion in 2024, as reported by the Loan Syndications and Trading Association (LSTA, 2025). Second, because secondary market quotes for corporate loans are available at a daily frequency, we can track investor behavior in real time. Third, the availability of secondary market prices allows us to construct loan-market-based credit spreads that are less subject to borrower composition effects than spreads in the primary market. Finally, we link individual loans to portfolios of Collateralized Loan Obligations (CLOs), the major debt investors in leveraged loans, and examine how ESG concerns shape their loan trading behavior.

For our identification strategy, we exploit a methodology-driven rewriting of Refinitiv ESG ratings on April 6, 2020 (Refinitiv, 2020). The rewriting introduced two main changes: (1) a reweighting of metrics to reflect their industry-specific materiality (e.g., emissions matter more for the energy sector than finance industry) and (2) a stricter treatment of missing values, where non-reporting firms now receive a score of zero rather than a neutral midpoint, thereby penalizing nondisclosure and incentivizing transparency. Following these adjustments, Refinitiv rewrote ESG ratings of its entire ESG database, with most firms experiencing a "downgrade" (i.e., the revised ESG score was lower than the initial one). Using Refinitiv's Point-In-Time data, we compare ratings downloaded between April 4, 2020 (pre-change) and April 6, 2020 (post-change), a narrow window that minimizes confounding effects from firm fundamentals or ongoing rewriting of scores (Berg, Fabisik, and Sautner, 2021).[3] We define downgraded firms as those in the bottom tercile of the score change distribution—i.e., firms with the largest negative rewriting—relative

[3]Refinitiv is an influential ESG data provider; its ESG data has been used by BlackRock and other asset managers to manage their portfolios, or by institutions such as the European Commission or OECD to shape their policy recommendations (Boffo and Patalano, 2020). See, e.g., Responsible Investor, April 11, 2011: "BlackRock taps Thomson Reuters' ASSET4 for global ESG data."

to firms above the lowest tercile.[4] To measure firms' cost of debt, we follow Saunders et al. (2024) to create daily loan market-based credit spreads based on secondary market pricing.

We find that loans of downgraded firms carry 9.7 percent higher loan spreads relative to the sample average after the methodology change, indicating that debt investors incorporate ESG ratings into loan pricing. The effect persists before dissipating after six months, consistent with debt investors interpreting downgrades as negative ESG signals facing higher information asymmetries than banks. This finding highlights that ESG rating changes are economically relevant, particularly for short-term financing considerations and liquidity management of firms. In terms of economic magnitude, our results are slightly smaller than the green discount found in the primary syndicated loan market (Degryse, Goncharenko, Theunisz, and Vadasz, 2023). We further show that our results are not limited to Refinitiv, as we find comparable effects for the Sustainalytics methodology change in 2018.[5]

Our sample period coincides with the onset of the Covid-19 pandemic, raising concerns about possible confounding events. To account for heightened financial risks and increased uncertainties during this period, we conduct various robustness tests. To summarize, our results remain qualitatively unchanged in all our robustness tests. First, we use granular measures of Ding, Levine, Lin, and Xie (2021), which capture both economy-wide and firm-level Covid-19 exposures on a weekly basis. Furthermore, we compare differences in loan spreads within the same industry, credit rating category, and month, allowing for the fact that firms in different industries and credit rating categories may have been affected differently by the pandemic. We also include firm characteristics, loan fixed effects, lender fixed effects, as well as credit rating scale fixed effects to absorb remaining correlations. Next, we include measures of heightened financial risks and other uncertainties around the Covid-19 pandemic such as market liquidity, firms' distance to default or volatility measures. Lastly, we show that ESG ratings are generally related to corporate spreads

[4]Results remain robust when using continuous ESG rating changes or alternative downgrade definitions. For additional robustness, we also analyze the more complex methodology change by Sustainalytics, which involved an inversion of the rating scale and the removal of an industry adjustment, and obtain consistent results.

[5]Sustainalytics announced the intent to update its methodology in September 2018, but disseminated the new ESG Risk Rating to its institutional clients in December 2018.

over a longer time period.[6]

To shed light on the mechanisms behind the effect of ESG rating changes on firms' cost of debt, we formally test whether changes in credit fundamentals or supply-side frictions in the secondary market explain the main effect. We decompose the loan spread into a credit risk component based on observable firm fundamentals and contract terms, which we term *predicted loan spread*, and a residual component that should capture the risk pricing of investors above credit risk fundamentals, which we term *excess loan premium* (ELP) (Gilchrist and Zakrajšek, 2012; Saunders et al., 2024). Our findings reveal that the main effect is driven by an excess ESG loan premium charged by debt investors, while the effect on the predicted spread, which reflects firm fundamental risks, is economically small and statistically insignificant.[7]

Next, we explore which investors and firms are affected the most by the ESG downgrade. We show that term loan Bs (TLBs) fully explain the identified effect on ELP. TLBs, which usually have a bullet payment at maturity, are more likely to be held by institutional investors, rather than by banks that are more likely to hold term loan As (TLAs) with a gradually increasing repayment structure until maturity (Acharya, Gopal, and Steffen, 2025).[8] We also interact our main coefficient with firm size measures, showing that the ESG downgrade effect is strongest for smaller and more opaque firms for which information asymmetries should be highest. Taken together, these findings suggest that institutional investors interpret ESG downgrades as negative signals about ESG-relevant disclosure and charge a temporary ESG premium.

To better understand how institutional investors respond to ESG downgrades, we examine the trading behavior of collateralized loan obligations (CLOs), the principal in-

[6]We also show that our sample of loans with ESG ratings is not different from typical leveraged loans in the secondary market.

[7]Because our prediction model uses data only through 2019, it cannot account for the Covid-19 pandemic. Including our Covid-19 exposure measure as an additional explanatory variable yields a significant effect of similar magnitude, but the ESG downgrade effect remains unchanged.

[8]According to Ivashina and Sun (2011), a leveraged loan typically includes a revolving credit line and several term loan facilities. However, institutional investors prefer term loans over revolving credit lines since revolvers allow borrowers to draw and repay committed funds at their own discretion, making it more costly for lenders. Moreover, institutional investors usually make use of TLBs, whereas banks make use of TLAs. This is also highlighted in the LSTA, 11 June 2024: "Lending & Secured Finance 2024."

vestors in the leveraged loan market.[9] CLOs are actively managed investment products consisting of a diversified pool of leveraged loans. CLOs have experienced substantial growth since the financial crisis of 2007/08, accounting for 75 percent of leveraged loan purchases in 2021 (Kundu, 2023). We find that CLOs sell loans of downgraded firms more frequently after the methodology change, with the effect concentrated among ESG-conscious CLOs. This pattern suggests that ESG-conscious debt investors react more strongly to heightened sustainability concerns when faced with ESG downgrades. Consistent with our main result, the effect dissipates within three months, as CLOs subsequently repurchase loans of downgraded firms.

Given that the secondary market is only a subset of the primary syndicated loan market, we also study the implications for the cost of borrowing for all ESG-rated firms in the primary syndicated loan market. We find evidence that ESG-downgraded firms experience a 17-19 percent increase in their all-in-spread drawn for new loan issuances after the downgrade event, similar to the green discount in the literature (Degryse et al., 2023). This corresponds to an increase in the average interest expense to EBIT ratio of a firm from 1.9 to 2.2 percent. This result shows that ESG downgrades have real and economically meaningful effects on firms' cost of debt.

Our paper is the first to examine the effect of ESG ratings on debt market participants' pricing and trading behavior. It relates to the work of Chava (2014), who shows that firms' environmental profiles impact bank loan spreads and highlights that the relationship is partly driven by environmentally sensitive lenders. Building on this idea, we use a sudden change in ESG ratings to estimate the effect on firms' cost of debt, mitigating potential confounding effects. We use ESG ratings based on double materiality (Refinitiv ESG methodology change) and financial materiality (Sustainalytics ESG methodology change), while Chava (2014) focuses on "planetary materiality" (i.e., a firm's environmental impact). Double materiality considers both a company's impact on sustainability and the impact of sustainability-related factors on the company itself. The notable difference in the materiality direction, which has also been termed "value" versus "values,"

[9] With banks having shifted from an "originate-to-hold" model to an "originate-to-distribute" model, credit risk has diversified across institutional investors, of which CLOs represent the largest group. This shift has increased the opacity of shock transmission channels and introduced new vulnerabilities (Kundu, 2023).

has been highlighted by Starks (2023) as a key aspect for academics to consider and differentiate in their work. Lastly, by focusing our analysis on the leveraged loan market, we are the first to show that debt investors respond to ESG ratings even in less regulated markets.

Our paper is also related to the growing literature on the effects of ESG in capital markets. Professional investors appear to consider sustainability, social responsibility or the climate when making investment decisions (Riedl and Smeets, 2017; Hartzmark and Sussman, 2019; Krüger, Sautner, and Starks, 2020; Baker, Egan, and Sarkar, 2022; Ilhan, Krueger, Sautner, and Starks, 2023; Giglio, Maggiori, Stroebel, Tan, Utkus, and Xu, 2025).[10] Empirical evidence shows that environmental risks matter for pricing in equity markets (Bolton and Kacperczyk, 2021; Ilhan, Sautner, and Vilkov, 2021), bond markets (Painter, 2020; Fatica, Panzica, and Rancan, 2021; Flammer, 2021; Acharya, Johnson, Sundaresan, and Tomunen, 2022), and real estate markets (Bernstein, Gustafson, and Lewis, 2019; Baldauf, Garlappi, and Yannelis, 2020). We contribute to this literature by studying the value of ESG for professional debt investors in the secondary loan market. A related paper by Hackenberg, Klaus, Klingler, and Sondershaus (2025) examines the trading behavior of CLOs in response to heightened media attention on climate change until 2017, while our study focuses on the impact of sudden ESG rating rewriting during a more recent time period.

There is also evidence on ESG risk factors of firms and its effects on firm financing and firm behavior. The literature documents that similarity in ESG and sustainability scores, environmental consciousness, and ethical domains between banks and firms affect lending decisions, loan pricing as well as ESG performance of firms (Houston and Shan, 2022; Degryse et al., 2023). A recent paper by Kacperczyk and Peydró (2024) shows that banks with green preferences decrease lending to larger firms with higher carbon footprints, while Giannetti, Jasova, Loumioti, and Mendicino (2025) report that green banks continue lending to small firms in brown industries in less visible parts of the lending portfolio. There is evidence on banks announcing environmental commitments to cut or exit industry exposures like coal or mining, although the effects of such commitments

[10] For recent reviews of the growing literature, see Giglio, Kelly, and Stroebel (2021) and Hong, Karolyi, and Scheinkman (2020).

remain mixed (Haushalter, Henry, and Iliev, 2023; Green and Vallee, 2024; Sastry, Verner, and Marques-Ibanez, 2024). More recent evidence explores the link between carbon pricing and loan terms as well as sustainability-linked loans and firm ESG performance (Ivanov, Kruttli, and Watugala, 2024; Kim, Kumar, Lee, and Oh, 2025). In contrast, our paper focuses on the secondary corporate loan market and explores the immediate impact of ESG rating downgrades on daily loan market prices and the behavior of debt investors.

The remainder of the paper proceeds as follows. In Section 2, we describe the data and the sample. In Section 3, we present the main result with Refinitiv ESG ratings and robustness tests, followed by the results using Sustainalytics, another ESG rating provider. Section 4 studies the economic channel through which higher loan spreads can be explained. In Section 5, we show the implications for firms' cost of debt in primary syndicated loan markets. Section 6 concludes the paper.

2. Data and Summary Statistics

In this section, we first describe the main data sources and variable definitions for ESG ratings and costs of debt of firms. We also provide summary statistics of the main dependent and explanatory variables.

2.1. ESG Data

2.1.1. Refinitiv ESG Data

We use Refinitiv's ESG methodology rewriting as a shock to firms' ESG ratings. The rewriting includes (1) a change to the materiality matrix and (2) a revised approach to handling missing values.[11] The first change involves recognizing that not all metrics are equally important across industries. For example, carbon emissions matter more in the automotive industry than in the healthcare sector. The second change relates to how missing ESG data is handled. Previously, companies that did not report were given a

[11] Table IA1 of the Internet Appendix provides a detailed description of Refinitiv's ESG methodology change.

neutral score of 0.5, which may have reduced the incentive to disclose. Under the new system, non-reporting companies receive a score of zero for relevant metrics, encouraging greater transparency and more complete ESG reporting.

Following the methodology change on April 6, 2020, Refinitiv rewrote all ESG ratings, with most firms experiencing a downgrade. To capture the immediate impact, we use Refinitiv's ESG Point-In-Time (PIT) data and compare two database versions: April 4, 2020 (pre-methodology change) and April 6, 2020 (post-methodology change).[12] In both data downloads, we rely on the latest ESG score for each firm (typically, from fiscal year 2019 or 2020).[13] With this choice we ensure that the change in the ratings is driven purely by the methodology change, a solution suggested by Berg et al. (2021). To compute our main explanatory variable of interest, we first compute the differences in ESG scores for each firm based on the latest fiscal year observation common to both data versions as follows:

$$\Delta\, ESG\, Score = ESG\, Score^{04/06\, Data} - ESG\, Score^{04/04\, Data}. \tag{1}$$

We observe, in line with Berg et al. (2021), that the ESG scores for the same firm and for the same year vary considerably between our pre- and post-methodology change data downloads in Table 1. Similarly to Berg et al. (2021), we find that due to the methodology change that took effect on April 6, 2020, not a single ESG score is the same.

To capture the most severe downgrades, we create an indicator variable *ESG Downgrade* that takes on a value of one for firms with an ESG rating difference (calculated according to Equation 1, i.e., pre- vs. post-methodology change) in the lowest tercile, and zero for all other firms. The variable *ESG Downgrade* is based on terciles calculated in the universe of firms with an ESG score for which we have data on both dates available after merging with the loan market data. As we show in later sections of the paper, our results are robust to different definitions of the downgrade measure.

