The effect of bond ownership structure on ESG performance

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ABSTRACT

We examine whether firms improve their environmental, social, and governance performance to satisfy the indirect demands of their bondholders. Specifically, we predict that insurance companies have unique incentives to monitor borrower's ESG performance because insurance companies incorporate ESG performance of firms when making bond investment decisions. We find that firms with higher bond ownership by insurance companies have higher ESG ratings. Our results are stronger for firms whose long-term issuer credit ratings are within closer proximity to the NAIC risk categories mandating larger capital requirement. To mitigate endogeneity concerns, we include firm-fixed effects (to examine within-firm variations), and examine changes in corporate ESG ratings following the initial bond investment by insurance companies. Overall, our results suggest that firms appease the needs of their bondholders in anticipation of expected future financing needs.

JEL: G2, G11, G32

Keywords: Corporate social responsibility; ESG; Bond ownership; Insurance companies; Mutual funds; Credit Ratings;

1. Introduction

In the United States, corporate governance structures place a strong emphasis on protecting the interests of shareholders. In such context, management is often motivated to attend to shareholder preferences. Accordingly, much of the debate among practitioners, academics and regulators has centered on the influence of shareholder preferences on firm policies. By contrast, much less is known about the role of corporate bondholders on firm governance, especially the heterogeneity among the bondholders, despite corporate bond market being the most important source of external finance for many large corporations (Philippon, 2009). As McDaniel (1986) discusses, "a company that makes a killing today at the expense of a creditor will be coldly received when the time comes to borrow again."

Evidence that firms appease any preferences of bondholders is scant. Dass and Massa (2014) propose that institutional bond investors prefer to invest in firms offering greater maturity variety in bond issuances to reduce information collection costs. Consistent with this theory, the authors find that bondholders are willing to pay more for bonds issued by companies offering greater bond maturity variety. Dass and Massa (2014) further suggest that institutional demand for bond maturity variability could itself explain why firms choose to offer bonds of varying maturities. De Franco, Shohfi, Xu, and Zhu (2023) study a recent increase in fixed income conference calls, in which management addresses concerns of debtholders. The authors find that firms faced with greater informational demands from debtholders are more likely to schedule fixed income conference calls. These fixed-income conference calls indicate that managers care about the unique concerns of debtholders. Kubitza (2023) documents causal evidence on the effect of institutional bond investors such as insurance companies on corporate financing and investment activities through their price impact in the secondary bond market. Seltzer, Starks, and Zhu (2022)

find that bond issuers with lower environmental risk exposures are associated with lower offering yields. Finally, Massa, Yasuda, and Zhang (2013) find that a negative exogenous shock to the bond investor base can force firms to reduce their leverage. Shocks to investor supply can therefore cause firms to deviate from their optimal capital structure and reduce firm value. Evidence in Massa, Yasuda, and Zhang (2013) suggests that firms have an incentive to make the firm attractive to bond investors.

In this paper, we investigate whether firms improve their environmental, social and governance (ESG) performance in response to the preferences of their bond investors. We focus on two major types of bond institutional investors in the US, insurance companies and bond mutual funds. Insurance companies and mutual funds are the largest holders of US corporate bonds, owning 27% and 19% respectively.[1] As a result, insurance companies and mutual funds are increasingly becoming more influential in firms' financial decision making (e.g., capital structure). Insurance companies are unique investors relative to all other types of bond investors because they are exposed to ESG risks on both sides of the balance sheet: Their investments (i.e., their assets) are exposed to left tail ESG risks and their insurance underwriting (i.e., their liabilities) is also exposed to ESG risks – particularly climate risk – (Ross (2021)). Insurance companies are also more concerned with left-tail ESG risk of bond issuers because investment regulatory constraints imposed by the National Association of Insurance Commissioners (NAIC) are associated with commonality in investment portfolios among insurance companies. An increase in the riskiness of a borrower (e.g., due to ESG related litigation) can trigger simultaneous sales of

[1] The next largest type of bond owner is pension funds, which own about 8% of corporate bonds. ETFs hold 5% and US Banks hold about 5% of bonds. Households, hedge funds, and private equity funds hold about 2% of corporate bonds and non-profits hold 1% of corporate bonds. Foreign institutions own the other 28% of the US corporate bonds and other undefined entities own the last 5% of the outstanding corporate bonds (source: Federal Reserve).

its bonds (i.e., fire sales), causing bond prices to fall below fundamental values (Girardi et al. (2021)). Finally, insurance companies can forecast future cash flow needs relatively well and therefore don't frequently need liquidity. As a result, insurance companies have longer investment horizons compared to bond mutual fund investors (e.g., matched to their liabilities), which means that insurance companies stand to gain more from engaging with issuers to resolve ESG concerns. These stark differences between insurance companies and mutual funds suggest that insurance companies stand to gain more from engaging with bond issuers to strengthen ESG policies than mutual funds.

There is anecdotal evidence that insurance companies incorporate ESG performance in their investment decisions. For example, some reports indicate that insurance companies screen bonds (sometimes excluding issuers) based on the ESG performance of companies (Dauphine, Munera, and Muller (2022) and Moorcraft (2021a)). Insurance companies also routinely evaluate the ESG risks of their portfolios, considering portfolio turnover costs. There are also reports that insurance companies divest bond investments in companies that do not make sufficient progress in achieving ESG goals (Antonelli, El-Shaer and Yagel (2002)). Specific examples of companies that incorporate ESG in their investment framework include Farmers Insurance and Marsh McLennan, two major insurance companies in the US, which recently became signatories of the UNEP Principles for Sustainable Insurance. As signatories, insurance companies must disclose commitments to integrate ESG issues into decision-making and investment practices.[2] AM Best, a major rating agency of insurance companies is also a signatory of the Principles for Sustainable Insurance, and currently incorporates ESG factors in their rating methodology.

[2] Information about Principles for Sustainable Insurance, including the signatories, can be found at https://www.unepfi.org/insurance/insurance/the-principles/.

There is also limited evidence that insurance companies engage with companies when they make bond investment decisions. Zurich insurance, for example, has committed to decarbonize their portfolio and to engage with companies directly to achieve their goals (Searman, (2021)). Antonelli, El-Shaer and Yagel (2022) point out that insurance corporations are "[c]ollaborating with companies that are part of a portfolio could encourage them to set net zero goals and align their capital expenditures and products with a less carbon-intensive business." There is also anecdotal evidence that credit research analysts engage with company investment relations teams (Agrawal, Troutman, Saia, and Dowdall, 2022). Insurance companies routinely interact with credit research analysts, who can in turn pressure companies to improve their ESG policies. However, there is limited academic research on bondholders' influence, direct or indirect, on changes in ESG policies.

Our study contributes to different strands of literature. First, our finding suggests that firms care about the needs of bond investors in delivering ESG performance. This result adds to the investor-driven corporate finance literature in general and particularly corroborates the documented price impact of bond investors' preference that translates into lower cost of debt financing for issuers meeting institutional bond investors' demand (Dass and Massa, 2014; Seltzer, Starks, Zhu, 2022; Kubitza, 2023). Second, our results contribute to the ESG literature in proposing a new reason why firms should care about their ESG performance. Third, our study compliments the literature on the impact of equity institutional ownership on firms' financial and accounting policies (Baghdadi, Bhatti, Nguyen, and Podolski, 2018; Bena, Ferreira, Matos, and Pires, 2017; Ramalingegowda and Yu, 2012). In particular, our findings extend our understanding on the role of bond institutional ownership on firms' *non-financial* policies. Finally, we contribute to the literature that examines the effect of a bond's ownership structure on firms' decisions. Research

in this area is relatively underdeveloped in part because bond ownership data became available only recently. Our study shows that the firm's bond ownership structure affects the firms' ESG performance.

We obtain bond ownership structure from the Refinitiv eMAXX database between 2004 and 2013. The eMAXX database contains detailed quarterly bond ownership information by U.S. and European insurance companies and mutual funds. eMAXX data have been used in many recent papers on bond ownership structure, including Massa, Yasuda and Zhang (2013), Manconi, Massa and Zhang (2015), Nanda, Wu and Zhou (2019), Seltzer, Starks and Zhu (2020), and others. To measure ESG performance, we use the MSCI ESG KLD database, which is also extensively used in studies on ESG (see, for example, Deng et al., 2013; Khan et al., 2016; Chen, Dong, and Lin, 2020; etc.).

Our findings are consistent with our predictions. We find that bond ownership by insurance companies is associated with greater ESG performance while bond ownership by mutual funds is not related to ESG performance. We address identification in three ways. First, our variable of interest, bond ownership, is lagged. Second, we include firm fixed effects. Thus, we find that, within firms, lagged bond ownership by insurance companies is associated with better ESG performance. By contrast, we observe no association between mutual funds bond ownership and ESG performance. Third, we perform an analysis similar to that in Houston and Shan (2021) where we examine ESG ratings after a bond issuing firm is added to the portfolio of a bond institutional investor for the first time. We confirm ESG improves after the initiation of the lending relationship between an issuing firm and an insurance company. However, there is no change in ESG performance after the bond is added to mutual funds for the first time. In robustness tests, we first confirm that our results are robust to the proxy we use for ESG performance. When we use

Refinitiv ESG rating data (formerly ASSET4), we continue to find that lagged bond ownership by insurance companies is associated with higher ESG performance. We then confirm that our results are not affected if we additionally control for equity institutional ownership, bond blockholder incidence, inclusion or exclusion of regulated financial companies, and using emissions data as a proxy for ESG performance instead of KLD ratings.

