Inferring Investor Preferences for Sustainable Investment from Asset Prices*

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ABSTRACT

This paper documents investors' preferences for ESG investments. Our identification is built on a fairly simple economic mechanism, the sensitivity of debt to equity. We find that while firm CDS spreads co-vary negatively with equity returns, this effect is less pronounced for firms with a high ESG rating. This divergence between equity returns and changes in CDS spreads for high- vs. low ESG-rated firms suggests that some equity investors have a preference for sustainability resulting in higher, demand-driven average returns which cannot be explained with firm risk.

JEL classification: G11, G12, Q01, Q5

Keywords: ESG, Sustainable investing, CDS-equity sensitivity

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1 Introduction

Sustainability has been found to drive investor demand and influence asset prices, thus becoming an important topic in finance and economics (Hsu et al., 2023; Riedl and Smeets, 2017). However, it is not clear why investors actually seek sustainable investments. The theoretical literature provides two, not mutually exclusive, explanations (Pástor et al., 2021; Pedersen et al., 2021). First, sustainable investments might be perceived as less risky, for example due to investors' expectations of future regulations. Second, regardless of the associated risk and expected return, sustainable investments might provide utility to investors based on their preferences. While Hsu et al. (2023) document a pollution premium as evidence for a risk channel, Riedl and Smeets (2017) and Giglio et al. (2023) present survey and experimental evidence suggesting that ethical considerations and climate hedging motives may also matter to investors. We provide empirical evidence from asset prices consistent with these experimental and survey data and demonstrate that investor preferences for sustainable investments translate into asset prices above and beyond the influence of a risk channel.

Our identification is based on a novel yet fairly simple mechanism: the co-movement of equity returns and credit spreads, as suggested by the Merton (1974) model for the pricing of risky corporate debt. In particular, we link the heterogeneity in the sensitivity of CDS changes to equity returns to differences in the firms' sustainability performance (as measured by its ESG rating). The assumption underlying our approach is that there is segmentation between CDS and equity markets, along with heterogeneity among investors, as described by Pástor et al. (2021) and Pedersen et al. (2021). The overall set of investors includes those with strong preferences for sustainable investments (ESG investors) and those without concerns about ESG, who primarily focus on financial risk (non-ESG investors). Assuming that only the latter group is trading on the CDS market, while both types of investors participate in equity trading, one would expect to see that the link between equity returns and changes in CDS spreads is independent of a firm's sustainability score in the case when only the risk channel is relevant.

On the other hand, if equity investors influence stock prices also (in addition to or independently of risk considerations) due to their investment preferences, we would observe a debt-to-equity sensitivity that varies with the firm's sustainability characteristics.

Using weekly observations of equity returns and CDS spread changes over the period from 2017 to 2019, we find that the CDS spread-equity sensitivity differs significantly between high and low ESG-rated firms. Specifically, we observe that for firms with high ESG ratings (at the $90th$ percentile of the ESG rating distribution), the decrease in CDS spreads induced by a 1 percentage point increase in equity prices is 0.41 basis points, while the analogous number for firms with low ESG ratings (at the 10th percentile of the distribution) is greater than 1 basis point, i.e., more than twice as much. We further observe that the effect is particularly pronounced for firms with a higher share of freely floating stocks. Moreover, when extending the sample period to include data from 2010 on, we observe that the effect is not evident in the early 2010s, but becomes apparent only after ESG ratings have garnered more widespread attention, as reflected in the Google Trend Search statistics for the term "ESG rating", which is significantly higher from 2017 onwards, see Figure 1.

Corporate Social Responsibility (CSR) and ESG have become important topics in the finance and economics literature in recent years, with numerous theoretical and empirical papers investigating the impact of firms' CSR and ESG performance on financial market outcomes. Most of these studies document that investors place a positive value on firm sustainability (Hong and Kacperczyk, 2009; Friedman and Heinle, 2016; Hartzmark and Sussman, 2019; Flammer, 2021; Fricke et al., 2022; Baker et al., 2022).[1] However, while these papers provide evidence that firms' ESG performance appears to matter to investors, they are largely silent regarding the underlying economic channel.

The theoretical literature suggests two explanations for why investors care about firm sustainability, and these explanations are not mutually exclusive: a direct (taste-based)

[1] One exception is Larcker and Watts (2020), who observe economically identical pricing for green and non-green bond issues in the municipal securities market.

motive and an indirect (risk-based) motive. The theoretical work by Pástor et al. (2021), for example, shows that the low expected returns of green assets can be explained by these two reasons together, meaning that investors enjoy holding green assets, and green assets also hedge climate risk. The two dimensions also play a crucial role in the model developed by Pedersen et al. (2021), which differentiates between three types of investors. The first group of investors is uninterested or unaware of ESG scores, while the second group uses ESG scores only to update their views on risk and expected return. The third group additionally has preferences for high ESG scores. For investors in this third group, ESG scores play a dual role, as they not only provide information about risk and expected returns, but also directly affect these investors due to their specific ESG preferences.