[12] These two downloads are the closest possible to the methodology change, which took place on April 6, 2020, and which was communicated to the general public in the April 15, 2020 press release (Refinitiv, 2020).

[13] As is common with ESG providers, Refinitiv ratings may lag reporting. We therefore rely on the score reported under the "FY0" value of the *FinancialPeriodRelative* variable and ensure consistency by comparing only within the same *FinancialPeriodAbsolute*.

2.1.2. Sustainalytics ESG Data

To ensure that our results are not a pure artifact of the Refinitiv ESG ratings or the specific time period, we rely on another methodology change of Sustainalytics ESG, which took place between September 2018 and December 2018. We use two downloads of Sustainalytics ESG data to construct a downgrade measure: one that contains ESG scores of firms prior to the methodology change and another after the methodology change. The latest rating differs from the original one in two aspects and now carries the name "ESG Risk Rating" instead of the original "ESG Rating." As the name suggests, one of the major changes to Sustainalytics' ESG ratings included the scale inversion, whereby lower scores became associated with higher ESG quality. However, in addition to this first major change, the methodology adjustment further entailed the removal of another crucial aspect: industry adjustment. Prior to the methodology change, the ESG rating facilitated predominantly the best-in-class investment strategies, whereas after the change, it became possible to compare firms to the universe of firms (i.e., across industries). As a result, under the new methodology, a new variable with a universe-wide firm rank was added by Sustainalytics. We hypothesize that if ESG ratings matter for debt investors in the secondary loan market, the pricing effect should be detectable in both settings: Refinitiv and Sustainalytics.

2.2. U.S. Secondary Syndicated Loan Market Data

To measure the cost of debt of U.S. firms at a high frequency, we use a data set from the Loan Syndication and Trading Association (LSTA), comprising daily secondary market quotes for corporate loans. With the creation of the LSTA in 1995, the secondary corporate loan market grew to an active and liquid dealer-driven, over-the-counter (OTC) market. Similar to other debt securities OTC markets, we can observe daily price quotes for private claims that can be traded by banks and institutional investors legally, even if in possession of material non-public information, because they are not public securities under U.S. securities law (Taylor and Sansone, 2006). The majority of loans traded in the secondary market are syndicated corporate loans that constitute an important source

of financing for public and private firms in the U.S.[14]

We follow Saunders et al. (2024) in that we restrict our sample to term loans that are fully funded at origination and typically repaid at maturity. We further use only loans that can be linked to LPC's Dealscan database and have a remaining maturity of at least one year.[15] We merge the secondary market data to the ESG ratings database based on the Compustat ID (GVKEY) and restrict our sample to six months before and after the ratings restatement (i.e., between October 1, 2019 and October 31, 2020). Our final sample for our main specification contains 62,392 observations with 315 primary market-issued loans of 203 publicly listed U.S. firms, of which one third has experienced an ESG downgrade.

To measure loan market-based credit spreads, as our key dependent variable, we rely on the methodology of Saunders et al. (2024). In particular, we define the *loan spread* as the difference between a loan's implied yield to maturity and its risk-free equivalent yield to maturity. To calculate the yield to maturity for each loan in each period, we use a series of quarterly-paid cash flows based on the sum of the three-month LIBOR forward curve (obtained from Bloomberg) and the term loan's fixed all-in-spread-drawn for the respective period. The all-in-spread-drawn (obtained from Dealscan) reflects the borrower's amount paid in basis points over the LIBOR for each dollar drawn down and therefore adds the spread of the loan that includes any annual fees paid to the lender. We use the risk-free equivalent yield to maturity based on zero-coupon Treasury yields with the same cash payment profile to account for a duration mismatch.

Following Saunders et al. (2024), we define the loan spread as follows:

$$Loan\ Spread_{i,j,t} = y_{i,j,t} - y^{f}_{i,j,t}, \tag{2}$$

where $y_{i,j,t}$ is the implied yield to maturity of loan j issued by firm i in period t based on the price of a loan promising a series of quarterly cash flows, and $y^{f}_{i,j,t}$ is its risk-free equivalent yield to maturity of loan j issued by firm i in period t based on a synthetic risk-free loan with the same cash-flow profile.

[14]For a more detailed discussion about the secondary loan market, refer to Saunders et al. (2024).

[15]We merge the primary and secondary syndicated market data by relying on the Loan Identification Number (LIN). In cases when the LIN is missing, we rely on the combination of the borrower names, maturities, and the all-in-drawn spreads.

2.3. Refinitiv CLO Data

For the analysis of the CLO market, we use Refinitiv's LPC Collateral Holdings database, which covers loan holdings and trading data across the global CLO universe. We focus on loans denominated in USD and those of tranche type term loan B to focus on institutional investors. Importantly, we restrict our sample to CLOs in the reinvestment period because this period provides the lowest constraints for CLO managers to actively trade loans in the secondary market in order to enhance portfolio performance (Fabozzi, Klingler, Mølgaard, and Nielsen, 2021).[16] Therefore, we drop observations outside the reinvestment period using a proxy of four months to account for the ramp-up period, as suggested by Kundu (2023). Moreover, we follow Fabozzi et al. (2021) in that we additionally remove observations with prices above USD 120, below USD 15, and equal to USD 100, and drop observations with negative transaction values.

Analogous to the previous subsection, we merge the CLO data sets (holdings and trading data) to the final sample using the loan identification number (LIN) and restrict our sample to six months before and after the ESG ratings methodology change (i.e., between October 1, 2019 and October 31, 2020). Following the merge, we create our ESG downgrade measure within the CLO sample. Our final CLO trading sample consists of 154 loans, 113 CLO managers and 102 firms, of which 36 have been downgraded.

To estimate the impact of an ESG rating downgrade on the CLO market, we focus on the trading behavior (i.e., the in- and outflows for each loan). In particular, we work with the monthly netted trade volume, which we term *Net Volume*, where sales reflect outflows and are thus subtracted from monthly purchases of a given loan held by a CLO manager.

2.4. Sample Summary Statistics

In Table 1, we report the summary statistics of the variables used in the main tests included in the paper. Our main variable of interest, the *loan spread*, has a mean (median)

[16] We use the CLO holdings data to identify active CLOs (the variable titled *DealReinvestmentEndDate*).

of 5.14 (3.28) and a sample standard deviation of 6.12.[17] On average, firms dropped 10.89 percentile ranks (0–100 scale, minimum to maximum). 33 percent of the loans are downgraded based on our downgrade measure. The mean (median) ESG score as of April 4, 2020, amounts to 45.99 (43.88), while the mean (median) ESG score as of April 6, 2020, amounts to 35.78 (31.61).

Firms in our sample have a mean (median) debt ratio (*Debt/Assets*) of 47 percent (47 percent), spend 4 percent (2 percent) of total assets on capital expenditures (*Capex/Assets*), are profitable having an *EBIT/Assets* ratio equal to 7 percent (6 percent), spend 2 percent of total assets on research & development (R&D) and their tangible assets represent 25 percent (16 percent) of their total assets (measured as *PP&E/Assets*). Consistent with a typical composition of secondary trading market, we see that 80 percent of the firms have a B-Letter S&P rating, while only 4 percent of firms have an A-letter rating, and 3 percent of firms have a C-letter rating. The remaining 14 percent of firms are unrated.

In Refinitiv's trading data, CLO managers are more likely to purchase loans than to sell loans, which results in a positive trading volume of USD 0.86 (0.50) million (defined as *Net Volume*).

[Table 1 here]

Finally, we provide a comparison of summary statistics between our loan sample and Compustat firms (that have an ESG Rating or not) and the overall sample of leveraged loans in the secondary loan market (that do not have an ESG rating). The sample covers non-financial U.S. firms (i.e., dropping firms with SIC codes 6000–6999) in the fiscal year 2019 because this is the year for which we compute control variables. We report the differences to all Compustat firms in Panel A of Table A2 of the Appendix. We find that U.S. firms with syndicated loans traded in the secondary market tend to be larger than the average firm in the Compustat sample. The average book leverage (*Debt/Assets*) of 47 percent is much higher than that of the average firm in the Compustat universe, which has a book leverage of 26 percent. This is not surprising, because our sample consists of firms

[17] In the robustness test pertaining to Sustainalytics ESG, the loan spread, has a mean (median) of 3.36 (2.78) and a sample standard deviation of 1.92 and the downgrade measure is as defined above.

from the leveraged loan market. The mean and median capital expenditures scaled by total assets (*Capex/Assets*) range in both samples between 2 and 4 percent. Firms in our loan sample tend to hold on average less cash (*Cash/Assets*) of 8 percent as compared to 25 percent), but tend to be much more profitable. In particular, the median *EBIT/Assets* is 6 percent in our loan sample as compared to 0 percent in the remaining Compustat universe. Lastly, there is no difference in tangibility (*PP&E/Assets*) across these samples in terms of medians. While differences look very similar in Panel B for Compustat firms with Refinitiv ESG ratings, our sample of firms is not statistically different from the average firm in the secondary loan market (see Panel C).

3. The Effect of ESG Methodology Changes on Firms' Cost of Debt

In this section, we begin with our main methodology to study the effect of sudden ESG rating downgrades on firms' cost of debt in Section 3.1. Section 3.2 presents the main results. Section 3.3 confirms that our results are robust to the Covid-19 pandemic and other elevated financial risks. Section 3.4 shows that our results are robust to alternative ESG downgrade measures and alternative settings. Lastly, Section 3.5 analyzes the unconditional effect of ESG ratings on loan pricing over a longer time period.

3.1. Empirical Methodology

In our main analysis, we are interested in understanding to what extent debt investors react to sudden changes in ESG ratings. Isolating the effect of ESG rating changes on loan pricing poses challenges for at least two reasons. First, it is typically difficult to disentangle changes in ESG ratings from changes in credit ratings or other changes in firm characteristics. Second, in primary syndicated loan markets, loan issuance does not appear on a daily basis and is partially affected by demand-side factors. To address these challenges, we exploit a purely methodology-driven rewriting of ESG scores and study its effect on daily loan spread measures in the secondary syndicated loan market. We compare changes in ESG ratings on the loan spreads of a firm within the *same industry*,

same credit rating, and *same month*. We hypothesize that loans of firms that experience a large drop in their ESG score are traded at higher loan spreads after the methodology change. We estimate the following difference-in-difference (DiD) regression model at the loan level:

$$Loan\,Spread_{i,j,t} = \alpha_j + \alpha_{c\times t} + \alpha_r + \alpha_l + \beta ESG\,Downgrade_i \times Post_t + \gamma X_{i,t-1} + \epsilon_{i,j,t}, \quad (3)$$

where $Loan\,Spread_{i,j,t}$ is the spread of loan j for firm i on day t. The key explanatory variable, $ESG\,Downgrade_i$ is equal to one for firm i with an ESG rating difference (calculated according to Equation 1, i.e., pre- vs. post-methodology change) in the lowest tercile, and zero for all other firms.[18] The variable $Post_t$ is equal to one after April 6, 2020, and zero otherwise.[19] $X_{i,t-1}$ stands for a vector of firm characteristics lagged by one year (as defined in the Appendix in Table A1), α_j stands for loan fixed effects, $\alpha_{c\times t}$ stands for firm cluster $\times$ month fixed effects, α_r stands for rating scale fixed effect, and α_l stands for lender fixed effect. A firm cluster is defined as the combination of a firm's two-digit Standard Industrial Classification (SIC) industry code and one of four credit risk categories (AAA to A-, BBB+ to B-, CCC+ to D, or unrated), building on Acharya, Eisert, Eufinger, and Hirsch (2018). Standard errors are clustered at firm $\times$ month level to account for potential serial correlation within firms and common shocks across firms at a given point in time, following Cameron, Gelbach, and Miller (2011) and Abadie, Athey, Imbens, and Wooldridge (2023). Essentially, we control for the fact that (1) treatment is at the firm level and (2) shocks might be correlated at the time level as we observe firms several times per month.[20] The clusters capture any residual correlation not captured by our fixed effects. The time period is the ± 6 month window around the ESG ratings methodology change on April 6, 2020, from October 2019 to October 2020.

With the help of firm cluster $\times$ month fixed effects, we compare the effect of ESG downgrades on loan spreads of firms within the *same industry*, *same credit rating*, and

[18] We show in later robustness tests that our results are robust to different treatment definitions such as continuous changes in ESG ratings or the treatment group defined in the lowest quartile.

[19] We drop observations between April 1, 2020 and April 6, 2020 such that $Post_t$ is subsumed by the time fixed effects.

[20] In unreported robustness tests, we show that our results are robust for additionally clustering by day of the month as some loans are traded several times a day.

same month. We thus control for potential differential effects of ESG downgrades on firms in certain industries and rating categories in the same month. For example, an ESG downgrade for a firm in the oil industry may have stronger negative effects on loan spreads than for a firm in the renewable energy sector in the same period. The same logic applies to firms with low versus high credit ratings. Loan fixed effects control for unobserved time-invariant firm and loan characteristics at time of the loan issuance. Given that firms have several loans trading per day and treatment varies at the firm level, we can use loan fixed effects in our setting. Our difference-in-difference estimator captures within-loan changes in loan spreads relative to control loans pre- versus post-methodology change. Firm controls account for differences in firm fundamentals over time. Lender fixed effects control for differences in lender characteristics at loan issuance in the primary market, as lender characteristics could influence how loans are priced in the secondary market. Credit rating fixed effects control for the scale of credit ratings.