Most closely related to our study, Houston and Shan (2021) find that firms improve their ESG after bank loans are granted. Our paper differs from the extant literature in that we examine the impact of *bond* ownership structure on ESG performance. In contrast to banks, bondholders lacking arm's-length relationships with the borrower are not generally able to directly impose ESG requirements on issuing firms. However, access to the corporate bond investor base can act as a transmission mechanism for promoting ESG policies. Our results are consistent with firms appeasing to the demands of specific bondholders (i.e., insurance companies) that are concerned about borrower ESG performance.

The remainder of this paper is organized as follows. In the next section, we discuss relevant literature in more detail and discuss our research design. In section 3, we discuss our data. We present results in section 4 and conclude in section 5.

2. Literature review and research methods

2.1 *ESG*

Gillan, Koch, and Starks (2020) provide a broad and complete survey of the ESG literature. More than ever, institutional investors have expressed a preference for stocks with strong ESG ratings. There are two main reasons for this. First, clients of institutional investors are demanding that institutions avoid firms with ESG concerns. In the fourth quarter of 2020 alone, Blackrock's ESG exchange-traded funds had (record) inflows of $8.6 billion (Hale, 2021). In Blackrock's 2020

CEO and client letters, respectively (Blackrock, 2020a; Blackrock 2020b), Larry Fink states "Over the past few years, more and more of our clients have focused on the impact of sustainability on their portfolios," and "Climate change is almost invariably the top issue that clients around the world raise with BlackRock." As a result, the Blackrock CEO announced that they would seek investment opportunities with strong ESG reputation. This does not surprise given Blackrock's role as a manager with fiduciary duties to the clients. Second, institutional investors consider ESG to be an investment risk. Investment firms that want to increase risk-adjusted returns will pursue firms that invest in risk-reducing ESG endeavors. In the aforementioned Blackrock CEO letter, Larry Fink explains he is convinced that "sustainability- and climate-integrated portfolios can provide better risk-adjusted returns to investors" (Blackrock, 2020b). Aside from external pressure, there are economic reasons why a firm would commit to stronger ESG ratings. ESG investments reduce litigation, reputational, financial and operational risks (e.g., Fortado, 2017; Blackrock and Ceres, 2015). In addition, ESG investments can prevent future regulation interventions. Reduction in risks then directly impacts firm value.

Chava (2014) tests whether the implied cost of equity and the interest charge on bank loans is related to the environmental profile of firms. Using KLD environmental concern data, Chava (2014) finds that both the cost of equity and the cost of debt are positively related to environmental concerns. Next, he finds that firms with environmental concerns have no greater incidence of bankruptcy, covenant violations, or credit rating declines. Furthermore, Chava (2014) finds no relation between a firm's stock beta or default risk. Alternatively, he finds that firms with high environmental concerns have lower institutional ownership. Chava (2014) concludes that institutional demand for environmentally friendly companies likely explains the higher cost of capital for firms with environmental concerns.

Similarly, Krueger, Sautner and Starks (2020) show that institutions are avoiding investing in firms with poor ESG ratings for reasons unrelated to performance or risk. Specifically, the authors survey 439 institutions regarding the importance of climate risks in their investment decisions. The authors first document that climate risks are of relatively low importance to firms when making investment decisions. Institutions appear to incorporate climate risk in investments primarily to satisfy investors' demand, for ethical considerations and to satisfy fiduciary duties. In fourth place, institutions mention higher expected returns and risk reduction as a motivation.

Several studies examine institutional intervention in companies to address ESG concerns. Krueger, Sautner and Starks (2020), for example, shows that institutions do not often divest environmentally problematic companies. Rather, financial institutions prefer to hedge, or even engage with companies to push them to improve. Hoepner, Oikonomou, Sautner, Starks, and Zhou (2022) study institutional ESG engagements with companies following equity investment positions. Forty-two percent of engagements by the major institution in their sample are related to environmental and social concerns. Institutions sometimes successfully convince firms to change more than half the time (51.8%), which suggests that firms care about institutional concerns even when the engagements are mostly done behind the scenes (through private conversations or meetings). In engagements that led to ES improvements, the authors find a reduction in left-tail risk.

Turning to fixed income investments, there is evidence that institutional investors successfully push firms to improve ESG performance. Houston and Shan (2021) study initial loan relationships and find that firms improve their ESG after loans are granted. The authors use data

from RepRisk to measure ESG concerns[3] and show that borrowers improve their ESG more when their ESG is lower than that of the lender. Second, the authors show that their results are stronger when the borrower is bank dependent.

Note that both banks and equity institutional investors have significant power over the investees. Equity institutional investors have voting power, whereas banks are known to have frequent interactions with borrowers. The focus of our study is on bondholders, which have limited ability to directly enforce behavior changes in firms. Any firm improvements in ESG is likely a result of firms catering to implicit demands of insurance companies. As Levine (2021) points out,

> "Sometimes bondholders really do want companies to do things that are not explicitly required by the contract: There are things that are expected and customary but not actually in the contract, or there are things technically allowed by the contract but that would be poor form for the company to actually do. Sometimes it happens that the company does a thing that the bondholders don't like, and the bondholders get mad but have no legal remedy. Usually what happens then is that reporters write articles about it, and in those articles bondholders are quoted saying "this is going to undermine the market's confidence in the company and limit its ability to raise money by selling bonds in the future."

2.2 Bond ownership structure and ESG

Research on bond ownership structure is much more limited. This is partly because bond ownership data was not easily available until recently. In one of the earlier papers using bond ownership data from eMAXX, Massa, Yasuda and Zhang (2013) show that bond investor base supply uncertainty is negatively related to the likelihood that a firm issues bonds. When this happens, firms raise any necessary capital with bank loans and equity. Furthermore, negative shocks to bond investor supply have long-term negative impacts on firm leverage. The authors therefore conclude that bond investor base has a material impact on a firm's capital structure. This

[3] Houston and Shan (2021) use RepRisk for ESG data because only RepRisk has data on ESG concerns for private companies and their study examines changes in ESG performance for both public and private firms.

result is important because it suggests that firms have incentives to satisfy demands of bondholders even if bondholders do not explicitly disclose such demands.

Financial reporting conservatism is another example of firm behavior that is rooted in demand by bondholders. Conditional conservatism is defined as the tendency to require a higher degree of verification to recognize good news than bad news in earnings (Watts, 2003). Conditional conservatism is important to debtholders because conditional conservatism, by definition, affects firm left-tail risk that is of critical importance to bondholders. Zhang (2008), Nikolaev (2010), and Lee and Steele (2019) find that bond and capital structure heterogeneity impacts conditional conservatism. More related to our study, Campbell, Lee, Salas and Shen (2021) find a causal relation between bond ownership structure and conditional conservatism. Specifically, they find that bond ownership by insurance companies causally and positively impacts conditional conservatism.

Ye, O'Brien, Carnes, and Hasan (2021) also study firm behavior in response to bondholder ownership structure. Specifically, the authors develop a theory based on stakeholder demand such that bond ownership concentration causes firms to be less myopic and invest more in R&D. This is because they argue that some bondholders have a longer temporal orientation and therefore want firms to invest more heavily in investments that take longer to materialize – such as R&D.

As discussed earlier, insurance companies tend to be long-term bond investors who tend to be more risk averse (relative to mutual funds) (e.g., Girardi et al., 2021). These two characteristics of insurance companies have been shown to be important for capital structure (Massa, Yasuda and Zhang, 2013), liquidity provision (Wang, Zhang, and Zhang, 2020), and conditional conservatism (Campbell et al., 2021). In our study, we argue that bond ownership structure in general, and bond ownership by insurance companies more specifically impacts firm ESG investments. There are

two reasons why insurance companies care significantly about ESG ratings. First, just like equity institutional investors, insurance companies care about their own reputation and so prefer to avoid having a reputation of investing in companies with ESG concerns. Second, ESG concerns are important to insurance companies for risk-management purposes. Climate change can lead to more volatile weather patterns, hurricanes, and tornadoes (Michener, et al. 1997) that cause insurance claims. Given that insurance companies have direct economic exposures to volatile weather, it is reasonable for insurance companies to avoid investing in companies that contribute to climate change. In fact, regulators are now encouraging insurance companies to consider financial risks from climate change in their risk management processes.[4]

Because of evidence that insurance companies care about ESG when selecting investments and because insurance companies tend to be long-term investors in bonds, we hypothesize that:

H1: Higher bond ownership by insurance companies is associated with greater net firm ESG ratings.