The empirical literature to date provides evidence primarily for the risk-based motive, with several potential sources of risk in play. For instance, Dunn et al. (2018) document that ESG exposures and firm risk are closely interrelated. In particular, they observe that stocks with poor ESG profiles are riskier according to several statistical risk measures, such as return volatility or beta.

Focussing on chemical pollutants data as one aspect of ESG, Hsu et al. (2023) document that the expected returns of polluting firms exceed those of non-polluting firms. While this outperformance cannot be explained by common risk factors, their findings suggest the presence of a new type of systematic risk related to environmental policy uncertainty.

Another paper that supports the risk channel is Ardia et al. (2022). The authors develop a novel measure of unexpected changes in climate change concerns and demonstrate that this measure helps to explain differences in the performance of firms with high and low greenhouse gas emission intensity. The effect is mainly driven by transition risk related to business impact, including the increasing risk of stricter future regulation.[2]

Atilgan et al. (2023) focus on the carbon premium and analyze the relationship between carbon emissions and earnings surprises. They find that carbon emissions positively correlate

[2]Ardia et al. (2022) also note that discussions on 'carbon tax' and 'political campaign' particularly contribute to the effect of unexpected changes in climate change concerns.

with earnings surprises, and further document that earnings surprises account for the carbon premium to a large extent. These results may suggest that financial markets do not fully price in carbon transition risk, leaving emissions an unpriced externality that harms wider society but not the emitting company.

To the best of our knowledge, the empirical evidence for the taste-based channel is solely based on survey and experimental data. For example, Riedl and Smeets (2017) combine administrative data on investors' mutual fund holdings with survey data and behavior in incentivized experiments to show that both social preferences and financial motives matter for socially responsible investments. Using data from two field surveys with a pension fund that grants its members a real vote on its sustainable-investment policy, Bauer et al. (2021) find evidence for a strong social preferences: In the survey, two thirds of participants expressed willingness to enhance the fund's engagement with companies based on specific sustainable development goals, even when anticipating potential adverse effects on the fund's financial performance. Giglio et al. (2023) use survey data on ESG beliefs and preferences in a large panel of retail investors and document substantial heterogeneity among investors in their motives for ESG investing. They find that 25% of survey respondents are primarily motivated by ethical considerations, while 22% are driven by climate hedging motives, and 45% do not see any reason to invest in ESG.

The rest of the paper is organized as follows. Section 2 presents the data and descriptive statistics. Section 3 describes the empirical setting and results, and Section 4 concludes.

2 Data

Our data sample covers the time period from January 1, 2017, to December 31, 2019, and comes from various sources.[3] We begin by collecting daily CDS spreads for all non-financial firms with a 5-year senior unsecured CDS spread in the Refinitiv EOD database. We exclude

[3]We choose to start our sample period in 2017, aligning with the growing popularity of ESG ratings as a measure of ESG performance. This trend is evident in the Google Trend Search Index, depicted in Figure 1. We end our sample period in 2019 to mitigate any potential impact from the Covid outbreak.

firms classified under the 'Bank' and 'Other Financial' industries as these firms benefit from implicit guarantees and thus exhibit a different sensitivity in the hedge ratio (Hett and Schmidt, 2017).

We then follow the cleaning process as described in Hett and Schmidt (2017). Specifically, we exclude observations for highly distressed firms whose CDS spreads exceeded 2,000 basis points, since the CDS market for distressed firms tends to be highly illiquid. Additionally, we find that some CDS time series are not regularly updated on a daily basis, indicating limited market activity and low liquidity. Therefore, we exclude data points where the CDS spread experiences a day-to-day change of more than 100 percent or remains constant on two consecutive trading days.

We calculate daily absolute changes (i.e., not percentage changes) in CDS spreads and aggregate them to weekly frequency. Whenever two or more daily observations are missing within a specific week, we exclude the corresponding week from our sample observation.

We match these data of actively traded single-name CDS with equity return data from Refinitiv Eikon. Not all firms with actively traded CDS are listed on an exchange, so our final sample comprises 336 unique firms for which we observe weekly CDS changes and (also weekly) equity returns.

We then add a measure of ESG performance, which we collect from Refinitiv. The Refinitiv ESG score is designed to transparently and objectively measure a company's ESG performance, commitment, and effectiveness across ten main themes. We use an overall sustainability score, which summarizes the performance across the three pillars, environmental, social, and corporate governance, and ranges between a minimum of 0 and a maximum of 100.