A key identifying assumption in our framework is that the sudden changes in ESG ratings are orthogonal to unobserved shocks to firm value or credit risks, implying that the methodology change is quasi-random shock to perceived ESG performance of a firm. As discussed above, the Refinitiv methodology changes applied uniformly to all firms, suggesting that any given firm's ESG rating change (e.g. new materiality matrix, missing data treatment) was driven by its prior firm-level data and the new methodology but not by new information revealed about the firm.[21]

A potential concern could be that treated firms might have similar characteristics that make them equally vulnerable to other confounding shocks. For example, it is possible that firms with the largest negative changes in ESG ratings happen to be smaller firms with more missing data that are more likely to be penalized or firms in industries for which the materiality matrix applied less. If these firms also experience greater stress during the sample period (e.g., smaller and opaque firms that could be hit harder by the Covid-19 crisis or facing more severe liquidity issues), then we will face an omitted variables problem. Table A3 of the Appendix addresses these concerns by showing that

[21]Similarly, Sustainalytics' late-2018 methodology change which involved an inversion of scale and the removal of industry adjustments was a broad one-time change beyond firms' characteristics and affected all firms unanimously.

observable firm characteristics are not statistically different for downgraded and non-downgraded firms, except for medians of property, plant, and equipment across the two groups.

We also estimate a dynamic regression, in which we decompose the effect on a monthly basis, to better understand the evolution of the effect over time:

$$Loan\ Spread_{i,j,t} = \alpha_j + \alpha_{c\times t} + \alpha_r + \alpha_l + \sum_{\tau=-6}^{\tau=+6} \beta_\tau ESGDowngrade_i \times D_t^\tau + \gamma X_{i,t-1} + \epsilon_{i,j,t}, \quad (4)$$

where D_t^τ stands for each month before and after the downgrade, and all other variables are defined as above. We use the month of October 2019 (-6) as the omitted category.[22]

3.2. Main Result

Table 2 shows the that ESG downgrades generally lead to higher loan spreads across all specifications based on Equation 3. In column (1), we include month and loan fixed effects; in column (2), we add firm controls; in column (3), we include rating scale fixed effects; and in column (4), we add firm cluster × month fixed effects and lender fixed effects. In column (5), we decompose the effect over months before and after the methodology change.

In our main specification in column (4), which includes the strictest set of fixed effects – firm cluster × month, loan, rating scale, and lender fixed effects– and firm controls, we find that, after the methodology change, loans of downgraded firms carry 9.7 percent [0.499/5.14] higher loan spreads relative to the sample average.[23] Importantly, the effect halves in column (4) relative to column (3) which is without firm cluster × month fixed effects and lender fixed effects, suggesting that it is crucial to account for differences in credit ratings and industries in each point in time.[24]

[22] In column (3) of Table A4, we confirm that our findings remain qualitatively similar when we use March 2020 (-1) as the omitted category, although the estimated coefficients are slightly smaller and significance falls to the 5% or 10% level, respectively.

[23] In columns (1) and (2) of Table A4, we confirm that our findings are robust to controlling for the industry-adjusted ESG scores of MSCI as well as to the inclusion of lender × year fixed effects. Table A5 shows that our effect is robust if we include firm characteristics × post to account for time varying firm characteristics around the methodology change.

[24] Note that adding only lender fixed effects after rating scale fixed effects does not change the coefficient as much as adding firm cluster × month fixed effects.

Following the methodology change, loan spreads gradually increase and remain elevated up to five months after the downgrade as can be seen in column (5) and in Figure 1. We argue that the reason for the effect not being significant immediately after the change is that ESG data users check the database for updates in ESG scores on a monthly basis which is the most common update frequency among ESG data providers. The nature of the effect is temporary as it becomes insignificant six months after and remains insignificant thereafter, as shown in Figure A1 of the Appendix, where we extend the time period to eight months after the methodology change. In Section 4, we highlight more formally that the transitory nature is consistent with our proposed mechanism, an investor-driven reaction to a negative signal about ESG ratings rather than a persistent deterioration in firm credit risk. A temporary effect underscores that ESG downgrades have immediate real consequences of higher borrowing costs, even if short-lived. This finding emphasizes that ESG rating changes are economically relevant, particularly for short-term financing considerations and liquidity management of firms.

An important assumption in difference-in-differences studies is that the treatment and control groups follow parallel trends in the absence of an ESG-methodology change. Figure 1 does not show any diverging latent trends between the treatment and control firms before the methodology change since the effect remains insignificant and small in the pre-methodology change period. This suggests that control firms are similar to treatment firms in terms of pre-methodology-change loan spreads, implying that had the methodology change not happened, the loan spreads would have evolved similarly. The figure also supports the notion that the methodology-driven ESG score changes are as good as random with respect to the counterfactual trajectory of loan spreads.

[Table 2 here]

[Figure 1 here]

3.3. Covid-19 Pandemic and Other Financial Risks

3.3.1. Economy-wide and Firm-level Covid-19 Exposure Measures

Since the period of our main test coincides with the onset of the Covid-19 pandemic in March 2020, we perform robustness tests that are aimed at alleviating concerns that our findings could, for example, be confounded by the differential effect of the Covid-19 pandemic on various industries or other financial risks. First, by comparing firms within the same credit rating category, industry and month, we already alleviate some concerns about the differential impact of the pandemic on differently rated firms and industries in each month. Second, from Figure 1, we would expect an increase in loan spreads already in the month of March (-1), if our results were purely driven by the Covid-19 exposure of firms. Third, to address any remaining concerns about the onset of the Covid-19 pandemic, we add several measures for Covid-19 exposure of firms to our main specification.

We employ the most granular measure available, which captures economy-wide as well as firm-level Covid-19 exposures of firms on a weekly basis taken from Ding et al. (2021).[25] All tests in Table 3 follow the same specification as in our main analysis in column (4) of Table 2, and include the additional exposure measures.[26] In column (1), we include *Covid-19 US Exposure* as an additional control variable, which reflects the weekly growth rate of confirmed Covid-19 cases within the U.S. economy. In column (2), we include *Covid-19 World Exposure*, which reflects the weekly growth rate of confirmed worldwide Covid-19 cases. The variable *Covid-19 Supplier Exposure* and *Covid-19 Customer Exposure* in columns (3) and (4) reflect a firm's weekly exposure to Covid-19, calculated as the weighted average of Covid-19 cases across the countries where its suppliers (customers) are located, as defined by Ding et al. (2021) based on the FactSet Revere database.

In all analyses, we find that both the economic magnitude as well as statistical significance of our coefficient in column (4) of Table 2 remain largely unchanged. Except for column (2), the Covid-19 measure is similar in size to our main effect, implying that firms

[25] We thank Ding et al. (2021) for providing us with the measure.

[26] Since the data from Ding et al. (2021) is only available up to May 2020, we calculate the average exposure for May and use it as a representative value for the periods from June to October 2020.

with larger Covid-19 exposures experience larger increases in loan spreads. In Table A6 of the Appendix, we also show that our decomposition in column (5) of the main regression is not affected by alternative Covid-19 measures. Overall, while Covid-19 exposures affect loan pricing, they do not explain our main result.

Another concern related to the Covid-19 pandemic is that some firms might have suffered conventional credit rating deterioration that coincided with ESG score changes. Our effect on loan spreads might thus be inflated. First, we think that it is relatively unlikely that treated firms experienced a credit rating downgrade within the 2-day window in which we define our ESG downgrade measure (changes between April 6, 2020 and April 4, 2020). Second, we control for credit rating categories through fixed effects that should partially capture differences in credit ratings prior to the ESG downgrade but not fully changes within a category. In unreported results, we also show that our results hold if we interact each credit rating category with a time dummy to capture granular changes in credit ratings. Third, given that firms in the secondary market are mostly non-investment grade (78%) or close to non-investment grade firms, it is important to control for possible credit rating downgrades of investment-grade firms around the Covid-19 pandemic. Acharya and Steffen (2020) show that BBB rated firms had quadrupled debt before 2020 and were at higher risk of being downgraded ("fallen angels"). In Table A7 of the Appendix, we show that our results are robust to excluding investment-grade firms and non-rated firms. The coefficient almost doubles, suggesting that our main result is primarily driven by non-investment grade firms, accounting for most firms in the secondary market.

[Table 3 here]

3.3.2. Financial Risks during the Covid-19 Pandemic

To account for heightened financial risks and daily uncertainties surrounding the Covid-19 pandemic, we incorporate proxies in Table 4. As before, we rely on our main specification (column (4) of Table 2) and add liquidity, default risk, uncertainty and credit risk proxies. In column (1), we include a daily *bid-ask spread* measure, which is intended to capture

loan-market liquidity. We find that a higher bid-ask spread is positively associated with the loan spread, confirming that in times of lower market liquidity, investors require higher loan spreads. In column (2), we add Merton (1974) distance to default measure and its square, following Bharath and Shumway (2008), to control for firms' heightened credit risks at the onset of the Covid-19 pandemic, which likewise do not change our main conclusion. Larger distance to default is associated with lower loan spreads, whereas its squared component has a positive but small effect, indicating a non-linear relationship. In columns (3) and (4), we add the *VIX* and *OVX* to account for possible increases in the loan spread due to higher uncertainty around the Covid-19 pandemic.[27] As expected, higher uncertainty is associated with higher spreads; nonetheless, the economic magnitude of our main coefficient remains largely unaffected.

In column (5), we add a *high yield loan share* measure that is defined as the share of new loan issuance rated B or below as most of the loans in the CLO market belong already to the high yield category (see Saunders et al. (2024)). We see that higher high-yield debt issuance results in higher loan spreads, but again our measure remains unchanged. In column (6), we add a *time on the market* measure based on Ivashina and Sun (2011) which reflects the average number of days between the syndication launch date and completion date for new institutional loan tranches. We find a positive relationship between time on the market and loan spreads as suggested by previous literature. Our measure slightly decreases in size but stays still sizeable and statistically significant.[28]

[Table 4 here]

[27]The VIX index provided by the Chicago Board of Exchange (CBOE) non-parametrically approximates the expected future realized volatility of the S&P 500 returns over the next 30 days (Bardgett, Gourier, and Leippold, 2019). The OVX refers to the CBOE Crude Oil ETF Volatility Index retrieved from https://www.cboe.com/us/indices/dashboard/ovx/.

[28]In unreported results, we show that results also hold if we add our main Covid-19 proxy to all specifications.

3.4. Alternative ESG Downgrade Measures and Settings

3.4.1. Alternative Refinitiv ESG Downgrade Measures

To verify that our findings are not restricted to a single downgrade specification or a specific ESG data provider, we employ alternative measures of ESG downgrades and replicate the analysis of the Refinitiv methodology change using data from another ESG rating agency that underwent a methodology change in 2018. We perform four changes to the ESG downgrade measurement: (1) we use a simple absolute difference in the pre- and post-methodology-change ESG ratings rather than a tercile dummy variable (as defined in Equation 1); (2) we rely on a quartile rather than tercile definition; (3) and (4) we redefine the time window to span from March 1, 2020 to April 6, 2020 to account for the possibility that the ESG data users may evaluate the data on a monthly basis rather than on a daily basis; and (5) we include the standard deviation of the ESG rating changes (calculated based on the Refinitiv's ESG PIT data set) to mitigate the ESG rating rewriting concern highlighted by Berg et al. (2021).

We show the results in Panel A of Table 5 based on the main specification from column (4) of Table 2. In column (1), where we use the absolute difference (scaled by its standard deviation), we find a result of similar magnitude to that relying on terciles. In column (2), where we use the quartiles, we find a slightly stronger effect, suggesting that firms with more severe downgrades experience even higher spreads. When we repeat the analyses from columns (1) and (2) with the ESG rating change measured using the data from March 1, 2020 and April 6, 2020, we observe that the frequency of ESG downgrade measurement, whether weekly or monthly, does not influence our results, as demonstrated in columns (3) and (4). Lastly, in column (5), we account for the possibility of ESG rating changes stemming from retroactive changes to ESG ratings by Refinitiv that can occur even on a weekly basis. When we control for the volatility of these changes on the firm-month level, we observe that our results are not sensitive to the rewriting issue of Refinitiv.

In Panel B of Table 5, we test for possible non-linearity of the effect, using dummies for quartile changes in ESG scores. We use firms in the highest quartile as omitted variables,

which are firms with smallest changes or no changes to the ESG score. Our results show that it is mostly firms in the lowest quartile, meaning with the highest downgrade in the ESG score that experience an increase in their loan spreads relative to the ones with the smallest changes. Loans of firms between the 25^{th} and 50^{th} percentile carry lower loan spreads, while loans of firms between the 50^{th} and 75^{th} percentile carry higher loan spreads but both are not statistically significant relative to the ones with the lowest changes in the ESG score. This implies a non-linear relationship between ESG scores changes and loan spreads, giving also support to our main ESG downgrade measures that captures the largest changes in the lowest tercile.

[Table 5 here]

3.4.2. Alternative Setting: Sustainalytics' Methodology Change

Next, we show that our findings are not limited to a methodology change by only one ESG rating agency. We rely on the methodology change by Sustainalytics, another influential ESG rating agency, which implemented a major methodology change in Q4 2018. This setting further enables us to demonstrate that our results are not restricted to a specific time period. The implementation of the Sustainalytics' ESG Risk Rating methodology change took place between September 2018, when Sustainalytics announced the intent to update its methodology, and December 2018, when Sustainalytics disseminated the new ESG Risk Rating to its institutional clients (Sustainalytics, 2018).

Because of the design of the methodology change by Sustainalytics (see the two major changes describe in Section 2.1.2), we cannot apply the same approach (i.e., relying on the numerical change in the ratings) to Sustainalytics as for Refinitiv. Therefore, we make use of the five categories (the number of which was unaffected by the methodology change), which present a higher-level step in ESG rating aggregation and are described in the Table IA2 of the Internet Appendix.