On the other hand, Massa, Yasuda, and Zhang (2013) find that bond mutual funds consistently have much higher turnover and volatility than insurance companies. Similarly, Anand, Jotikasthira, and Venkataraman (2020) show that bond mutual funds trade more actively than other institutional investors. Compared with insurance companies, bond mutual funds are more transient. Also, bond mutual funds chase profitability and have no specific climate change exposures. As a result, we argue bond mutual funds are less concerned with ESG related risks. Because of these reasons, they likely do not have incentives to monitor the borrower and thus might not care as much as insurance companies about the borrower's ESG, leading to the following hypothesis:

[4] See Moorcraft (2021).

H2: Higher bond ownership by bond mutual funds is not positively related to net firm ESG ratings.

2.3. Research design

To test whether bond ownership structure is associated with ESG, we employ a variety of empirical tests. Firstly, we perform multivariate regressions. The dependent variable in our OLS regressions include net ESG ratings (ESG_net), ESG strengths (ESG_strgth), ESG concerns (ESG_con). We also then use net ESG ratings for each of the 5 dimensions we consider (environmental, community, employee relations, diversity, and product). Next, we use strengths and concerns for the environmental dimension and for what we call the "social" category of ESG. The "social" category of ESG is the sum of the non-environmental dimensions of ESG. In our main tests, we control for year and firm fixed effects. We also include year fixed effects in all our models. Standard errors in all regressions are adjusted for heteroskedasticity. Our main variable of interest is the bond ownership by insurance companies. However, we control for bond ownership by mutual fund companies as well. In terms of control variables, we generally follow Chen, Dong and Lin (2020) and include firm size (log of assets), leverage (book leverage), ROA, market to book ratio, cash holdings, advertising expense, R&D, a dividend dummy variable and sales growth. We use assets as a deflator for cash holdings, advertising expenses and R&D.[5] Detailed definitions of our variables are provided in the Appendix.

In order to address identification, we use three strategies. First, our main variable of interest, bond ownership by insurance companies, is lagged in all models. Second, we include firm fixed effects in our base models. Including firm fixed effects fixes the comparison group within the firm.

[5] Other studies on ESG that use similar control variables to ours include Dyck, Lins, and Wagner (2019), Houston and Shan (2021), Seltzer, Starks and Zhu (2020), and Davidson, Dey and Smith (2019), among others.

In other words, we are examining whether variation in lagged bond ownership by insurance companies over time is associated with better ESG ratings. Third, we follow the approach in Houston and Shan (2021) to examine changes in ESG ratings after initial "lending" relationships between insurance companies and firms. In other words, we identify when a bond is added to an insurance company investment portfolio for the first time, and then examine changes to ESG ratings following such initial investments. For such initial "lending relationships" we then examine whether changes in ESG vary across firm long-term credit ratings.

3. Data

To construct our sample, we combine data from a number of sources: the Refinitive eMAXX database, the Mergent Fixed Income Securities Database (FISD), the Compustat Fundamentals Annual database, and the MSCI ESG KLD database (KLD).

We start our bond sample from Mergent FISD. Mergent FISD covers majority of publicly offered U.S. bonds, including U.S. agency debentures, convertible bonds, and 144A offerings, etc. Following Bessembinder, Jacobsen, Maxwell and Venkataraman (2018) and Seltzer, Starks and Zhu (2021), we restrict our bond sample to nonputtable U.S. corporate debentures, U.S. corporate bank notes, and U.S. corporate medium-term notes (bond type = CDEB, USBN, or CMTN) with a reported maturity date. Mergent FISD also provides bond characteristics at issuance, such as face value, maturity date, and issuer identification (CUSIP), etc. We merge our bond sample with Compustat fundamentals database to retrieve issuer characteristics. This essentially limit our bond sample to those issued by U.S. public companies.

To build the bond ownership data, we merge our U.S. corporate bond sample with the Refinitive eMAXX bond ownership database. Our eMAXX data cover the period between 2004 and 2013. The eMAXX database includes quarterly ownership of corporate bonds for nearly

20,000 US and European insurance companies; US, Canadian and European mutual funds; and leading US public pension funds. Data on ownership by insurance companies and mutual funds are nearly complete because they come from required disclosures to the NAIC and the Securities and Exchange Commission (SEC), respectively. For companies that have multiple bond issues in a given year, bond ownership by insurance (mutual fund) companies is the average, across bond issues, of the bond ownership by insurance (mutual fund) companies.

In the last step, we merge the corporate bond ownership data (as of the fiscal year end) with the KLD database. The KLD provides comprehensive data on firm-level environmental and social ratings. The first year of analysis in our sample is 2005 because we use lagged bond ownership structure in all of our analysis and the last year is 2014. Our final dataset has 8,383 observations which is somewhat larger than other studies that use annual bond ownership structure data from eMaxx, such as Massa et al. (2013).

We use KLD ratings to study ESG performance for companies in our sample. Specifically, we consider 5 dimensions: environment, product, employee relations, diversity and community. We do not consider the corporate governance dimension because it is outside of the scope of our study. Finally, we do not consider human rights that are applicable only to a very small subset of firms in our sample. KLD identifies strengths and concerns for each ESG dimension for each firm-year observation. For each dimension, we add strengths and concerns and then also compute the net rating as the difference between the sum of strengths and the sum of concerns. We compute an overall net ESG rating, which is the sum of strengths for all five dimensions minus the sum of concerns for all five dimensions. In addition, we follow prior studies (Chen, Dong and Lin, 2020; Davidson et al. 2019) to compute a ESG rating for "social" ESG dimensions: Community, Employee, Diversity, and Product.

We provide summary statistics of our sample in Table 1 below. The net ESG rating averages 0.48; ESG strengths average 2.33 and average concerns average 1.85. Average net ESG ratings in our sample are higher than in Chen, Dong and Lin (2020) (the average net ESG rating is 0.13 in Chen, Dong and Lin, 2020). However, ESG ratings are positively correlated with firm size and our firms are larger (the average natural log of assets is 8.83 in our sample vs 7.35 in Chen, Dong and Lin, 2020). On average, our firms have leverage of 0.30, ROA of 12%, market to book ratios of 1.62, and cash ratios of 10%. Sixty-six percent of the firms in our sample pay dividends. About 77% of the equity of our companies, on average, is owned by institutions. Overall, our ESG and accounting summary statistics are in line with those in Chen, Dong and Lin (2020).

Turning to our bond ownership structure variables, 21% (8.2%) of the bonds of our firms are owned by U.S. insurance companies (mutual funds), on average. In 62% of the firms in our sample, at least one bond is owned by an institution with a stake greater than 5% (BondBlock). Some corporate debt instruments in our sample have no ownership by insurance companies. For example, Universal Corporation, a tobacco holdings company based in Virginia, issued a $100 million senior note in 2009, of which 67% was owned by U.S. mutual funds and 0% by U.S. insurance companies.

***** Insert Table 1 here *****

4. Results

4.1. Univariate results

Our main hypothesis is that insurance company ownership of bonds is positively related with ESG ratings. In Table 2, we explore differences in means of firms with high vs low insurance company ownership. We first build two subsamples based on the upper quartile and lower quartile of lagged bond ownership by insurance companies. We compare the mean of all our variables for

the upper vs the lower quartile and present t-stats and p-values for the difference in means of the variables. We find that net ESG ratings are lower for firms with high insurance ownership (firms in the upper quartile of bond ownership by insurance companies) than for firms with low insurance ownership (firms in the lower quartile of bond ownership by insurance companies), which goes against our hypothesis 1. In fact, strengths and concerns for all dimensions of ESG are lower for firms with high insurance ownership than for firms with low insurance ownership. In part, this is because firms with high insurance ownership tend to be smaller (the log of assets is 8.5 for firms with high insurance ownership vs 9.13 for firms with low insurance ownership. The difference is statistically significant at the 1% level) and smaller firms tend to have lower ESG ratings.[6] Also, firms with high insurance ownership have higher leverage, on average, than firms with low insurance ownership (leverage is 0.27 for firms with high insurance ownership vs 0.25 for firms with low insurance ownership. The difference is statistically significant at the 1% level). As we show in multivariate tests, ESG ratings are negatively related to leverage. Therefore, lower ESG ratings for firms with high insurance ownership vs firms with low insurance ownership could be due to differences in leverage between the two groups. Overall, differences in mean univariate statistics between firms with high vs low bond ownership by insurance companies reinforce the need for multivariate analyses of our main hypothesis.

***** Insert Table 2 here *****

4.2. Multivariate results

We now examine whether ESG is related to bond ownership by insurance companies in a multivariate setting. Our hypothesis 1 states that *lagged* bond ownership by insurance companies

[6] Larger firms tend to disclose more information, which makes it easier for KLD to rate. Therefore, larger firms tend to have greater strengths and concerns.

is positively related to ESG. For our first set of tests, we use the net ESG ratings, which are computed as the sum of strengths minus the sum of concerns across all five dimensions. Separately, we also perform analyses of strengths vs weaknesses separately (again, for the five dimensions). We present results of these tests in Table 3 below. In model 1, we use ESG net rating as the dependent variable. We then use ESG strengths as the dependent variable in model 2. Finally, we use ESG concerns as the dependent variable in model 3. We include firm fixed effects and year fixed effects in all models.