In the construction of our downgrade measure (*ESG Downgrade Sust.*), we attempt to isolate the effect stemming from dropping the industry adjustment by allowing the measure to only vary within the following industries, which we hypothesize were most

affected by the removal of the industry adjustment due to their high exposure to environmental risks: "Auto Components," "Chemicals," "Consumer Services," "Machinery," "Oil & Gas Producers," "Semiconductors," "Transportation," and "Construction & Engineering," which are defined as provided by Sustainalytics. For additional robustness, we repeat the analysis focusing on industries with the highest carbon emission production across scopes 1 to 3, using the framework outlined by Bolton and Kacperczyk (2021) to identify impacted sectors.[29] We aim to design a measure that captures unexpected category shifts. Therefore, to create a measure similar to that of Refinitiv in terms of magnitude of the downgrade, we assign a value of one to firms that were reassigned from being average performers to an even worse standing due to the methodology change.[30]

We perform the same panel regression as specified in Section 3.2. However, because the announcement of an upcoming rating change was already publicized in September 2018, with the final ESG scores remaining unavailable until three months later, we omit the transition period from September to November 2018 (i.e., *t-3* to *t-1*).

We report the effect of ESG downgrades on loan spreads in Panel C of Table 5. In column (1) we include month and loan fixed effects; in column (2), we add firm controls; in column (3), we include the rating scale fixed effects; and in column (5), we add firm cluster fixed effects and lender fixed effect. In the specification in column (5), we find that firms downgraded after the methodology change carry 3.3 percent [0.111/3.36] higher loan spreads relative to the average loan spread of 3.36 percent. Although the economic magnitude of the effect is smaller, the finding may be attributable to the complex nature of the methodology change within the Sustainalytics database. In an unreported analysis, using the framework outlined by Bolton and Kacperczyk (2021), we find results largely consistent when considering industries that likely have a more pronounced impact on the environment.

[29] The industries with the highest carbon emissions across scopes 1 to 3 as defined by the EPA (2024).

[30] Because our North American sample is a subset of the universe of firms rated by Sustainalytics ESG, the sample average can slightly differ from the global average measured in the full universe of ESG-rated firms.

3.5. ESG Ratings and Loan Spreads

As our main analysis focuses only on one year around the methodology change in April 2020, we show that, unconditionally, lower ESG ratings lead to higher loan spreads for firms over and above other determinants such as credit ratings or firm characteristics over a longer time period. We base the analysis on the time period between 2013 and 2019 for which we have loan spreads, firm-level characteristics and ESG ratings available. We simply regress the loan spread on ESG rating levels using the following regression framework:

$$Loan\,Spread_{i,j,t} = \alpha_j + \alpha_{c\times t} + \alpha_r + \alpha_l + \beta ESG\,Score_i + \gamma X_{i,t-1} + \epsilon_{i,j,t}, \qquad (5)$$

where $Loan\,Spread_{i,j,t}$ is the spread of loan j for firm i on day t. The key explanatory variable, $ESG\ Score_i$, represents the ESG rating assigned by Refinitiv to firm i, with values ranging from 0 to 100. The remaining variables and fixed effects correspond to our main specification in Table 2.

In Table 6, we observe that a one-standard-deviation change in the ESG rating is associated with a decrease in the loan spread of 4.4 percent [-0.149/3.4] (relative to the baseline spread of 3.40 percent during the sample period) based on our estimated effect in column (4) with a complete set of fixed effects. This result confirms that ESG ratings matter in general for loan pricing in the secondary loan market.

[Table 6 here]

4. Economic Channels

So far, we have presented consistent evidence that sudden downgrades in ESG ratings lead to higher loan spreads. In this section, we present potential economic mechanisms that explain which set of investors reacts to the ESG downgrade and for what reason. In Section 4.1, we first test whether the effect is driven by changes in firm fundamentals or supply-side frictions in the secondary market. In Section 4.2, we examine the impact

of ESG downgrades on the trading behavior of institutional investors that dominate the secondary market.

4.1. Loan Spread Decomposition

As a possible channel, we study whether our effect is driven by changes in firm fundamentals or by unexplained supply-side frictions in the secondary market. To this end, we decompose loan spreads into two components following Gilchrist and Zakrajšek (2012): (1) a predicted loan spread (*Predicted LS*), which captures variation due to default risk based on firm fundamentals and contract terms, and (2) an excess loan premium (ELP), defined as the residual that should capture unexplained supply-side frictions above the default risk premium coming from investors. If debt investors react to ESG rating changes, it implies that they charge an excess ESG premium above observable credit risk fundamentals.

Table 7 shows the results of the decomposition (based on Equation 3), in which we vary the definition of the dependent variable. In column (1), we show the first stage regression, in which we regress the loan spread on firm's distance to default risk, the volatility of its distance to default risk, and loan characteristics, as well as the loan type, industry, and rating scale fixed effects. In column (2), we use *Predicted LS*, the fitted values based on column (1), and in column (3), we use the *ELP*, the residual component, as dependent variables.[31] While there is no economically meaningful effect of ESG downgrades on the predicted loan spread, we find that the ELP can fully explain the effect. In particular, the coefficient in column (3) is of similar magnitude as in our main specification in column (4) of Table 2. As ELP is highly correlated with ESG downgrades in the post-period, it suggests that higher loan spreads might be explained by an excess ESG premium charged by debt investors.

[Table 7 here]

As our main analysis coincides with the onset of the Covid-19 pandemic, our first stage prediction model is not able to predict possible increases in the loan spread due to

[31] The lower number of observations in column (3) of Table 7 reflects missing loan spread data and observations with incomplete firm controls or fixed effects.

the Covid-19 pandemic which would suffer from a look-ahead bias. To account for the fact that parts of our excess loan premium might be explained by the exposure of firms to the Covid-19 pandemic, in column (1) of Table 8, we add the *Covid-19 US Exposure* measure as an additional control to the same specification as in column (3) of Table 7. As the measure entered with the highest magnitude in our baseline specification, we expect it to capture the main Covid-19 exposure of firms.[32] Similar to our main specification, the Covid-19 exposure partly explains the excess premium, but our main effect remains the same size as before and similar to the exposure measure. This suggests that we are capturing the effect of ESG downgrades beyond the Covid-19 effect.

To further understand whether it is the institutional investors that mostly respond to the ESG downgrades, we include a dummy variable that equals one if a tranche belongs to the term loan B (TLB) category. Due to their bond-like structure with a bullet repayment at maturity, TLBs are more likely to be held by institutional investors relative to term loan As that are typically held by banks, having a gradually increasing repayment structure until maturity. In column (2) of Table 8, we include a dummy for TLBs and its interaction with the main coefficient. We find that the increase in ELP can mostly be explained by TLBs, suggesting that institutional investors drive the effect. In particular, the triple interaction is highly significant, with the total effect in column (2) amounting to 0.973 (p-value = 0.005). The coefficient for the ESG downgrade in the post period is negative and significant, suggesting that other loan categories are associated with smaller ELPs after the downgrade event. This might be because the coefficient includes different categories such as term loans As or Cs or even no classification, making interpretation more challenging.

In columns (3) and (4) of Table 8, we interact our main effect with the natural logarithm of firm assets and the average number of analysts following a firm as proxies for size and information sensitivity. Consistently, we find that the effect is less pronounced for larger firms and firms with extensive analyst coverage, but highly significant and large for smaller firms and firms with low analyst coverage. Given that institutional investors are less informed about ESG ratings of firms than banks, it seems plausible that we find a larger excess ESG premium for smaller, more opaque firms.

[32] In Table A8, we show that our results hold for alternative Covid-19 measures.

Overall, our results support the prediction that the main effect is driven by possible changes in beliefs on ESG ratings of opaque firms among institutional investors. Debt investors interpret the ESG downgrade as a negative signal on firms' ESG quality, independent of ex-ante firm fundamentals, and thus charge an excess ESG premium above the credit risk premium.

[Table 8 here]

4.2. Evidence from the Collateralized Loan Obligation Market

To further investigate a possible reaction by debt investors on ESG downgrades, we test whether ESG rating downgrades have an impact on their trading behavior (see, e.g., Cordell, Roberts, and Schwert, 2023). Changes in trading behavior might imply that investors update their beliefs about the ESG stance of firms and start to sell the ones with a worse rating. We continue to use the Refinitiv methodology change of April 6, 2020, and examine the impact of ESG downgrades on CLO managers' trading behavior using Refinitiv's CLO data. To explore in greater depth how the methodology change affected this market, we test whether CLO managers sell loans of ESG-downgraded firms more frequently by estimating the following regression:

$$Net\,Volume_{m,j,t} = \alpha_j + \alpha_r + \alpha_{m\times k\times t} + \beta\, ESG\,Downgrade_i \times Post_t + \gamma X_{i,t-1} + \epsilon_{m,j,t}, \quad (6)$$

where $Net\,Volume_{m,j,t}$ reflects a CLO manager m's trading in- and outflows of loan j in month t. The netted trade amount is calculated by subtracting loan sales from purchases.[33] As before, the key explanatory variable, $ESG\,Downgrade_i$, is equal to one for firms with an ESG rating difference (calculated according to Equation 1, i.e., pre- vs. post-methodology change) equal to or below the lowest tercile, and zero for all other firms. The variable $Post_t$ is equal to one after April 6, 2020, and zero otherwise. α_j stands for loan fixed effects, α_r stands for rating scale fixed effects, $\alpha_{m\times k\times t}$ stands for

[33] A similar measure was used by e.g., Elkamhi and Nozawa (2022).

manager × industry × month fixed effects, and $X_{i,t-1}$ denotes lagged firm controls, which are as defined in the Appendix in Table A1.

In column (1) of Table 9, we include loan fixed effects, rating scale fixed effects, and CLO manager × industry × month fixed effects to account for a manager's industry-level demand in a month (see Hinzen (2023)), and in column (2), we add firm controls as in our main regression to control for time-varying firm characteristics. We find that the monthly netted trade amount decreases significantly, implying that CLO managers sell loans of ESG-downgraded firms more frequently. In our main specification in column (2), we find that, on average, loans of ESG-downgraded firms are more frequently sold than purchased after the methodology change, exhibiting a negative net trading volume of \$2.997 million. On average, loan purchases outweigh sales with a positive net trading volume of \$0.86 million.

To complement our analysis, we also study the extent to which the detected effect is driven by CLO manager beliefs. We collect data on CLO management companies, that publicly state their sustainability-related considerations. In column (3) and (4) of Table 9, we estimate our main specification separately for two distinct sub-samples. In column (3), we restrict our sample to CLO managers for whom sustainability considerations are likely to be important. To identify them, we systematically collect data on all CLO managers within our sample to determine their adherence to three predetermined sustainability criteria: (1) whether the CLO managers mention the term "ESG" on their website, (2) whether the CLO managers apply negative ESG exclusion criteria, and (3) whether the CLO managers are signatories of the UN Principles for Responsible Investment (PRI). If all three criteria are met, we include the CLO manager in the *ESG* sub sample. In column (3), we find the coefficient to be negative and significant suggesting that CLO managers, who appear to care about ESG sell loans of ESG-downgraded firms more frequently. The economic magnitude of the coefficient suggests that our main net volume coefficient in column (2) is driven by ESG-conscious investors.[34] The results imply that sustainable investors exhibit a more pronounced reaction toward heightened sustainability concerns

[34]The sum of observations in columns (3) and (4) does not match the total in column (2) because singleton observations are excluded during the calculation of loan fixed effects.

in the event of ESG downgrades.[35]

In Figure 2, we decompose the downgrade effect on net volume over time to gauge the trading pattern of CLO managers and potentially explain the transient nature of higher loan spreads in Figure 1. Although trading data is relatively volatile, making the estimation of coefficients less precise, we find a negative effect of ESG downgrades on the netted trade amount until 3 months after the event, indicating that investors were more likely to sell than purchase ESG downgraded loans. After 4 months the effect becomes smaller in magnitude and is not anymore significantly different from ESG non-downgraded firms. This rebound might suggest that CLOs start again to sell less or purchase more ESG downgraded firms, having adjusted their portfolio to the new ESG rating methodology.[36] The CLO managers' trading activity might indeed partially contribute to the transient nature of our main effect.

[Table 9 here]

[Figure 2 here]

5. Evidence from the Primary Syndicated Loan Market

To provide evidence that ESG downgrades have real and economically meaningful implications, we study borrowing costs for firms in the primary syndicated loan market. Prior literature suggests that sustainability scores, environmental consciousness, or ethical domains between banks and firms affect lending decisions, leading to more favorable loan pricing in primary markets (Kim, Surroca, and Tribó, 2014; Hauptmann, 2018; Houston and Shan, 2022; Degryse et al., 2023). Therefore, an ESG downgrade should result in

[35] In untabulated results, we confirm that our results are also unaffected by the Covid-19 US exposure measure.

[36] Around December 2019, we also see a drop in trading activity and a rebound at the beginning of the year before Covid-19 which might be due to the generally cyclical nature of CLOs (see Fleckenstein (2025)).

less favorable loan pricing in the primary loan market. Because loan issuance in the primary market is rather infrequent in general, we include all loans issued on the primary syndicated loan market of firms that experienced an ESG downgrade event even if they were not traded on the secondary market. The sample period is between January 2019 and December 2021.

Building on our main specification in column (4) of Table 2, we rely on the same ESG downgrade measure but use the natural logarithm of the all-in-spread drawn (measured in basis points) at the time of loan issuance as the dependent variable. We additionally control for different loan characteristics such as the natural logarithm of one plus the loan size, the natural logarithm of one plus the duration of a loan, a dummy for secured loans, a loan type dummy (i.e., revolver, term loan or others), main syndicated loan market segments (i.e., leveraged, sponsored, middle market, M&A, institutional), rating scale dummies as well as lender fixed effects to account for bank characteristics. The analysis sheds light on the broader implications of ESG rating changes on the costs of debt of firms.