***** Insert Table 3 here *****

Our results suggest that firm size, advertisement and dividend policy are mostly positively related to ESG net rating in most models. Most other coefficients on control variables are statistically insignificant. A few coefficients on control variables are inconsistent across models. For example, firm size is negatively related to net ESG ratings in model 1. Nonetheless, coefficients on our control variables are broadly consistent with the literature.[7] In part, this is because these firms receive more media attention and so suffer more from poor ESG ratings.

Turning to our variables of interest, we find that lagged bond ownership by insurance companies is positively related to ESG and negatively related to ESG concerns. The coefficients on lagged bond ownership by insurance companies are statistically significant at the 1% level. By contrast, bond ownership by mutual funds is unrelated related to ESG ratings. These results are consistent with hypothesis 1 and hypothesis 2 that lagged bond ownership by insurance companies is positively related to ESG ratings while lagged bond ownership by mutual funds is not positively related to ESG ratings. Our results are also economically significant. The standard deviation of bond ownership by insurance companies is 025. Increasing bond ownership by insurance

[7] See, for example, Houston and Shan (2021) and Gillan et al. (2020).

companies by 1 standard deviation is associated with an increase in net ESG of about 0.19,[8] which represents almost a 40% increase in ESG from the mean in our sample.

Next, in Table 4, we examine whether the effect of lagged bond ownership on ESG is similar across different dimensions of ESG. As discussed in our data section above, we consider five KLD dimensions: Environment, community, employee, diversity, and product. Separately, we also combine/add the ESG ratings on community, employee, diversity and product and define this as social ESG category. In Panel A of Table 4, we re-estimate the regressions from Table 3, except that we replace the dependent variable with the net ESG rating for each of the five dimensions one at a time. Next, in panel B of Table 4, we use net ESG ratings, strengths, and concerns for the environment dimension (models 1-3) and for the social ESG category (models 4-6) separately as dependent variables. All models in Table 4 include firm and year fixed effects.

***** Insert Table 4 here *****

In panels A and B of Table 4, we again see some inconsistent signs on control variables across models. These differences are likely due to our inclusion of firm fixed effects in all models. For example, we observe mostly insignificant coefficients on the market to book ratio. This could be because market to book ratios vary much more than ESG ratings within firms. In terms of our variable of interest, lagged bond ownership by insurance companies, we continue to observe a positive coefficient in most models. In Panel A, where we focus on net ESG ratings for each of the five dimensions, we only do not find a significant coefficient on the diversity ESG rating. Alternatively, lagged bond ownership by mutual funds is negatively related to environmental ESG ratings and positively related to diversity ESG ratings.

[8] In model 1 (where the dependent variable is ESG Net Rating), the coefficient on lagged bond ownership by insurance companies equals 0.7537. Multiplying 0.7537 times the standard deviation of bond ownership by insurance companies of 0.25 yields about 0.19.

In Panel B of Table 4, we focus on the environmental dimension of ESG and the social category of ESG that we construct as the sum of ESG ratings of dimensions other than the environmental dimension (Gillan et al. 2010). We examine net ESG ratings, strengths and concerns separately for the environmental dimension and the social category. Our results are again consistent with hypothesis 1. Lagged bond ownership by insurance companies is positively related to environmental and social ESG strengths (models 1 and 5), and we find that lagged bond ownership is negatively related to social ESG concerns (model 6). We do not find a significant coefficient on lagged bond ownership by insurance companies in the model where the dependent variable is environmental ESG concerns. Like in Panel A of Table 4, we find a that lagged bond ownership by mutual funds is negatively related to environmental ESG ratings, negatively related to environmental strengths and positively related to environmental concerns.

The next set of analyses we perform is motivated by Houston and Shan (2021). They study whether firms improve their ESG ratings after a facility starts a lending relationship with the firm. Similarly, our goal is to examine changes in ESG ratings around the time an insurance company initiates a bond investment. To do this, we first construct relationship pairs between each bond issuer and each institutional investor of bonds. We identify investment pairs such that the institution does not have any bond ownership of the given issuer as of 2004 (the first year in our sample). For every such pair, there is therefore no "relationship" between the issuer and the institutional investor initially. Next, we identify the first time institutional investors initiate a "lending" relationship with a firm. We then set the dummy variable "*Insurance Company Lender*" equal to one on the first year that the insurance company becomes a "lender". In other words, for each insurance company – bond issuer pair, the "*Insurance Company Lender*" variable is equal to

zero until the insurance company becomes an investor in the bond (until the bond ownership by that insurance company is positive).

Next, we restrict the sample to one year before and one year after lending relationship initiations for each bond-institutional investor pair. We then compute the change in ESG before and after the initiation of a "lending" relationship between institutional investors and firms (via investments in the company bonds). Specifically, we compute the change in net ESG ratings, strengths and concerns (Δ ESG Net Rating, Δ ESG Strengths, and Δ ESG Concerns, respectively). In addition, we compute the difference between the weighted average of the net ESG ratings, strengths and concerns of the institutional investor's portfolio and the net ESG ratings, strengths and concerns of the bond issuer (the firm) prior to initiating the lending relationship. We present means of these six variables for insurance companies and for other institutional investors separately in Table 5.

***** Insert Table 5 here *****

We find that net ESG ratings improve following lending relationships for all investors. However, we find that net ESG ratings and strengths improve more when the institutional investor is an insurance company than for other institutional investors. ESG concerns also fall more following initiations of lending relationships with insurance companies than with other institutional investors. Separately, we find positive differences between difference between a given institutional bond investor's weighted average portfolio ESG and the firm's ESG. The difference between institutional bond investor's weighted average portfolio ESG and the firm's ESG is also significantly larger when the investor is an insurance company. Alternatively, we find that institutions' weighted average concerns are higher than that of the firm before the initial investment. In other words, institutions tend to invest in companies that have fewer concerns than

the weighted average of the ESG concerns in the institutional firm. The difference in concerns between institutions' portfolios and the firm is smaller for insurance companies than for non-insurance companies.

In Table 6, we present results of multivariate analyses of changes in ESG ratings around lending initiations. We examine changes in net ESG ratings, strengths and concerns in models 1, 2, and 3 respectively. The key variable of interest is the *Insurance Company Lender* dummy variable that indicates that the institutional investor is an insurance company. We expect that ESG ratings and strengths improve, whereas ESG concerns fall after an insurance company invests in a firm's bonds for the first time in our sample. Therefore, we expect a positive coefficient on the *Insurance Company Lender* dummy variable in models 1 and 2 and a negative coefficient on the same variable in model 3. Following Houston and Shan (2021), we also control for lagged ESG of the issuer (as of the year prior to the initial investment) to control for a potential path dependency problem. Our results confirm our prediction. Net ESG ratings and strengths improve and concerns fall significantly more (statistically significant at the 1% level) after insurance companies invest in a firm's bonds for the first time relative to initial institutional investors by non-insurance companies.

***** Insert Table 6 here *****

We then examine whether improvements in ESG are related to the difference between a given institutional bond investor's weighted average portfolio ESG and the firm's ESG prior to the initiation of the lending relationship. Here, we get mixed results. We confirm the results in Houston and Shan (2021) that ESG ratings improve more when the difference between the institutional investor's portfolio ESG and the firm's ESG is larger. Alternatively, ESG strengths improve less if the difference between the institutional investor's portfolio ESG strengths and the firm's ESG

strengths is larger. Similarly, firm's reduce ESG concerns more (i.e., ESG concerns fall more) if the difference between the institutional investor's portfolio ESG concerns and the firm's ESG concerns is larger. In Table 5, we show that institutions' portfolios tend to have greater weighted ESG concerns than those of the investee. In such cases, results in Table 6 suggest that firms improve their ESG more (i.e. they reduce their concerns more) when the institution has greater ESG problems before the initial investment.