We present our result in Table 10. Since loan issuance in the primary market is infrequent, we cannot include borrower or loan fixed effects; the ESG downgrade dummy remains in the regressions but is insignificant across all specifications, suggesting that the parallel trends assumption should hold. In column (1), which only includes month, tranche type, and rating scale fixed effects, we find a small but insignificant effect. By contrast, columns (2) to (4) show economically meaningful and statistically significant coefficients once we add richer sets of controls. Column (2) adds loan characteristics, market segment dummies, and industry × year fixed effects. Column (3) further controls for lender fixed effects. Here, the effect corresponds to a 17–19 percent increase in primary market interest rates, translating into 44–50 basis points relative to the average loan spread of 270.3 basis points. Put differently, the average interest expense to EBIT ratio increases from 1.9 percent [1096×0.02703/1577] to 2.2 percent [1096×0.02703×1.19/1577], both based on the average loan amount and EBIT in our sample.

In column (4), our strictest specification, we additionally include firm controls alongside lender × year fixed effects. Downgraded firms now face a 25 percent increase in

primary market interest rates, which corresponds to 67 basis points. The effect is slightly larger than in column (3), likely due to sample selection issues as firm-level controls are only available for a subset of loans. Degryse et al. (2023) find a green discount of around 50-59 basis points after the Paris agreement which is comparable to the results in columns (2) and (3). Although our sample is smaller, we still detect a comparable penalty for less sustainable firms, and thus a discount for greener firms.[37] Overall, the results highlight that ESG downgrades have real and economically meaningful consequences for firms' cost of debt. Relative to the secondary market results, we see higher interest rates one and a half years after the ESG downgrade, suggesting medium-term effects for firms.

[Table 10 here]

6. Conclusion

We show that institutional debt investors respond to ESG-related concerns. Using a methodology change to firms' ESG ratings by Refinitiv, we find that downgraded firms experience an increase in loan spreads. The effect is robust to many alternative settings and is not limited to only one ESG data provider. We also shed light on the potential channel through which ESG downgrades affect prices in the secondary loan market. When we decompose the loan spread, we observe that the driving factors are not changes in firm fundamentals, but primarily institutional investors requiring a higher ESG premium upon receiving a negative signal. The effect is particularly pronounced for loans held by institutional investors and for smaller and opaque firms where information asymmetries are the highest for institutional investors.

Next, we examine the trading patterns of CLOs and find that CLO managers sell loans of downgraded firms more frequently after the ESG rating methodology change, especially if they are ESG-conscious. This finding suggests that CLO managers' behavior may explain some variation in the frictions of the secondary market and that sustainable investors exhibit a more pronounced reaction toward heightened sustainability concerns

[37] In untabulated results, we also confirm that our findings are robust to including the *Covid-19 US exposure* measure.

in the event of ESG downgrades. Lastly, we also show that ESG rating downgrades have medium-term implications for the cost of debt of firms in the primary syndicated loan market.

Overall, we present evidence that debt investors respond to purely methodology-driven ESG rating changes that are unrelated to firm fundamentals. This leads us to conclude that lightly regulated debt investors indeed take sustainability ratings into account when pricing loans. We encourage future research to study the effects on other institutional investors, such as mutual funds.

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Figures

Figure 1: Loan Spread around Refinitiv ESG's Methodology Change: Parallel Trends

The figure plots the coefficients from regressing loan spreads on a dummy for ESG-downgraded firms interacted with a monthly dummy six months before and after the Refinitiv downgrade event on April 6, 2020, using October 2019 as the baseline month. We include loan fixed effects, firm cluster × month fixed effects, rating scale fixed effects, as well as lender fixed effects. Firm cluster is defined as the firm's two-digit SIC industry classification × the four credit risk categories (AAA to A-, BBB+ to B-, CCC+ to D, and unrated). The corresponding 95% confidence intervals are based on standard errors that are clustered at the firm × time level.

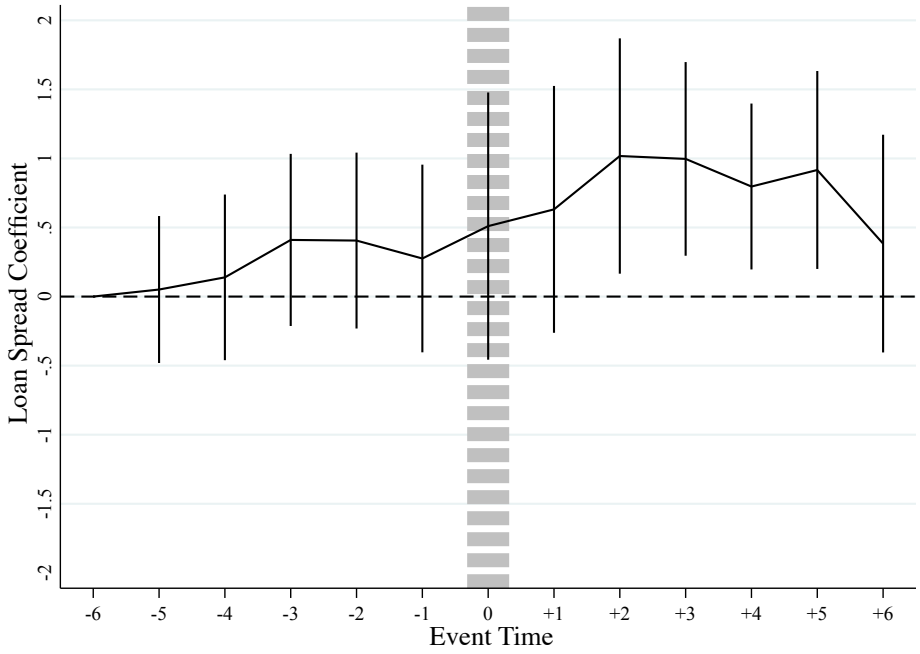
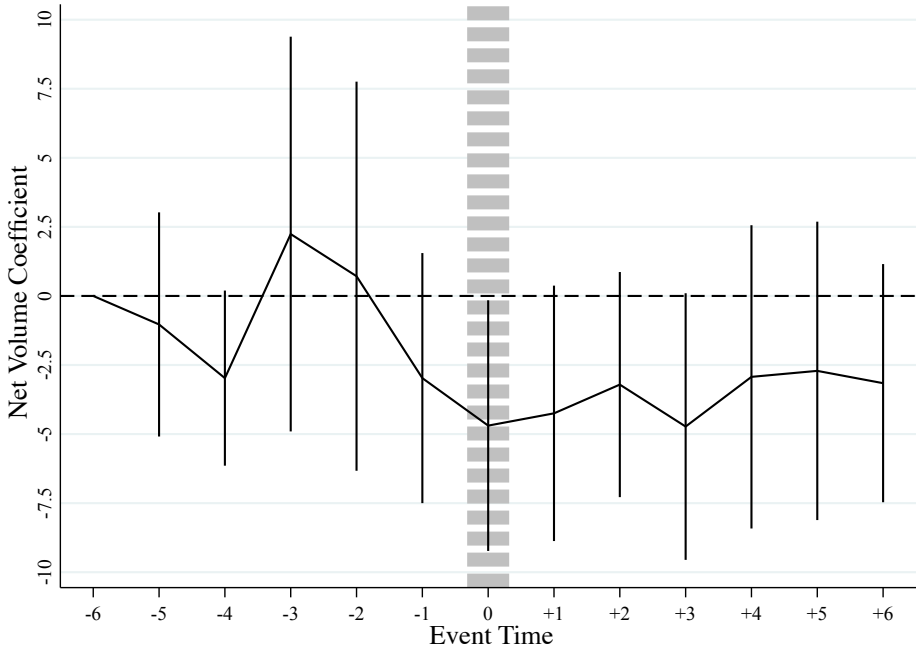


Figure 2: CLO Net Volume around Refinitiv ESG's Methodology Change

The figure plots the coefficients from regressing CLO trade volumes on a dummy for ESG-downgraded firms interacted with a monthly dummy six months before and after the Refinitiv downgrade event on April 6, 2020, using October 2019 as the baseline month. We include loan fixed effects, CLO × industry × month fixed effects, as well as rating scale fixed effects. The corresponding 95% confidence intervals are based on standard errors that are clustered at the firm × time level.



Tables

Table 1: Summary Statistics

The table reports summary statistics for our loan sample used in column (4) of Table 2. It includes U.S. non-financial firms with secondary market data during the period between October 2019 and October 2020, for which we have Refinitiv ESG available. The column abbreviated "SD" reports the standard deviation. The columns abbreviated "25%" and "75%" report the 25th and 75th percentile, respectively. The abbreviation "S&P" stands for Standard & Poor's. The variables are constructed as described in the Appendix in Table A1.

Variable	Observations	Mean	SD	25%	Median	75%
Dependent Variables						
Loan Spread [%]	62,392	5.14	6.12	2.36	3.28	5.53
AISD [bps]	613	270.32	164.10	175.00	225.00	325.00
Net Volume	3,368	0.86	6.73	-1.77	0.50	2.43
ESG Firm Characteristics						
ESG Downgrade	62,392	0.33	0.47	0.00	0.00	1.00
ESG Score$^{04/04/2020}$	62,392	45.99	15.52	34.11	43.88	56.58
ESG Score$^{06/04/2020}$	62,392	35.78	16.86	23.69	31.61	45.91
Δ *ESG Score*	62,392	-10.89	5.60	-15.22	-10.97	-7.25
Other Firm Characteristics						
Log(Assets)	62,392	8.52	1.26	7.58	8.35	9.30
Capex/Assets	62,392	0.04	0.05	0.01	0.02	0.04
Debt/Assets	62,392	0.47	0.16	0.37	0.47	0.57
EBIT/Assets	62,392	0.07	0.05	0.04	0.06	0.10
R&D/Assets	62,392	0.02	0.03	0.00	0.00	0.02
PP&E/Assets	62,392	0.25	0.22	0.08	0.16	0.37
Sales Growth	62,392	0.07	0.23	-0.04	0.04	0.13
A-Letter Grade S&P Rating	62,392	0.04	0.19	0.00	0.00	0.00
B-Letter Grade S&P Rating	62,392	0.80	0.40	1.00	1.00	1.00
C-Letter Grade S&P Rating	62,392	0.03	0.16	0.00	0.00	0.00
Unrated by S&P	62,392	0.14	0.35	0.00	0.00	0.00
Covid-19 Measures						
Covid-19 US Exposure	62,392	0.43	0.54	0.00	0.30	0.39
Covid-19 World Exposure	62,392	0.38	1.16	0.00	0.16	0.16
Covid-19 Supplier Exposure	52,244	0.30	0.49	0.00	0.12	0.20
Covid-19 Customer Exposure	55,202	0.30	0.49	0.00	0.14	0.20

Table 2: Loan Spreads around Refinitiv's ESG Methodology Change

The table reports the results of regressions of an ESG score downgrade on loan spreads in the secondary syndicated loan market at the daily loan – firm – level for the period between October 2019 and October 2020. *Loan spread* is defined as the difference between the loan's implied yield to maturity and its risk-free equivalent yield to maturity. *ESG Downgrade* is equal to one for firms in the lowest tercile, and zero for all other firms. *Post* is equal to one after April 6, 2020 and zero otherwise. In column (5), we use monthly dummies where October 2019 is the omitted category. Firm Controls are defined in the Appendix in Table A1. Firm cluster is defined as the firm's two-digit SIC industry classification × the four credit risk categories (AAA to A-, BBB+ to B-, CCC+ to D, and unrated). The *t*-statistics, based on standard errors clustered at firm level × time, are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Loan Spread [%]				
	(1)	(2)	(3)	(4)	(5)
ESG Downgrade × Post	0.813***	0.914***	0.848***	0.499***	
	(2.89)	(3.26)	(3.08)	(2.60)	
ESG Downgrade × -5					0.051
					(0.19)
ESG Downgrade × -4					0.139
					(0.45)
ESG Downgrade × -3					0.410
					(1.29)
ESG Downgrade × -2					0.405
					(1.25)
ESG Downgrade × -1					0.276
					(0.80)
ESG Downgrade × 0					0.510
					(1.03)
ESG Downgrade × +1					0.631
					(1.39)
ESG Downgrade × +2					1.018**
					(2.34)
ESG Downgrade × +3					0.997***
					(2.79)
ESG Downgrade × +4					0.797***
					(2.60)
ESG Downgrade × +5					0.916**
					(2.51)
ESG Downgrade × +6					0.384
					(0.95)
Firm Controls	No	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	No	No
Loan FE	Yes	Yes	Yes	Yes	Yes
Firm Cl. × Month FE	No	No	No	Yes	Yes
Rating Scale FE	No	No	Yes	Yes	Yes
Lender FE	No	No	No	Yes	Yes
Adjusted R^2	0.693	0.698	0.704	0.753	0.753
N	62,392	62,392	62,392	62,392	62,392

Table 3: Loan Spreads around Refinitiv's ESG Methodology Change: Covid-19 Robustness

The table reports the results of regressions of an ESG score downgrade on loan spreads in the secondary syndicated loan market at the daily loan – firm – level for the period between October 2019 and October 2020. *Loan spread* is defined as the difference between the loan's implied yield to maturity and its risk-free equivalent yield to maturity. *ESG Downgrade* is equal to one for firms in the lowest tercile, and zero for all other firms. *Post* is equal to one after April 6, 2020 and zero otherwise. *Covid-19 US Exposure*, *Covid-19 World Exposure*, *Covid-19 Supplier Exposure* and *Covid-19 Customer Exposure* are from Ding et al. (2021) and are defined in the Appendix in Table A1. Firm controls are defined in the Appendix in Table A1. Firm cluster is defined as the firm's two-digit SIC industry classification × the four credit risk categories (AAA to A-, BBB+ to B-, CCC+ to D, and unrated). The *t*-statistics, based on standard errors clustered at firm level × time, are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Loan Spread [%]			
	(1)	(2)	(3)	(4)
ESG Downgrade × Post	0.496***	0.499***	0.452**	0.422**
	(2.58)	(2.60)	(2.21)	(2.13)
Covid-19 US Exposure	0.516***			
	(8.88)			
Covid-19 World Exposure		0.024***		
		(4.51)		
Covid-19 Supplier Exposure			0.219***	
			(3.96)	
Covid-19 Customer Exposure				0.379***
				(6.76)
Firm Controls	Yes	Yes	Yes	Yes
Loan FE	Yes	Yes	Yes	Yes
Firm Cl. × Month FE	Yes	Yes	Yes	Yes
Rating Scale FE	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.754	0.753	0.736	0.737
N	62,392	62,392	52,244	55,202

Table 4: Loan Spreads around Refinitiv's ESG Methodology Change: Robustness

The table reports the results of regressions of an ESG score downgrade on loan spreads in the secondary syndicated loan market at the daily loan – firm – level for the period between October 2019 and October 2020. *Loan spread* is defined as the difference between the loan's implied yield to maturity and its risk-free equivalent yield to maturity. *ESG Downgrade* is equal to one for firms in the lowest tercile, and zero for all other firms. *Post* is equal to one after April 6, 2020 and zero otherwise. *Bid-Ask Spread* is equal to the daily bid-ask spread. *DD* is equal to the Merton Distance to Default and DD^2 to the square of it. *VIX* is equal to the natural logarithm of the S&P 500 volatility index. *OVX* is equal to the natural logarithm of the oil volatility index. *HY Loan Share* reflects the weekly share of new loan issuances rated B or below (Saunders et al., 2024). *Time on Market* reflects the average number of days between the syndication launch date and completion date for new institutional loan tranches issued in the primary market during a given week (Ivashina and Sun, 2011). Firm controls are defined in the Appendix in Table A1. Firm cluster is defined as the firm's two-digit SIC industry classification × the four credit risk categories (AAA to A-, BBB+ to B-, CCC+ to D, and unrated). The *t*-statistics, based on standard errors clustered at firm level × time, are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Loan Spread [%]					
	(1)	(2)	(3)	(4)	(5)	(6)
ESG Downgrade × Post	0.515***	0.486*	0.504***	0.510***	0.499***	0.378**
	(2.81)	(1.74)	(2.62)	(2.65)	(2.60)	(2.10)
Bid-Ask Spread	0.888***					
	(14.98)					
Distance to Default		-0.029				
		(-1.40)				
Distance to Default²		0.000*				
		(1.67)				
VIX			1.134***			
			(12.21)			
OVX				1.613***		
				(14.75)		
HY Loan Share					0.330***	
					(4.78)	
Time on Market						0.001***
						(4.30)
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Loan FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm Cl. × Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Rating Scale FE	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.761	0.807	0.754	0.755	0.753	0.756
N	62,392	43,507	62,392	62,190	62,392	45,502

Table 5: Loan Spreads around Refinitiv's ESG Methodology Change: Alternative Downgrade Measures

Panel A and Panel B (Panel C) report the results of regressions of an ESG score downgrade on loan spreads in the secondary syndicated loan market at the daily loan – firm – level for the period between October 2019 and October 2020 (June 2018 and June 2019). Panel A repeats the specification in column (4) of Table 2, using alternative data downloads or definitions of ESG downgrades. Panel B uses dummies for quartile changes in ESG scores to test for non-linearity, where firms in the highest quartile are omitted. *Loan spread* is defined as the difference between the loan's implied yield to maturity and its risk-free equivalent yield to maturity. *ESG Downgrade*$_{Abs.,\ April}$ reflects the absolute difference (as defined in Equation 1) scaled by its standard deviation. *ESG Downgrade*$_{Qrtl.,\ April}$ is equal to one for firms in the lowest quartile, and zero for all other firms. *ESG Downgrade*$_{Abs.,\ March}$ reflects the absolute difference in the latest ESG scores between March 1, 2020, and April 6, 2020, and is scaled by its standard deviation. *ESG Downgrade*$_{Qrtl.,\ March}$ is equal to one for firms in the lowest quartile of the difference in the latest ESG scores between March 1, 2020, and April 6, 2020 , and zero for all other firms. *ESG Downgrade* is equal to one for firms in the lowest tercile, and zero for all other firms. *Post* is equal to one after April 6, 2020 and zero otherwise. *SD (ESG Score)* is the firm-specific standard deviation of ESG ratings, calculated using Refinitiv's ESG PIT dataset. Panel C refers to the Sustainalytics sample, where *Post* is equal to one after December 3, 2018 and zero otherwise. *ESG Downgrade Sust.* is equal to one, if a company within a risky industry that already had a rating below industry average experiences a category downgrade in its ESG score after Sustainalytics' methodology change between August and December 2018 and zero otherwise. Firm controls are defined in the Appendix in Table A1. Firm cluster is defined as the firm's two-digit SIC industry classification × the four credit risk categories (AAA to A-, BBB+ to B-, CCC+ to D, and unrated). The *t*-statistics, based on standard errors clustered at firm level × time, are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Alternative Downgrade Measures

	Loan Spread [%]				
	(1)	(2)	(3)	(4)	(5)
ESG Downgrade$_{Abs.,\ April}$ × *Post*	0.438***				
	(3.00)				
ESG Downgrade$_{Qrtl.,\ April}$ × *Post*		0.593***			
		(2.67)			
ESG Downgrade$_{Abs.,\ March}$ × *Post*			0.443***		
			(2.98)		
ESG Downgrade$_{Qrtl.,\ March}$ × *Post*				0.613***	
				(2.84)	
ESG Downgrade × *Post*					0.448**
					(2.31)
SD(ESG Score)					0.012
					(0.50)
Firm Controls	Yes	Yes	Yes	Yes	Yes
Loan FE	Yes	Yes	Yes	Yes	Yes
Firm Cl. × Month FE	Yes	Yes	Yes	Yes	Yes
Rating Scale FE	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.754	0.753	0.754	0.753	0.752
N	62,392	62,392	62,392	62,392	61,856

Panel B: Non-linearity

	Loan Spread [%]
	(1)
ESG Downgrade 1st Qrtl. × Post	0.547**
	(2.21)
ESG Downgrade 2nd Qrtl. × Post	-0.241
	(-1.04)
ESG Downgrade 3rd Qrtl. × Post	0.086
	(0.45)
Firm Controls	Yes
Loan FE	Yes
Firm Cl. × Month FE	Yes
Rating Scale FE	Yes
Lender FE	Yes
Adjusted R^2	0.753
N	62,392

Panel C: Sustainalytics Sample

	Loan Spread [%]			
	(1)	(2)	(3)	(4)
ESG Downgrade Sust. × Post	0.143**	0.134**	0.117**	0.111*
	(2.54)	(2.37)	(2.05)	(1.94)
Firm Controls	No	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
Loan FE	Yes	Yes	Yes	Yes
Firm Cl. FE	No	No	No	Yes
Rating Scale FE	No	No	Yes	Yes
Lender FE	No	No	No	Yes
Adjusted R^2	0.951	0.952	0.954	0.954
N	35,424	35,424	35,424	35,424

Table 6: General Trend

The table reports the results of regressions of an ESG score on loan spreads in the secondary syndicated loan market at the daily loan – firm – level for the period between 2013 and 2019. The variable *ESG Score* is standardized to have a mean of zero and a standard deviation of one. Firm controls are defined in the Appendix in Table A1. Firm cluster is defined as the firm's two-digit SIC industry classification × the four credit risk categories (AAA to A-, BBB+ to B-, CCC+ to D, and unrated). The *t*-statistics, based on standard errors clustered at firm level × time, are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Loan Spread [%]			
	(1)	(2)	(3)	(4)
ESG Score	-0.125***	-0.147***	-0.118***	-0.149***
	(-2.59)	(-3.44)	(-2.85)	(-3.64)
Firm Controls	No	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	No
Loan FE	Yes	Yes	Yes	Yes
Firm Cl. × Month FE	No	No	No	Yes
Rating Scale FE	No	No	Yes	Yes
Lender FE	No	No	No	Yes
Adjusted R^2	0.920	0.927	0.931	0.965
N	161,811	161,811	161,811	161,811

Table 7: Loan Spread Decomposition around Refinitiv's ESG Methodology Change

The table reports the results of regressions of an ESG score downgrade on loan spreads in the secondary syndicated loan market at the daily loan – firm – level for the period between October 2019 and October 2020. In column (1), we show the first stage regression of the determinants of the loan spread based on Gilchrist and Zakrajšek (2012), defined in Table A1, for the sample period between September 2018 and September 2019. In column (2) and (3), we decompose the loan spread into the *Predicted Loan Spread* that is defined as a component that captures changes in default risk based on the fundamentals of the borrower based on column (1) and the *Excess Loan Premium* that captures the residual component of risk pricing above a default risk. *ESG Downgrade* is equal to one for firms in the lowest tercile, and zero for all other firms. *Post* is equal to one after April 6, 2020 and zero otherwise. Firm controls are defined in the Appendix in Table A1. Firm cluster is defined as the firm's two-digit SIC industry classification × the four credit risk categories (AAA to A-, BBB+ to B-, CCC+ to D, and unrated). The *t*-statistics, based on standard errors clustered at firm level × time, are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	First Stage	*Predicted LS*	*ELP*
	(1)	(2)	(3)
ESG Downgrade × Post		0.008	0.560**
		(0.68)	(2.31)
Distance to Default	-0.123***		
	(-7.90)		
Distance to Default²	0.003***		
	(7.93)		
Vol(Distance to Default)	-0.020***		
	(-5.80)		
Ln(AISD)	3.283***		
	(37.58)		
Ln(Age)	0.052***		
	(2.59)		
Ln(Amount)	0.110***		
	(5.51)		
Secured	0.080		
	(1.28)		
Firm Controls	No	Yes	Yes
Month FE	Yes	No	No
Loan Type FE	Yes	No	No
Industry FE	Yes	No	No
Loan FE	No	Yes	Yes
Firm Cl. × Month FE	No	Yes	Yes
Rating Scale FE	Yes	Yes	Yes
Lender FE	No	Yes	Yes
Adjusted R^2	0.875	0.329	0.795
N	34,690	46,397	43,312

Table 8: Loan Spread Decomposition around Refinitiv's ESG Methodology Change: Channels

The table reports the results of regressions of an ESG score downgrade on loan spreads in the secondary syndicated loan market at the daily loan – firm – level for the period between October 2019 and October 2020. The *Excess Loan Premium* captures the residual component of the price risk above a default risk. *ESG Downgrade* is equal to one for firms in the lowest tercile, and zero for all other firms. *Post* is equal to one after April 6, 2020 and zero otherwise. *TLB* is a dummy variable equal to one if the tranches belong to the term loan B category and zero otherwise. *Size* reflects the logarithm of total assets. *Analyst* is the average number of analysts following the firm. Firm controls are defined in the Appendix in Table A1. Firm cluster is defined as the firm's two-digit SIC industry classification × the four credit risk categories (AAA to A-, BBB+ to B-, CCC+ to D, and unrated). The *t*-statistics, based on standard errors clustered at firm level × time, are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	ELP			
	(1)	(2)	(3)	(4)
ESG Downgrade × *Post*	0.554**	-1.166***	12.580***	1.288***
	(2.29)	(-2.84)	(3.85)	(3.12)
Covid-19 US Exposure	0.432***	0.433***	0.433***	0.431***
	(7.98)	(8.00)	(8.01)	(7.96)
Post × *TLB*		-0.421**		
		(-2.22)		
ESG Downgrade × *Post* × *TLB*		2.139***		
		(3.30)		
Post × *Size*			0.040	
			(0.43)	
ESG Downgrade × *Post* × *Size*			-1.453***	
			(-3.79)	
Post × *Analyst*				-0.037*
				(-1.96)
ESG Downgrade × *Post* × *Analyst*				-0.083***
				(-2.89)
Firm Controls	Yes	Yes	Yes	Yes
Loan FE	Yes	Yes	Yes	Yes
Firm Cl. × Month FE	Yes	Yes	Yes	Yes
Rating Scale FE	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.797	0.798	0.805	0.799
N	43,312	43,312	43,312	43,041

Table 9: CLO Trade Volume around Refinitiv's ESG Methodology Change

The table reports the results of regressions of an ESG score downgrade on the trading activity at the monthly manager – loan – level for the period between October 2019 and October 2020. *Net Volume* reflect the monthly netted trade amounts. *ESG Downgrade* is equal to one for firms in the lowest tercile, and zero for all other firms. *Post* is equal to one after April 6, 2020 and zero otherwise. In column (3), we restrict our sample to CLO managers that meet all three criteria for an *ESG-Conscious* investor, as specified in Table A1. In column (4), we restrict our sample to CLO managers that do not meet all three criteria specified in Table A1. Firm controls are defined in the Appendix in Table A1. Industry reflects a firm's two-digit SIC industry classification. The *t*-statistics, based on standard errors clustered at firm level × time, are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Net Volume			
	Full Sample		*ESG*	*Non-ESG*
	(1)	(2)	(3)	(4)
ESG Downgrade × *Post*	-2.348*	-2.997**	-5.168**	-2.378
	(-1.85)	(-2.13)	(-2.02)	(-1.63)
Firm Controls	No	Yes	Yes	Yes
Loan FE	Yes	Yes	Yes	Yes
Rating Scale FE	Yes	Yes	Yes	Yes
CLO × Industry × Month FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.187	0.205	0.134	0.232
N	3,821	3,368	802	2,521

Table 10: Primary Market Loan Interest Rates around Refinitiv ESG's Methodology Change