Next, we further consider the impact of credit ratings of the issuer on the subsequent improvement in ESG ratings following initial investments by institutions. Insurance companies' bond holdings, unlike that of mutual funds, are subject to regulatory capital requirement prescribed by NAIC. The regulatory capital constraints become increasingly more binding (i.e. higher risk-based capital ratios) for insurance companies as their portfolio firms' credit ratings deteriorate. Nanda, Wu and Zhou (2019) argue that insurer holding clustering induces greater fire sale risk for bonds closer to NAIC risk category boundaries, especially between investment grade (i.e. NAIC 1&2) and speculative grade (i.e. NAIC 3~6). We, therefore, anticipate firms whose credit ratings are within closer proximity to induce higher capital requirement be imposed on the insurer bondholders have greater incentives to cater to the needs of the insurance company lenders and improve their ESG ratings. Specifically, we test this prediction based on a bond issuer's credit rating's NAIC categorical proximity to the speculative categories as well as its distance to the critical cutoffs between the NAIC risk categories. We use S&P long term credit ratings and, similar to Nanda, Wu and Zhou (2019), focus on bonds classified as either NAIC category 1 or category 2, which accounts for the vast majority of insurance companies' bondholding. We define credit ratings A- and BBB- as critical cutoffs because any drop in credit ratings would downgrade the issuer to a lower NAIC risk category. We then test our predictions in four subsamples: bonds that

are in NAIC risk categories 1 or 2; bonds that are in NAIC risk category 1 and category 2 separately (i.e. category 2 being the boundary category of investment grade); bonds that are rated A- or BBB- (i.e. the borderline ratings of NAIC risk categories). As in Table 6, we model the change in net ESG ratings around the time that an institution makes an investment in a bond for the first time and our variable of interest is the *Insurance Company Lender* dummy variable. We expect the coefficient on the dummy variable to be more positive for firms with borderline credit ratings. We also expect that firms in the NAIC 2 category will improve their ESG ratings more than firms with credit ratings in the NAIC 1 category following initial lending relationships with insurance companies because NAIC 2 ratings are closer to the critical investment grade border. We present results of this analysis in Table 7.

***** Insert Table 7 here *****

Our results are consistent with our expectations. In fact, firms with non-borderline "A" ratings (NAIC 1 category) do not improve their ESG ratings more when the firm has an initial lending relationship with an insurance company compared to when a firm has an initial lending relationship with other institutional investors (model 2 of Table 7). Firms with non-borderline "B" ratings (NAIC 2) do improve their ESG more when an insurance company initiates a lending relationship with the firm. The coefficient on the *Insurance Company Lender* is 0.08 in such cases and is statistically significant at the 1% level (model 3). This is consistent with our expectations because NAIC 2 credit ratings are closer than NAIC 1 ratings to the investment grade border. For firms in either NAIC 1 or NAIC 2 credit rating category, the coefficient on the *Insurance Company Lender* dummy variable is positive and statistically significant for (model 1). Finally, we find the biggest change in ESG for firms initiating a lending relationship with insurance companies when the firm has borderline credit ratings of A- or BBB- (model 4). The coefficient on the *Insurance*

Company Lender coefficient is 0.10 and is statistically significant at the 1% level. This coefficient of 0.10 is larger than the 0.08 coefficient we find for firms with non-borderline "B" credit ratings (NAIC 2 category). Our results therefore confirm our prediction that firms cater to the needs of insurance companies especially when the firm has credit ratings that are on borders that can trigger changes to risk-based capital ratios of insurance companies.

4.3.Robustness tests

One concern with our evidence so far is that it is based solely on ESG ratings data from KLD. Berg, Kölbel and Rigobon (2022) show that ESG ratings can vary significantly depending on the provider. Relying on only one data source for our conclusions may therefore be premature. As a first robustness test, we use the revised Asset4 data computed by Refinitiv to measure ESG ratings despite its limited sample coverage relative to KLD. We re-estimate our base regressions (from Table 3) and present the results in Table 8. Asset4 ESG scores are higher when ESG ratings are higher. Therefore, we expect to find a positive coefficient on lagged bond ownership by insurance companies. Our results using Asset4 data generally confirm the base results from Table 3. Lagged bond ownership is positively related to ESG ratings – particularly for environmental and social categories.

***** Insert Table 8 here *****

In Table 9, we present results of robustness tests we perform related to equity institutional investors, bond blockholders, regulated financial companies, and the proxy we use for ESG ratings. Ye, O'Brien, Carnes and Hasan (2021) propose that large bondholders can influence the firm to become less myopic and invest more in R&D. Our variable of interest is bond ownership by insurance companies, which could be correlated with bond blockholder incidence because insurance companies, as a group, are often the most important bond investors. To verify that our

results are not driven by bondholder blockholders, we re-estimate our base results from Table 3 and include a bond blockholder dummy variable as in Ye et al. (2021).[9] As in Table 3, we control for firm and year fixed effects. Our results in models 1, 3, and 4 suggest that bond blockholders are not associated with firm ESG ratings. The coefficient on the bond blockholder dummy variable is not statistically significant in any of our models. Still, the coefficient on lagged bond ownership by insurance companies is positive and significant.

***** Insert Table 9 here *****

Seltzer, Starks and Zhu (2021), Chen, Dong and Lin (2020), Dyck et al. (2019) all find that equity institutional investors causally lead to improvements in firms' ESG. If equity institutional investments are correlated with bond investments by insurance company investments in the firms' bonds, our results could be explained by equity institutional investments. In models 2, 3, and 4, we control for equity institutional ownership. Here, we find results inconsistent with extant literature in that we do not find a statistically significant coefficient on equity institutional ownership. Our samples and empirical methodologies are different than in studies of equity institutional ownership and ESG. Nonetheless, we continue to find a positive relation between lagged bond ownership and ESG.

The next set of robustness tests we perform are related to financial firms. In our sample construction so far, we do not exclude financial companies. However, it is possible that ESG incentives of financial companies are different than those for non-financial companies. In model 4 of Table 9, we present our base results from Table 3 excluding financials (SIC codes 6000-6999).

[9] In unreported tests, we also separately control for long-term vs short-term bond blockholders following Ye et al. (2021) and find that our results remain the same.

In short, our results are essentially unchanged when we exclude financials. The coefficient on bond ownership by insurance companies is positive and statistically significant at the 1% level.

The last set of robustness tests we present in Table 9 have to do with emissions. We argue that insurance companies have particularly strong incentives to monitor ESG in firms in part because insurance companies are exposed to environmental factors in the liabilities side of their balance sheets (the insurance claims). We thoroughly investigate this claim by studying whether insurance companies pay particular attention to firm CO2 emissions. We use two measures of firm emissions: An emissions score from Asset4 (by Refinitiv), and scope 1 CO2 equivalent emissions (emissions directly by the firm), also from Asset4 (by Refinitiv). Following Seltzer, Starks and Zhu (2020), we limit the analysis to the 15 highest emitting industries. As before, we test whether firm emissions are a function of past insurance company ownership of bonds. Results in model 5 (for emissions rating) and model 6 (for level 1 emissions) confirm the results in our base tests. Higher lagged insurance company ownership of the company's bonds is associated with higher (better) emissions scores and with lower direct CO2 equivalent emissions. These results again suggest that firms are satisfying the implicit demands of the bondholders of the firm.

5. Conclusions

There is increasing interest in corporate ESG policy. Firms' investments in ESG are growing tremendously. Regulators also express intentions to increase regulations to force firms to care more about ESG topics. In the insurance industry, these concerns are especially important because of their natural exposure to climate-change related events. For example, rising temperatures cause sea level rises, which lead to an increase in insurance claims. Insurance regulators are now strongly encouraging firms to consider ESG when making investment decisions. Given that insurance

companies are the largest investors in bond market, any changes in investment decisions by insurance companies have important consequences on the demand and supply of bonds. Given evidence in Massa et. al. (2013), firms have important incentives to be viable investment targets for insurance companies.

In this study, we examine whether firms respond to preference for better ESG performance by insurance companies in the corporate bond market. Our results are consistent with the theme of investor driven corporate finance literature. In particular, despite the lack of negotiating power often available to lenders through arm-length relations in the corporate loan market, we find that firms with larger bond ownership by insurance companies deliver better ESG performance. Our results are therefore consistent with idle bondholder activism. Given the sheer magnitude of investment by insurance companies in the corporate bond market, the commonality in their portfolio holdings, and the implied price impact of their asset liquidation, we expect firms that value access to corporate bond market as external financing source respond to insurance companies' preference. Consistent with our conjecture, our results show that the positive relationship between firm ESG performance and the bond ownership by insurance companies is stronger for firms whose long-term issuer credit ratings are within closer proximity to the NAIC risk categories mandating larger capital requirement. Future studies should study a recent trend for firms to communicate with bondholders to understand their needs (e.g., Cordone, 2018).

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Appendix. Variable definitions

Variable	Description
ESG Net Rating	Sum of all strengths minus the sum of all concern ratings
ESG Strengths	Sum of all strength ratings
ESG Concerns	Sum of all concern ratings
Environment Strengths	Sum of all strength ratings in Environment category
Environment Concerns	Sum of all concern ratings in Environment category
Environment Net Rating	Net rating in Environment category
Community Net Rating	Net rating in Community category
Employee Net Rating	Net rating in Employee category
Diversity Net Rating	Net rating in Diversity category
Product Net Rating	Net rating in Product category
Social Strengths	Sum of all strength ratings in Community, Employee, Diversity, and Product categories
Social Concerns	Sum of all concern ratings in Community, Employee, Diversity, and Product categories
Social Concerns	Social Strengths - Social Concerns
Change in ESG Net Rating	Change in ESG net rating from t-1 to t+1 where t is the year that a given firm initiates a lending relationship with a bond investor
Change in ESG Strengths	Change in ESG strength rating from t-1 to t+1 where t is the year that a given firm initiates a lending relationship with a bond investor
Change in ESG Concerns	Change in ESG concern rating from t-1 to t+1 where t is the year that a given firm initiates a lending relationship with a bond investor
Emission Rating	ESG rating based on a firm's emission from Asset4 (Refinitiv)
Direct CO2 Equivalent emissions	Logarithm of (1+ direct CO2 equivalent emission)

ESG—Diff	Difference between a given investor's weighted average portfolio ESG and the firm's ESG.
Bond ownership by insurance companies	Percent Bond ownership by insurance companies
Bond ownership by mutual funds	Percent Bond ownership by mutual funds
Size	Compustat: log(AT)
Leverage	Compustat: (DLTT+DLC)/AT
ROA	Compustat: OIBDP/AT
Market-to-Book	Compustat: abs(AT-CEQ+CSHO*PRCC_F)/AT
Cash Holding	Compustat: CHE/AT
Advertising	Compustat: XAD/AT
R&D	Compustat: XRD/AT
Dividend	Compustat: =1 if DVC>0 and zero otherwise
Sales Growth	Compustat: [sale(t)-sale(t-1)]/sale(t-1)
Institutional Equity Ownership	Equity ownership by institutional investors
Bond Blockholder	=1 if a firm has at least one institutional bondholder that holds more than 5% of its total outstanding bonds and zero otherwise.

Table 1. Summary statistics

This table summarizes sample statistics of our key variables for the sample period of 2005-2014. All variables are reported at firm-year level. Detailed variable definitions are described in Appendix.

	N	Mean	St. Dev	P10	P50	P90
ESG Net Rating	8,383	0.4807	3.0540	-2.0000	0.0000	5.0000
ESGStrengths	8,383	2.3340	3.1240	0.0000	1.0000	7.0000
ESGConcerns	8,383	1.8533	1.9108	0.0000	1.0000	4.0000
Environment	8,383	0.1588	1.1397	-1.0000	0.0000	1.0000
Community	8,383	0.1343	0.6420	0.0000	0.0000	1.0000
Employee	8,383	0.0930	1.2778	-1.0000	0.0000	1.0000
Diversity	8,383	0.3616	1.5154	-1.0000	0.0000	2.0000
Product	8,383	-0.2670	0.7698	-1.0000	0.0000	0.0000
Size	8,383	8.8326	1.5400	6.9836	8.6634	10.8231
Leverage	8,379	0.3004	0.1949	0.0664	0.2744	0.5567
ROA	8,102	0.1215	0.0931	0.0265	0.1167	0.2218
Market-to-Book	8,375	1.6168	0.8641	0.9861	1.3518	2.5547
Cash Holdings	8,383	0.0990	0.1131	0.0078	0.0607	0.2376
Advertising	8,383	0.0094	0.0300	0.0000	0.0000	0.0259
R&D	8,383	0.0126	0.0343	0.0000	0.0000	0.0399
Dividend	8,383	0.6612	0.4733	0.0000	1.0000	1.0000
Sales Growth	8,372	0.0585	0.2160	-0.0702	0.0275	0.2276
Bond Ownership by Insurance Companies	8,383	0.2121	0.2504	0.0000	0.0960	0.5951
Bond Ownership by Mutual Funds	8,383	0.0824	0.0871	0.0000	0.0457	0.1865
Institutional Equity Ownership	7,758	0.7695	0.2091	0.4943	0.8063	0.9768
Bond Block holder	8,383	0.6265	0.4838	0.0000	1.0000	1.0000

Table 2. Univariate tests

This table reports sample means of our key variables for the two subsamples based on the quartile ranks of % bond ownership by insurance companies. The first two columns report the means of the respective subsamples and the third column reports the differences in means. The last column reports the p-values. ***, **, and * denote statistical significance at 1%, 5%, and 10% level, respectively.

	Bond Ownership by Insurance Companies			
	Bottom Quartile	Top Quartile	Difference	p-value
ESG Net Rating	0.2305	0.8731	-0.6426***	0.0000
ESG Strengths	1.5806	2.7904	-1.2098***	0.0000
ESG Concerns	1.3502	1.9173	-0.5671***	0.0000
Environment	0.1399	0.2172	-0.0773*	0.0204
Community	0.0550	0.1678	-0.1128***	0.0000
Employee	0.1096	0.1298	-0.0201	0.5662
Diversity	0.1134	0.5737	-0.4603***	0.0000
Product	-0.1874	-0.2153	0.0279	0.1650
Size	8.4657	9.1268	-0.6610***	0.0000
Leverage	0.2741	0.2516	0.0225***	0.0000
ROA	0.1237	0.1305	-0.0067*	0.0141
Market-to-Book	1.7849	1.6453	0.1396***	0.0000
Cash Holdings	0.1171	0.0803	0.0368***	0.0000
Advertising	0.0095	0.0082	0.0013	0.1468
R&D	0.0165	0.0117	0.0048***	0.0000
Dividend	0.5788	0.8997	-0.3210***	0.0000
Sales Growth	0.0777	0.0499	0.0278***	0.0000
Bond Ownership by Insurance Companies	0.0000	0.5867	-0.5867***	0.0000
Bond Ownership by Mutual Funds	0.0041	0.0579	-0.0538***	0.0000
Institutional Equity Ownership	0.7776	0.7530	0.0246***	0.0001
Bond Block holder	0.2738	0.9178	-0.6439***	0.0000

Table 3. The effect of bond ownership on firm ESG ratings.

This table reports the OLS regressions of the ESG ratings on the % ownership by insurance companies. Industry fixed effect is based on two-digit SIC code. Detailed definitions of all variables are described in Appendix. Robust t-statistics are reported in parentheses. ***, **, and * denote statistical significance at 1%, 5%, and 10% level, respectively. All models include firm and year fixed effects.

	(1) ESG Net Rating	(2) ESG Strengths	(3) ESG Concerns
Bond Ownership by	0.7537***	0.5267***	-0.2270***
Insurance Companies $_{t-1}$	(4.83)	(4.03)	(-2.74)
Bond Ownership by	-0.3162	-0.2213	0.0950
Mutual Funds $_{t-1}$	(-1.08)	(-0.97)	(0.53)
size	-0.2494***	0.2072***	0.4567***
	(-3.39)	(3.28)	(9.73)
Leverage	-0.3692*	0.0892	0.4584***
	(-1.73)	(0.52)	(3.45)
ROA	0.1727	0.0808	-0.0919
	(0.59)	(0.39)	(-0.47)
Market-to-Book	-0.0731	-0.0832**	-0.0100
	(-1.64)	(-2.10)	(-0.38)
Cash Holdings	-0.6812**	-0.2207	0.4605**
	(-1.99)	(-0.76)	(2.16)
Advertising	-0.3962	2.5998	2.9960**
	(-0.17)	(1.44)	(2.50)
R&D	-0.9405	0.2208	1.1613*
	(-0.80)	(0.24)	(1.70)
Dividend	0.2564***	0.2307***	-0.0257
	(2.88)	(3.20)	(-0.45)
Sales Growth	-0.0098	-0.0705	-0.0607
	(-0.11)	(-0.81)	(-0.92)
Constant	2.6722***	0.3978	-2.2745***
	(3.89)	(0.68)	(-5.27)
Year & Firm FE	Yes	Yes	Yes
N	8,074	8,074	8,074
R^2	0.7181	0.8129	0.7531

Table 4. The effect of bond ownership on individual category ESG rating

Panel A of this table reports the OLS regressions of the net ESG ratings in the five major categories tracked by KLD: Environment, Community, Employee, Diversity, and Product. Panel B further reports the OLS regressions of the net ratings, strengths, and concerns within the Environment and non-Environment (i.e., Social) categories. Detailed definitions of all variables are described in Appendix. Robust t-statistics are reported in parentheses. ***, **, and * denote statistical significance at 1%, 5%, and 10% level, respectively.