This table reports the results of regressions of an ESG score downgrade on primary market loan interest rates at the loan – firm – level for loans issued one year before (January 2019) and two year after (December 2021) the ESG downgrade event. *Ln(AISD)* reflects the loan interest rate and is defined as the natural logarithm of the all-in-spread drawn (in basis points) at loan issuance in the primary syndicated loan market. *ESG Downgrade* is equal to one for firms in the lowest tercile, and zero for all other firms. *Post* is equal to one after April 6, 2020 and zero otherwise. Loan controls contain the natural logarithm of one plus the loan size, the natural logarithm of one plus the duration of a loan as well as a dummy for whether the loan is secured. Firm controls are defined in the Appendix in Table A1. Segment controls are dummies for main market segments of the syndicated loan market such as leveraged, sponsored, middle market, M&A and institutional. Industry reflects a firm's two-digit SIC industry classification. Tranche type are fixed effects for the different tranche types such as revolver loans, term loans and others. *t*-statistics, based on standard errors clustered at firm level × time, are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Ln(AISD)			
	(1)	(2)	(3)	(4)
ESG Downgrade	-0.021	-0.010	-0.005	0.020
	(-0.33)	(-0.16)	(-0.09)	(0.25)
ESG Downgrade × *Post*	0.111	0.170**	0.153*	0.223*
	(1.30)	(1.97)	(1.79)	(1.80)
Loan Controls	No	Yes	Yes	Yes
Firm Controls	No	No	No	Yes
Segment Controls	No	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
Industry × Year FE	No	Yes	Yes	Yes
Rating Scale FE	Yes	Yes	Yes	Yes
Tranche Type FE	Yes	Yes	Yes	Yes
Lender FE	No	No	Yes	No
Lender × Year FE	No	No	No	Yes
Adjusted R^2	0.431	0.731	0.733	0.801
N	614	613	613	326

Appendix

Figure A1: Loan Spread around Refinitiv ESG's Methodology Change: Extended

The figure plots the coefficients from regressing loan spreads on a dummy for ESG-downgraded firms interacted with a monthly dummy six months before and eight months after the Refinitiv downgrade event on April 6, 2020, using October 2019 as the baseline month. We include loan fixed effects, firm cluster × month fixed effects, rating scale fixed effects, as well as lender fixed effects. Firm cluster is defined as the firm's two-digit SIC industry classification × the four credit risk categories (AAA to A-, BBB+ to B-, CCC+ to D, and unrated). The corresponding 95% confidence intervals are based on standard errors that are clustered at the firm × time level.

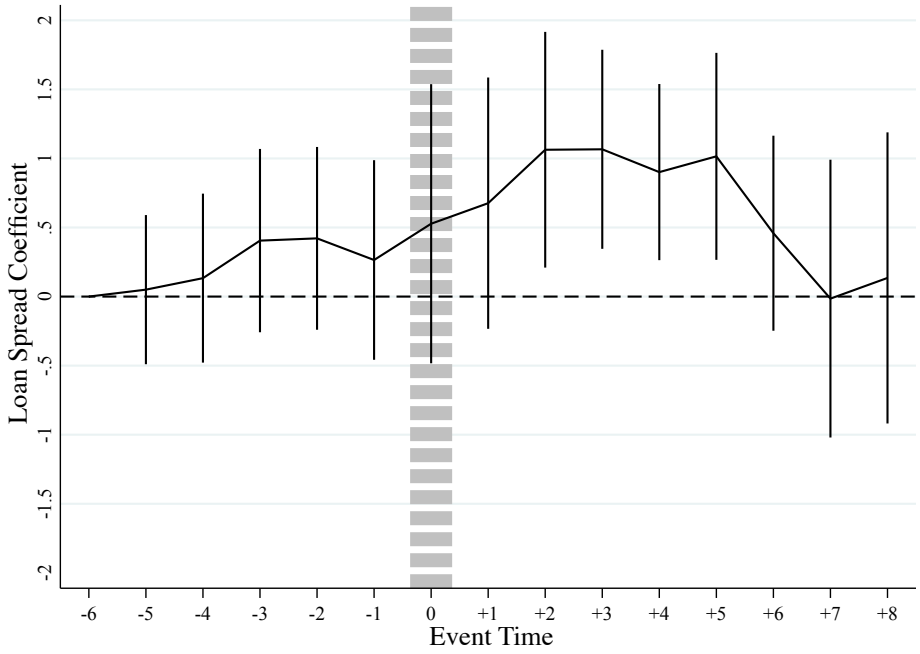


Table A1: Variable Definitions

Variable	Description
ESG Variables	
ESG Score	Overall score of a firm's ESG performance. The score covers a firm's environmental (E), social (S) and corporate governance (G) performance. The score ranges between 0 (minimum) and 100 (maximum score). $ESG\ Score^{04/04\ Data}$ is the data set as of April 4, 2020 (pre-methodology change), and $ESG\ Score^{04/06\ Data}$ is the data set as of April 6, 2020 (post-methodology change).
$\Delta\, ESG\, Score$	The difference between the $ESG\ Score^{04/06\ Data}$ and the $ESG\ Score^{04/04\ Data}$ calculated according to Equation 1, i.e., pre- vs. post-methodology change.
ESG Downgrade	Indicator variable equal to one for firms with an ESG rating difference ($\Delta\, ESG\, Score$) that lies in the lowest tercile, and zero for all other firms.
ESG Downgrade Sust.	Indicator variable equal to one, if a company within a risky industry that already had a rating below industry average experiences a category downgrade in its ESG score after Sustainalytics' methodology change between August and December 2018 and zero otherwise.
SD(ESG Score)	For each firm, we extract from the Refinitiv's ESG PIT data set all ESG ratings assigned to it in each month and calculate their firm-specific standard deviation.
Loan Spread Variables	
Loan spread [%]	The difference between the loan's implied yield to maturity and its risk-free equivalent yield to maturity. Winsorized at the 1% and 99% levels and multiplied by 100.
Predicted Loan Spread	Predicted component of the loan spread that captures changes in default risk based on firm fundamentals.
Excess Loan Premium	Residual component of the loan spread that captures the price of risk in excess of default risk.
Loan-Level Variables	
AISD [bps]	All-in spread drawn (AISD) in basis points at loan issuance. Winsorized at the 1% and 99% levels.
Ln(AISD)	Natural logarithm of all-in spread drawn (AISD) at loan issuance.
Ln(Age)	Natural logarithm of loan age determined from the tranche active date.
Ln(Amount)	Natural logarithm of one plus the dollar loan amount at loan issuance.
Secured	Indicator variable equal to one, if a loan is secured by collateral, and zero otherwise.
Firm-Level Variables	
Log(Assets)	Logarithm of total assets. The variable is constructed using Compustat data item *at*. Winsorized at the 1% and 99% levels.
Capex/Assets	Ratio of capital expenditures to total assets. The variable is constructed using Compustat data items $capx/at$. Winsorized at the 1% and 99% levels.

Variable	Description
Debt/Assets	Ratio of total debt in current liabilities plus total long-term debt to total assets. The variable is constructed using Compustat data items $(dlc + dltt)/at$. Winsorized at the 1% and 99% levels.
EBIT/Assets	Ratio of earnings before interest and taxes to total assets. The variable is constructed using Compustat data items $ebit/at$. Winsorized at the 1% and 99% levels.
R&D/Assets	Ratio of research and development expenses to total assets (missing values are set to zero). The variable is constructed using Compustat data items xrd/at. Winsorized at the 1% and 99% levels.
PP&E/Assets	Ratio of property, plant and equipment to total assets. The variable is constructed using Compustat data items $ppent/at$. Winsorized at the 1% and 99% levels.
Sales Growth	Total sales at the end of the year divided by total sales at the end of the previous year, minus one. The variable is constructed using Compustat data item *sale*. Winsorized at the 1% and 99% levels.
Analyst	Average number of analysts following the firm. Winsorized at the 1% and 99% levels.
Additional Variables	
Post	Indicator variable equal to one after April 6, 2020, and zero otherwise.
Bid-Ask Spread	Daily median bid-ask spread over industries in the secondary market. Winsorized at the 1% and 99% levels.
Distance to Default	Naïve distance to default based on Bharath and Shumway (2008).
Vol(Distance to Default)	Daily volatility of the *Distance to Default* across firms calculated based on Bharath and Shumway (2008).
VIX	Natural logarithm of the S&P 500 volatility index retrieved from the Federal Reserve Bank of St. Louis (FRED).
OVX	Natural logarithm of the Cboe Crude Oil ETF volatility index.
HY Loan Share	Weekly share of new loan issuances rated B or below (Saunders et al., 2024). Winsorized at the 1% and 99% levels.
Time on Market	Average number of days between the syndication launch date and completion date for new institutional loan tranches issued in the primary market during a given week (Ivashina and Sun, 2011). Winsorized at the 1% and 99% levels.
Covid-19 US Exposure	The weekly growth rate of confirmed Covid-19 cases within the U.S. economy, as defined by Ding et al. (2021). Winsorized at the 1% and 99% levels.
Covid-19 World Exposure	The weekly growth rate of confirmed Covid-19 cases within an economy, as defined by Ding et al. (2021). Winsorized at the 1% and 99% levels.
Covid-19 Supplier Exposure	A firm's weekly exposure to Covid-19, calculated as the weighted average of Covid-19 cases across the countries where its suppliers are located, as defined by Ding et al. (2021). Winsorized at the 1% and 99% levels.

Variable	Description
Covid-19 Customer Exposure	A firm's weekly exposure to Covid-19 in its sales markets, calculated as the weighted average of Covid-19 cases across the countries where the firm sells its products, as defined by Ding et al. (2021). Winsorized at the 1% and 99% levels.
CLO Variables	
Net Volume	Reflects a CLO manager's monthly trading inflows and outflows of a given loan and is calculated by subtracting sales (i.e., outflows) from purchases (i.e., inflows), scaled by one million. Winsorized at the 1% and 99% levels.
ESG-Conscious	Indicator variable equal to one, if a CLO manager mentions ESG on its website, applies negative ESG exclusions, and is a signatory of the UN Principles for Responsible Investment (PRI).

Table A2: Sample Comparison: Loan Sample vs. Compustat, LSTA, and Refinitiv ESG

Panel A, Panel B, and Panel C compare summary statistics between the loan sample used in our paper and firms from Compustat, LSTA, and Refinitiv ESG, respectively. The comparison is based on non-financial U.S. firms in fiscal year 2019, which is the year used to construct our control variables. All variables are defined as described in Appendix Table A1. Columns labeled "Loan Sample" include the firms in our loan dataset, while columns labeled "Compustat," "Refinitiv ESG," and "LSTA" include all non-financial firms available in each respective dataset. The variables are winsorized at the 1% and 99% levels, respectively. ***, **, and * indicate statistical significance of the underlying coefficient at the 1%, 5%, and 10% levels, respectively (based on a t-test allowing for unequal variances, and a non-parametric Mann-Whitney-Wilcoxon rank-sum test of equality of distributions, respectively).

Panel A: Loan Sample vs. Compustat

	Means		Medians	
Variables	Loan Sample	Compustat	Loan Sample	Compustat
Log(Assets)	8.40	5.50***	8.24	5.77***
Debt/Assets	0.47	0.26***	0.45	0.23***
Capex/Assets	0.04	0.04	0.02	0.02**
Cash/Assets	0.08	0.25***	0.06	0.11***
EBIT/Assets	0.07	-0.55***	0.06	0.00***
PP&E/Assets	0.27	0.30*	0.18	0.18

Panel B: Loan Sample vs. Refinitiv ESG

	Means		Medians	
Variables	Loan Sample	Refinitiv	Loan Sample	Refinitiv
Log(Assets)	8.41	7.96***	8.24	7.84***
Debt/Assets	0.47	0.31***	0.45	0.30***
Capex/Assets	0.04	0.04**	0.02	0.03
Cash/Assets	0.08	0.19***	0.06	0.10***
EBIT/Assets	0.07	0.01***	0.06	0.06***
PP&E/Assets	0.27	0.30**	0.18	0.20

Panel C: Loan Sample vs. LSTA

	Means		Medians	
Variables	Loan Sample	LSTA	Loan Sample	LSTA
Log(Assets)	8.41	8.46	8.24	8.26
Debt/Assets	0.47	0.46	0.45	0.44
Capex/Assets	0.04	0.04	0.02	0.03
Cash/Assets	0.08	0.08	0.06	0.05
EBIT/Assets	0.07	0.07	0.06	0.06
PP&E/Assets	0.27	0.29	0.18	0.20

Table A3: Sample Comparison: Downgrade vs. Non-Downgrade

This table reports a comparison of summary statistics between downgraded firms and non-downgraded firms used in our paper. The sample covers non-financial U.S. firms in the fiscal year 2019, as this is the year for which we compute control variables. The variables are constructed as described in the Appendix in Table A1. The column labelled "Downgrade" contains all firms with an ESG rating difference (calculated according to Equation 1, i.e., pre- vs. post-methodology change) in the lowest tercile. The column labelled "Non-Downgrade" contains all firms with an ESG rating difference (calculated according to Equation 1, i.e., pre- vs. post-methodology change) in the second or third tercile. The variables are winsorized at the 1% and 99% levels, respectively. ***, **, and * indicate statistical significance of the underlying coefficient at the 1%, 5%, and 10% levels, respectively (based on a t-test allowing for unequal variances, and a non-parametric Mann-Whitney-Wilcoxon rank-sum test of equality of distributions, respectively).