Panel A	(1) Environment	(2) Community	(3) Employee	(4) Diversity	(5) Product
Bond Ownership by Insurance Companies $_{t-1}$	0.2900***	0.0700*	0.2430***	0.0375	0.1132**
	(4.14)	(1.71)	(2.95)	(0.50)	(2.46)
Bond Ownership by Mutual Funds $_{t-1}$	-0.4569***	0.0506	-0.2572	0.3906**	-0.0434
	(-3.74)	(0.74)	(-1.62)	(2.56)	(-0.54)
size	-0.1493***	-0.0389**	-0.1142***	0.1409***	-0.0880***
	(-4.98)	(-2.00)	(-3.18)	(3.74)	(-4.03)
Leverage	-0.0008	0.1573***	-0.3156***	-0.0245	-0.1855***
	(-0.01)	(3.17)	(-2.71)	(-0.23)	(-2.96)
ROA	-0.1913	0.0903	0.2211	0.1159	-0.0632
	(-1.34)	(1.37)	(1.21)	(0.88)	(-0.88)
Market-to-Book	-0.0194	-0.0243**	-0.0359	-0.0040	0.0105
	(-1.03)	(-2.00)	(-1.38)	(-0.18)	(0.74)
Cash Holdings	-0.0970	-0.0301	-0.0666	-0.2105	-0.2771**
	(-0.64)	(-0.34)	(-0.36)	(-1.19)	(-2.46)
Advertising	0.9191	1.2823**	-2.9091***	2.3675**	-2.0561***
	(1.05)	(2.05)	(-3.12)	(2.26)	(-3.00)
R&D	-1.1178*	0.6747***	-0.5468	1.2798*	-1.2304**
	(-1.75)	(2.69)	(-0.93)	(1.93)	(-2.38)
Dividend	-0.0056	0.0117	0.0253	0.1682***	0.0567**
	(-0.15)	(0.55)	(0.56)	(3.75)	(1.99)
Sales Growth	0.0362	0.0178	-0.0196	-0.0388	-0.0054
	(0.97)	(0.71)	(-0.34)	(-0.67)	(-0.19)
Constant	1.5181***	0.4172**	1.2104***	-1.0248***	0.5514***
	(5.44)	(2.34)	(3.60)	(-2.94)	(2.70)
Year & Firm FE	Yes	Yes	Yes	Yes	Yes
N	8,074	8,074	8,074	8,074	8,074
R^2	0.6270	0.5709	0.5519	0.7203	0.6083

Table 4 (continued)

Panel B	(1)	(2)	(3)	(4)	(5)	(6)
		Environment			Social category	
	Net Rating	Strengths	Concerns	Net Rating	Strengths	Concerns
Bond Ownership by Insurance Companies $_{t-1}$	0.2900***	0.2906***	0.0006	0.4637***	0.2362**	-0.2276***
	(4.14)	(5.00)	(0.01)	(3.56)	(2.13)	(-3.18)
Bond Ownership by Mutual Funds $_{t-1}$	-0.4569***	-0.3058***	0.1510**	0.1406	0.0846	-0.0561
	(-3.74)	(-3.09)	(2.05)	(0.56)	(0.43)	(-0.35)
size	-0.1493***	-0.0194	0.1299***	-0.1002	0.2266***	0.3268***
	(-4.98)	(-0.80)	(6.60)	(-1.57)	(4.18)	(8.25)
Leverage	-0.0008	0.0938	0.0946*	-0.3683**	-0.0045	0.3638***
	(-0.01)	(1.24)	(1.83)	(-2.02)	(-0.03)	(3.16)
ROA	-0.1913	-0.1091	0.0822	0.3640	0.1899	-0.1741
	(-1.34)	(-1.11)	(0.81)	(1.39)	(1.04)	(-1.11)
Market-to-Book	-0.0194	-0.0113	0.0082	-0.0537	-0.0719**	-0.0182
	(-1.03)	(-0.69)	(0.78)	(-1.39)	(-2.15)	(-0.79)
Cash Holdings	-0.0970	-0.0151	0.0819	-0.5842**	-0.2056	0.3786**
	(-0.64)	(-0.12)	(0.98)	(-2.02)	(-0.86)	(2.06)
Advertising	0.9191	0.6685	-0.2507	-1.3153	1.9313	3.2466***
	(1.05)	(0.85)	(-0.67)	(-0.72)	(1.35)	(3.11)
R&D	-1.1178*	-1.0052*	0.1126	0.1774	1.2260	1.0487*
	(-1.75)	(-1.84)	(0.58)	(0.18)	(1.44)	(1.80)
Dividend	-0.0056	0.0183	0.0239	0.2620***	0.2124***	-0.0496
	(-0.15)	(0.59)	(1.08)	(3.52)	(3.57)	(-1.00)
Sales Growth	0.0362	-0.0385	-0.0747***	-0.0460	-0.0320	0.0140
	(0.97)	(-1.22)	(-3.02)	(-0.57)	(-0.43)	(0.23)
Constant	1.5181***	0.6973***	-0.8207***	1.1542*	-0.2995	-1.4537***
	(5.44)	(3.09)	(-4.58)	(1.94)	(-0.60)	(-3.98)
Year & Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
N	8,074	8,074	8,074	8,074	8,074	8,074
R^2	0.6270	0.6734	0.7671	0.6829	0.7845	0.6950

Table 5. The effect of bond ownership on evolution in firm ESG ratings: Univariate analysis

This table reports the change in a firm's ESG ratings around the initiation of the lending relationship with an institutional bond investor. We take an event study approach similar to that used in Houston and Shan (2021). Changes in ESG ratings are defined as the difference between a firm's ESG rating 1 year post and 1 year prior to the initiation of the lending relationship. ESG -Diff is the difference between a given institutional bond investor's weighted average portfolio ESG and the firm's ESG prior to the initiation of the lending relationship. The sample consists of borrower-institutional bond investor pairs when the lending relationship is first established. Column one reports the sample mean of the change in ESG ratings when the newly established lending relationship is with a non-insurance company. Column two reports the sample mean of the change in ESG ratings when the newly established lending relationship is with an insurance company. Column three reports the differences in the sample means and the last column reports the p-value. Detailed definitions of all variables are described in Appendix. ***, **, and * denote statistical significance at 1%, 5%, and 10% level, respectively.

	Non-insurer	Insurer	Difference	p-value
Δ ESG Net Rating	0.8848	0.9963	-0.1115***	0.0000
Δ ESG Strengths	0.5997	0.6321	-0.0324**	0.0017
Δ ESG Concerns	-0.2851	-0.3642	0.0792***	0.0000
ESG Net Rating—Diff	0.4800	0.5325	-0.0525**	0.0028
ESG Strengths—Diff	1.2740	1.2951	-0.0211	0.2497
ESG Concerns—Diff	0.7940	0.7626	0.0314**	0.0054

Table 6. The effect of bond ownership on evolution in firm ESG ratings

This table reports the OLS regressions of the change in a firm's ESG ratings around the initiation of the lending relationship with an institutional bond investor. We take an event study approach similar to that used in Houston and Shan (2021). Changes in ESG ratings are defined as the difference between a firm's ESG rating 1 year post and 1 year prior to the initiation of the lending relationship. The sample consists of borrower-institutional bond investor pairs when the lending relationship is first established. Detailed definitions of all variables are described in Appendix. Robust t-statistics are reported in parentheses. ***, **, and * denote statistical significance at 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)
	Δ ESG Net Rating	Δ ESG Strengths	Δ ESG Concerns
Insurance Company Lender	0.0723***	0.0360***	-0.0520***
	(6.30)	(3.63)	(-8.27)
ESG —Diff$_{pre}$	0.0181***	-0.0109***	-0.0354***
	(4.78)	(-4.28)	(-10.26)
ESG _Issuer$_{pre}$	-0.3593***	-0.3673***	-0.4568***
	(-85.79)	(-115.19)	(-112.98)
size$_{pre}$	0.4543***	0.7160***	0.3301***
	(99.06)	(146.00)	(110.45)
Leverage$_{pre}$	0.1651***	0.1247***	0.0297
	(4.67)	(4.06)	(1.40)
ROA$_{pre}$	0.1336	1.2374***	1.1311***
	(1.41)	(18.66)	(17.67)
Market-to-Book$_{pre}$	0.2679***	0.2573***	-0.0032
	(25.00)	(30.25)	(-0.50)
Cash Holdings$_{pre}$	1.0218***	1.5958***	0.6327***
	(13.10)	(23.15)	(16.74)
Advertising$_{pre}$	6.2458***	4.5658***	-1.4656***
	(22.25)	(18.43)	(-9.70)
R&D$_{pre}$	11.7240***	7.2980***	-4.2848***
	(40.88)	(28.04)	(-30.69)
Dividend$_{pre}$	0.6153***	0.3949***	-0.1787***
	(46.79)	(36.13)	(-22.60)
Sales Growth$_{pre}$	-0.0278	-0.1214***	-0.1182***
	(-1.03)	(-5.33)	(-7.18)
Constant	-4.5751***	-6.2230***	-2.1165***
	(-90.25)	(-125.17)	(-69.23)
Year & Industry FE	Yes	Yes	Yes
N	181,271	181,271	181,271
R^2	0.3385	0.3559	0.4519

Table 7. The effect of bond ownership on evolution in firm ESG ratings and a borrower's long-term credit rating

This table reports the OLS regressions of the change in a firm's net ESG ratings around the initiation of the lending relationship with an institutional bond investor for four different sub-samples based on the proximity of a firm's long-term credit rating to a credit rating associated with higher capital requirement according to the NAIC risk-based capital ratio applicable to insurance companies' portfolio holdings. NAIC classifies corporate bonds into six risk categories based on credit ratings and prescribe different capital requirements on insurers for holding bonds in different risk categories. Investment grade bonds belong to the top two NAIC risk categories (NAIC 1 & 2), which account for the majority of bondholding by insurance companies. Similar to Nanda, Wu, and Zhou (2019), we break down the sample used in our test of the initiation of lending relationship (Table 6) into four subsamples based on firms' NAIC risk categories and their proximity to critical cutoffs between the risk category boundaries: NAIC 1 =AAA-A; NAIC 2= BBB; A- and BBB- are the borderline credit ratings within NAIC 1 and 2 categories respectively. Detailed definitions of all variables are described in Appendix. Robust t-statistics are reported in parentheses. ***, **, and * denote statistical significance at 1%, 5%, and 10% level, respectively.

	(1) NAIC 1& 2	(2) NAIC 1	(3) NAIC 2	(4) A- & BBB-
	Δ Net ESG Rating			
Insurance Company Lender	0.0731***	0.0242	0.0822***	0.1017***
	(5.60)	(1.36)	(4.43)	(4.12)
ESG —Diff$_{pre}$	0.0146***	0.0143**	0.0176**	0.0318***
	(3.06)	(2.47)	(2.26)	(3.22)
ESG _Issuer$_{pre}$	-0.3586***	-0.3309***	-0.4236***	-0.4043***
	(-68.74)	(-51.19)	(-50.17)	(-37.32)
size$_{pre}$	0.4382***	0.2453***	0.5882***	0.6358***
	(72.41)	(25.98)	(43.40)	(46.28)
Leverage$_{pre}$	-0.0137	0.2372***	0.7982***	-1.6434***
	(-0.26)	(3.60)	(8.21)	(-15.31)
ROA$_{pre}$	0.0533	-2.8017***	-1.4055***	-1.3726***
	(0.37)	(-13.36)	(-6.65)	(-6.45)
Market-to-Book$_{pre}$	0.2972***	0.4953***	0.1347***	0.6205***
	(21.08)	(32.27)	(4.73)	(21.92)
Cash Holdings$_{pre}$	0.8535***	1.3539***	-0.4090**	0.6400***
	(9.21)	(12.45)	(-2.49)	(4.08)
Advertising$_{pre}$	8.3804***	1.9385***	16.6739***	9.5196***
	(19.04)	(3.96)	(29.93)	(9.83)
R&D$_{pre}$	10.9247***	10.4730***	16.0748***	11.9988***
	(35.18)	(29.72)	(28.28)	(20.39)
Dividend$_{pre}$	0.9398***	0.6561***	0.8972***	0.5925***
	(50.14)	(22.96)	(34.59)	(17.67)
Sales Growth$_{pre}$	0.0316	0.5011***	0.1029**	0.3124***
	(0.88)	(6.61)	(2.50)	(4.52)
Constant	-4.6412***	-2.3595***	-5.7776***	-6.2215***
	(-65.52)	(-18.49)	(-38.59)	(-40.11)
Year & Industry FE	Yes	Yes	Yes	Yes
N	135,924	73,264	62,660	34,650
R^2	0.3760	0.4234	0.3903	0.4680

Table 8: The effect of bond ownership on firm ESG ratings-Alternative ESG measures.

This table reports the OLS regressions of the ESG ratings on the % ownership by insurance companies. ESG data for these results come from the revised Asset4 database (Refinitiv). Detailed definitions of all variables are described in Appendix. Robust t-statistics are reported in parentheses. ***, **, and * denote statistical significance at 1%, 5%, and 10% level, respectively. All models include firm and year fixed effects.

	(1) ESG	(2) Environment	(3) Governance	(4) Social
Bond Ownership by Insurance Companies $_{t-1}$	0.0206**	0.0352**	0.0059	0.0281**
	(2.01)	(2.43)	(0.35)	(2.42)
Bond Ownership by Mutual Funds $_{t-1}$	-0.0426**	-0.0897***	-0.0517	-0.0105
	(-2.37)	(-3.16)	(-1.51)	(-0.53)
size	0.0087	0.0218**	-0.0184	0.0179**
	(1.24)	(2.07)	(-1.58)	(2.31)
leverage	0.0494**	0.0219	0.0537	0.0515**
	(2.34)	(0.74)	(1.42)	(2.15)
ROA	0.0142	-0.0097	0.0553	0.0228
	(0.43)	(-0.23)	(1.00)	(0.74)
MB	0.0063*	0.0079	-0.0060	0.0108**
	(1.68)	(1.40)	(-1.06)	(2.36)
cash_holding	0.0413	-0.0077	0.1380***	0.0043
	(1.37)	(-0.18)	(2.83)	(0.13)
advertising	0.2335	0.3733	0.4004	-0.0846
	(1.09)	(1.30)	(1.49)	(-0.37)
RnD	-0.0087	0.2057*	-0.1791	-0.0045
	(-0.08)	(1.79)	(-1.24)	(-0.02)
div_dummy	0.0248***	0.0511***	0.0216*	0.0195**
	(3.12)	(4.41)	(1.76)	(2.18)
sales_growth	-0.0027	-0.0149	-0.0159	0.0211*
	(-0.28)	(-1.30)	(-1.03)	(1.89)
Constant	0.2926***	0.0664	0.6352***	0.2139***
	(4.29)	(0.65)	(5.55)	(2.76)
Year & Firm FE	YES	YES	YES	YES
Observations	4,011	4,009	4,011	4,009
R^2	0.8361	0.8429	0.6261	0.8172

Table 9. Additional robustness tests

This table reports robustness tests for the baseline results reported in Table 3. The dependent variable in Columns (1)~(4) is ESG Net Rating. Column (1) presents the results with an additional variable controlling for the potential influence of the Bond block holder. Column (2) presents the results with an additional variable controlling for the institutional equity ownership. Column (3) presents the results with both additional control variables. Column (4) presents the results under alternative sample selection criteria that limit our sample to non-financial public firms. The dependent variable is the Refinitiv Asset4 emissions rating in Columns (5) and scope 1 direct CO2 equivalents emissions in (6). Detailed definitions of all variables are described in Appendix. Robust t-statistics are reported in parentheses. ***, **, and * denote statistical significance at 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	ESG Net Rating				Emission	
	Additional Control Variable	Additional Control Variable	Additional Control Variables	Non-Financial Firms	Emissions Rating	Direct CO2 Equivalent emissions
Bond Ownership by Insurance Companies $_{t-1}$	0.8073***	0.5761***	0.6323***	0.5925***	0.0721**	-0.5626**
	(4.62)	(3.58)	(3.51)	(2.80)	(2.53)	(-2.21)
Bond Ownership by Mutual Funds $_{t-1}$	-0.2316	-0.1596	-0.0523	0.0068	-0.0258	0.5768
	(-0.71)	(-0.54)	(-0.16)	(0.02)	(-0.38)	(1.10)
Bond Blockholder	-0.0328		-0.0535	-0.0458		
	(-0.42)		(-0.66)	(-0.52)		
Institutional Equity Ownership		-0.1186	-0.1166	-0.0345		
		(-0.64)	(-0.63)	(-0.16)		
size	-0.2455***	-0.3205***	-0.3198***	-0.3920***	0.1639***	0.8742***
	(-3.33)	(-3.90)	(-3.89)	(-4.44)	(21.56)	(15.80)
Leverage	-0.3744*	-0.5291**	-0.5199**	-0.6782***	-0.0185	-0.0666
	(-1.76)	(-2.31)	(-2.28)	(-2.75)	(-0.27)	(-0.12)
ROA	0.2144	0.1686	0.1744	0.1955	-0.0911	0.8658
	(0.73)	(0.56)	(0.59)	(0.64)	(-1.03)	(1.09)
Market-to-Book	-0.0729	-0.0993**	-0.1000**	-0.1407***	0.0192	-0.0083
	(-1.63)	(-2.04)	(-2.06)	(-2.70)	(1.45)	(-0.08)
Cash Holdings	-0.7194**	-0.6852*	-0.6833*	-0.7218*	0.0129	-2.5878***
	(-2.09)	(-1.80)	(-1.80)	(-1.73)	(0.10)	(-2.78)
Advertising	-0.3352	0.1032	0.0883	-0.0348	0.3826	-15.1589***
	(-0.15)	(0.04)	(0.03)	(-0.01)	(0.82)	(-5.55)
R&D	-0.9504	-1.7616	-1.7741	-1.6235	0.2359	-20.2636***
	(-0.81)	(-1.45)	(-1.46)	(-1.33)	(0.60)	(-8.97)
Dividend	0.2572***	0.2989***	0.2993***	0.2506**	0.0799***	0.2872
	(2.89)	(3.11)	(3.11)	(2.44)	(3.66)	(1.30)
Sales Growth	-0.0104	-0.0002	-0.0029	0.0273	-0.0275	-0.4119
	(-0.11)	(-0.00)	(-0.03)	(0.26)	(-0.67)	(-1.05)
Constant	2.6393***	3.5134***	3.5159***	4.0802***	-1.2159***	6.6311***
	(3.84)	(4.65)	(4.66)	(5.15)	(-15.72)	(9.78)
Year & Firm FE	YES	YES	YES	YES	YES	YES
N	8,081	7,483	7,483	6,269	1,154	513
R^2	0.7178	0.7244	0.7244	0.7311	0.5034	0.7934