	Means		Medians	
Variables	Downgrade	Non-Downgrade	Downgrade	Non-Downgrade
Log(Assets)	8.41	8.41	8.37	8.18
Debt/Assets	0.46	0.47	0.45	0.45
Capex/Assets	0.03	0.04	0.02	0.03
Cash/Assets	0.08	0.08	0.05	0.06
EBIT/Assets	0.06	0.07	0.06	0.06
PP&E/Assets	0.25	0.28	0.12	0.21**
Rating	13.02	13.07	13.00	13.00

Table A4: Loan Spreads around Refinitiv's ESG Methodology Change: Alternative Specifications

The table reports the results of regressions of an ESG score downgrade on loan spreads in the secondary syndicated loan market at the daily loan – firm – level for the period between October 2019 and October 2020. *Loan spread* is defined as the difference between the loan's implied yield to maturity and its risk-free equivalent yield to maturity. *ESG Downgrade* is equal to one for firms in the lowest tercile, and zero for all other firms. *Post* is equal to one after April 6, 2020 and zero otherwise. *MSCI ESG* reflects the industry-adjusted ESG score of MSCI. In column (3), we use monthly dummies where March 2020 is the omitted category. Firm Controls are defined in the Appendix in Table A1. Firm cluster is defined as the firm's two-digit SIC industry classification × the four credit risk categories (AAA to A-, BBB+ to B-, CCC+ to D, and unrated). The *t*-statistics, based on standard errors clustered at firm level × time, are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Loan Spread [%]		
	(1)	(2)	(3)
ESG Downgrade × Post	0.380*	0.644***	
	(1.85)	(2.85)	
MSCI ESG	-0.433***		
	(-4.12)		
ESG Downgrade × -6			-0.276
			(-0.80)
ESG Downgrade × -5			-0.225
			(-0.67)
ESG Downgrade × -4			-0.137
			(-0.40)
ESG Downgrade × -3			0.134
			(0.41)
ESG Downgrade × -2			0.130
			(0.39)
ESG Downgrade × 0			0.235
			(0.49)
ESG Downgrade × +1			0.356
			(0.82)
ESG Downgrade × +2			0.742*
			(1.82)
ESG Downgrade × +3			0.721**
			(2.14)
ESG Downgrade × +4			0.521*
			(1.79)
ESG Downgrade × +5			0.641*
			(1.79)
ESG Downgrade × +6			0.108
			(0.27)
Firm Controls	Yes	Yes	Yes
Loan FE	Yes	Yes	Yes
Firm Cl. × Month FE	Yes	Yes	Yes
Rating Scale FE	Yes	Yes	Yes
Lender FE	Yes	No	Yes
Lender × Year FE	No	Yes	No
Adjusted R^2	0.701	0.757	0.753
N	51,794	62,392	62,392

Table A5: Loan Spreads around Refinitiv's ESG Methodology Change: Firm controls × Post

The table reports the results of regressions of an ESG score downgrade on loan spreads in the secondary syndicated loan market at the daily loan – firm – level for the period between October 2019 and October 2020. *Loan spread* is defined as the difference between the loan's implied yield to maturity and its risk-free equivalent yield to maturity. *ESG Downgrade* is equal to one for firms in the lowest tercile, and zero for all other firms. *Post* is equal to one after April 6, 2020 and zero otherwise. In all specifications, Firm Controls are interacted with the indicator variable *Post*. In column (4), we use monthly dummies where October 2019 is the omitted category. Firm Controls are defined in the Appendix in Table A1. Firm cluster is defined as the firm's two-digit SIC industry classification × the four credit risk categories (AAA to A-, BBB+ to B-, CCC+ to D, and unrated). The *t*-statistics, based on standard errors clustered at firm level × time, are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Loan Spread [%]			
	(1)	(2)	(3)	(4)
ESG Downgrade × Post	1.163***	1.105***	0.261*	
	(4.42)	(4.28)	(1.72)	
ESG Downgrade × -5				0.059
				(0.23)
ESG Downgrade × -4				0.151
				(0.51)
ESG Downgrade × -3				0.337
				(1.09)
ESG Downgrade × -2				0.320
				(1.03)
ESG Downgrade × -1				0.164
				(0.50)
ESG Downgrade × 0				0.209
				(0.46)
ESG Downgrade × +1				0.332
				(0.81)
ESG Downgrade × +2				0.713*
				(1.85)
ESG Downgrade × +3				0.698**
				(2.17)
ESG Downgrade × +4				0.498*
				(1.73)
ESG Downgrade × +5				0.623*
				(1.74)
ESG Downgrade × +6				0.102
				(0.28)
Firm Controls × Post	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	No	No
Loan FE	Yes	Yes	Yes	Yes
Firm Cl. × Month FE	No	No	Yes	Yes
Rating Scale FE	No	Yes	Yes	Yes
Lender FE	No	No	Yes	Yes
Adjusted R^2	0.708	0.715	0.755	0.755
N	62,392	62,392	62,392	62,392

Table A6: Loan Spreads around Refinitiv's ESG Methodology Change: Time Decomposition with Covid-19 measurements

The table reports the results of regressions of an ESG score downgrade on loan spreads in the secondary syndicated loan market at the daily loan – firm – level for the period between October 2019 and October 2020. *Loan spread* is defined as the difference between the loan's implied yield to maturity and its risk-free equivalent yield to maturity. *ESG Downgrade* is equal to one for firms in the lowest tercile, and zero for all other firms. *Covid-19 US Exposure*, *Covid-19 World Exposure*, *Covid-19 Supplier Exposure* and *Covid-19 Customer Exposure* are from Ding et al. (2021) and are defined in the Appendix in Table A1. In all specifications, we use monthly dummies where October 2019 is the omitted category. Firm Controls are defined in the Appendix in Table A1. Firm cluster is defined as the firm's two-digit SIC industry classification × the four credit risk categories (AAA to A-, BBB+ to B-, CCC+ to D, and unrated). The *t*-statistics, based on standard errors clustered at firm level × time, are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Loan Spread [%]			
	(1)	(2)	(3)	(4)
Covid-19 US Exposure	0.516***			
	(8.88)			
Covid-19 World Exposure		0.024***		
		(4.50)		
Covid-19 Supplier Exposure			0.215***	
			(3.87)	
Covid-19 Customer Exposure				0.373***
				(6.62)
ESG Downgrade × -5	0.051	0.051	0.086	0.087
	(0.19)	(0.19)	(0.30)	(0.31)
ESG Downgrade × -4	0.139	0.139	0.120	0.121
	(0.46)	(0.45)	(0.39)	(0.39)
ESG Downgrade × -3	0.412	0.410	0.545	0.573
	(1.30)	(1.29)	(1.55)	(1.64)
ESG Downgrade × -2	0.409	0.406	0.515	0.541
	(1.26)	(1.25)	(1.41)	(1.50)
ESG Downgrade × -1	0.272	0.275	0.468	0.452
	(0.78)	(0.79)	(1.25)	(1.22)
ESG Downgrade × 0	0.503	0.510	0.836	0.756
	(1.02)	(1.03)	(1.60)	(1.48)
ESG Downgrade × +1	0.629	0.631	0.799	0.736
	(1.38)	(1.39)	(1.60)	(1.51)
ESG Downgrade × +2	1.016**	1.018**	1.031**	1.000**
	(2.34)	(2.34)	(2.18)	(2.14)
ESG Downgrade × +3	0.994***	0.996***	1.056***	1.037***
	(2.78)	(2.79)	(2.68)	(2.67)
ESG Downgrade × +4	0.794***	0.797***	0.823**	0.832**
	(2.59)	(2.60)	(2.41)	(2.46)
ESG Downgrade × +5	0.914**	0.916**	0.850**	0.871**
	(2.50)	(2.51)	(2.14)	(2.25)
ESG Downgrade × +6	0.381	0.383	0.275	0.318
	(0.95)	(0.95)	(0.65)	(0.77)
Firm Controls	Yes	Yes	Yes	Yes
Loan FE	Yes	Yes	Yes	Yes
Firm Cl. × Month FE	Yes	Yes	Yes	Yes
Rating Scale FE	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.754	0.753	0.736	0.737
N	62,392	62,392	52,244	55,202

Table A7: Loan Spreads around Refinitiv's ESG Methodology Change: Excluding investment-grade firms and non-rated firms

The table reports the results of regressions of an ESG score downgrade on loan spreads in the secondary syndicated loan market at the daily loan – firm – level for the period between October 2019 and October 2020. The sample excludes investment-grade and non-rated firms. *Loan spread* is defined as the difference between the loan's implied yield to maturity and its risk-free equivalent yield to maturity. *ESG Downgrade* is equal to one for firms in the lowest tercile, and zero for all other firms. *Post* is equal to one after April 6, 2020 and zero otherwise. In column (5), we use monthly dummies where October 2019 is the omitted category. Firm Controls are defined in the Appendix in Table A1. Firm cluster is defined as the firm's two-digit SIC industry classification × the four credit risk categories (AAA to A-, BBB+ to B-, CCC+ to D, and unrated). The *t*-statistics, based on standard errors clustered at firm level × time, are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Loan Spread [%]				
	(1)	(2)	(3)	(4)	(5)
ESG Downgrade × *Post*	1.782***	1.663***	1.642***	0.932***	
	(4.65)	(4.50)	(4.47)	(4.28)	
ESG Downgrade × *-5*					0.148
					(0.43)
ESG Downgrade × *-4*					0.324
					(0.83)
ESG Downgrade × *-3*					0.334
					(0.94)
ESG Downgrade × *-2*					0.362
					(0.99)
ESG Downgrade × *-1*					0.228
					(0.60)
ESG Downgrade × *0*					0.891
					(1.56)
ESG Downgrade × *+1*					1.142**
					(2.05)
ESG Downgrade × *+2*					1.449***
					(2.75)
ESG Downgrade × *+3*					1.324***
					(3.14)
ESG Downgrade × *+4*					1.075***
					(3.21)
ESG Downgrade × *+5*					1.168***
					(3.12)
ESG Downgrade × *+6*					1.214***
					(3.16)
Firm Controls	No	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	No	No
Loan FE	Yes	Yes	Yes	Yes	Yes
Firm Cl. × Month FE	No	No	No	Yes	Yes
Rating Scale FE	No	No	Yes	Yes	Yes
Lender FE	No	No	No	Yes	Yes
Adjusted R^2	0.753	0.761	0.770	0.846	0.846
N	48,766	48,766	48,766	48,766	48,766

Table A8: Loan Spread Decomposition around Refinitiv's ESG Methodology Change: Alternative Covid-19 Measures

The table reports the results of regressions of an ESG score downgrade on the *Excess Loan Premium* that is defined as a residual that captures the price of risk above a default risk at the daily loan – firm – level for the period between October 2019 and October 2020. *ESG Downgrade* is equal to one for firms in the lowest tercile, and zero for all other firms. *Post* is equal to one after April 6, 2020 and zero otherwise. *Covid-19 US Exposure*, *Covid-19 World Exposure*, *Covid-19 Supplier Exposure* and *Covid-19 Customer Exposure* are from Ding et al. (2021) and are defined in the Appendix in Table A1. *TLB* is a dummy variable equal to one if the tranches belong to the term loan B category and zero otherwise. Firm Controls are defined in the Appendix in Table A1. Firm cluster is defined as the firm's two-digit SIC industry classification × the four credit risk categories (AAA to A-, BBB+ to B-, CCC+ to D, and unrated). The *t*-statistics, based on standard errors clustered at firm level × time, are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	ELP		
	(1)	(2)	(3)
ESG Downgrade × *Post*	-1.161***	-1.183***	-1.204***
	(-2.83)	(-2.81)	(-2.84)
Covid-19 World Exposure	0.150***		
	(6.08)		
Covid-19 Supplier Exposure		0.221***	
		(4.61)	
Covid-19 Customer Exposure			0.361***
			(7.00)
Post × *TLB*	-0.422**	-0.530***	-0.473**
	(-2.24)	(-2.77)	(-2.40)
ESG Downgrade × *Post* × *TLB*	2.136***	2.593***	2.439***
	(3.29)	(3.52)	(3.42)
Firm Controls	Yes	Yes	Yes
Loan FE	Yes	Yes	Yes
Firm Cl. × Month FE	Yes	Yes	Yes
Rating Scale FE	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes
Adjusted R^2	0.797	0.786	0.785
N	43,312	38,037	40,379

Internet Appendix for

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Table IA1: Description of Changes to the ESG Scoring Methodology

The table cites the description of the changes to Refinitiv's ESG scoring methodology (Refinitiv, 2020).

Change name	Description provided by Refinitiv
(1) Change to Materiality Matrix	"Refinitiv enhanced ESG scores further takes into account that not all metrics have the same importance to every industry. The Refinitiv ESG magnitude matrix is developed as a proprietary model and is applied at the category level. Importantly, the magnitude values are automatically and dynamically adjusted as ESG corporate disclosure evolves and matures. For Boolean metrics, levels of data disclosure can act as a proxy for investor driven pressure on company reporting. Levels of disclosure inform the relative 'weight' of data points for each industry. For measurable numeric metrics, we use our data to determine which sectors contribute most and the proportion of the contribution to the total is used as a proxy for the level of materiality for that sector. For example, the more a given sector contributes to carbon emissions, the more material are carbon emissions data points to companies in that sector. Refinitiv proprietary "magnitude matrix" assesses materiality, showing the weight, from 1 to 10, of data points for each industry."
(2) Change to Transparency/ Investment Grade Scores	"The previous ESG scoring methodology allocated a score of 0.5 to companies which didn't report on metrics, essentially giving them the 'benefit of the doubt'. However, as this may disincentivize companies to report on their ESG performance, the enhanced methodology assigns a score of zero to companies who don't report on metrics relevant to the industry. This new approach encourages company disclosure and transparency."

Table IA2: Categories of Sustainalytics's ESG rating

The table shows the categories of Sustainalytics's ESG rating before and after the methodology change (Sustainalytics, 2018).

Pre/Post Categories	Description provided by Sustainalytics
Pre Change Categories	The five pre-methodology-change categories of ESG ratings: "Laggard," "Underperformer," "Average Performer," "Outperformer," and "Leader."
Post Change Categories	The five post-methodology-change categories of ESG ratings: "Negligible," "Low," "Medium," "High," and "Severe."

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