We further add firm leverage, defined as total assets over book equity (both collected from Refinitiv Eikon)[4] and the Sautner et al. (2023) measure of climate change exposures. This

[4]Some firms show negative values for leverage due to negative book equity values. As negative equity would imply an infinite leverage, we replace negative values of leverage with the maximum value observed in our sample.

measure is derived from conversations in earnings conference calls and captures exposures related to shocks associated with climate change.[5]

In addition to firm-specific information, we collect data on other factors that were found to be important determinants of CDS spreads (Collin-Dufresne et al., 2001; Elton et al., 2001; Schaefer and Strebulaev, 2008; Hett and Schmidt, 2017). In particular, we add the 10-year Treasury rate, the slope of the Treasury curve (measured as the difference between the 10y and 2y Treasury rates), Moody's Seasoned Baa Corporate Bond Yield Spread, and the volatility index of the Chicago Board Options Exchange (VIX), which were all collected from the Federal Reserve Economic Data (FRED) database at the Federal Reserve Bank of St. Louis.

We present descriptive statistics of our data in Table 1. The average weekly absolute change in 5Y CDS is −0.19 basis points, with a range from −566 to +248 basis points. As we have very few extreme outliers, we winsorize the CDS data at the 0.1% and 99.9% quantiles, which results in observed weekly CDS changes ranging from −118 to 128 basis points. Weekly equity returns are on average 0.22%, with a median weekly return of 0.33%. The average ESG rating for our sample firms is 68, with ESG scores ranging between 16 and 95.

[**Table 1 about here**]

3 Empirical Analysis

Our empirical analysis aims to investigate the sensitivity of debt to equity values, and thus, builds on the Merton (1974) model, where prices of equity and debt are linked to the value of the firm, represented by the total value of its assets. In particular, as described in Collin-Dufresne et al. (2001), the model implies that the credit spread can be modeled as a function

[5]See Sautner et al. (2023) for a detailed description of how this measure is constructed. The data are available online at `https://osf.io/4xuvz`, see Sautner et al. (2020).

of the firm value V_t, the spot rate r_t, and all 'other' state variables $\{X_t\}$, i.e.,

$$CDS_t = CDS(V_t, r_t, \{X_t\}).$$

Given that credit spreads are uniquely determined by the current values of the state variables, it follows that changes in credit spreads are also exclusively determined by changes in these state variables.

In our empirical analysis, we investigate whether changes in equity prices are accompanied to a lesser degree by changes in CDS prices for companies with high ESG performance compared to those with low ESG performance. This effect may be attributed to factors like an increased demand for the equity of high sustainability firms, which is exogenous to the inherent risk of the firm. To investigate this issue, we estimate a regression relating changes in CDS spreads to equity returns, using a methodology similar to the one proposed in Hett and Schmidt (2017):

$$\Delta CDS_{iw} = \alpha_i + \alpha_w + \beta_1 \cdot r^E_{iw} + \beta_2 \cdot ESG_{iy-1} + \beta_3 \cdot r^E_{iw} \cdot ESG_{iy-1} + \gamma X_{it} + \epsilon_{it}. \quad (1)$$

Here, ΔCDS_{iw} and r^E_{iw} are the weekly change in the 5-year CDS spread of firm i from week $w-1$ to week w and the corresponding equity return, respectively. ESG_{iy-1} denotes the ESG performance of firm i measured as the Refinitiv ESG rating of firm i published in year $y-1$. The vector of controls X_{it} contains additional factors that were found to be important determinants of credit spreads in Collin-Dufresne et al. (2001). These are on a weekly frequency the change in the 10-year Treasury rate, the change in the slope of the Treasury curve measured by the change in the difference between the 10y and 2y Treasury rates, the change in the Moody's Seasoned Baa Corporate Bond Yield Spread, and the change in the volatility index of the Chicago Board Options Exchange (VIX). We further control for the annual variation in firm leverage, defined as total assets over book equity, and the quarterly variation in the Sautner et al. (2023) measure of climate change exposure. We saturate the model with time (weekly) fixed effects, α_w, as well as industry fixed effects or firm fixed effects (α_i). To allow for a potential serial correlation of CDS changes within a week and within each firm, we employ two-way clustering of standard errors (Cameron et al., 2011) at the time and firm dimensions.

Note that, in contrast to Collin-Dufresne et al. (2001), we do not estimate bond returns as a function of equity returns, but rather use credit default swaps, an instrument that is commonly traded among institutional investors but not by retail investors (Abad et al., 2016). This market segmentation allows us to use a similar differentiation between investors as in Pedersen et al. (2021). That is, we suppose that retail investors whose preferences are directly influenced by a firm's ESG performance (taste-based discrimination) have access only to the equity market, while large, sophisticated investors whose preferences are affected by this ESG performance either only indirectly (i.e., via firm risk) or not at all, have access to both the equity and the CDS market. With this notion of market segmentation, we can conduct an additional test to examine whether the sensitivity of CDS spreads to equity returns varies with the ESG performance more for firms with more free-floating stocks, i.e., where equity investors have easier access to trading. The idea of this test is that stocks with lower free-float may be less influenced by short-term demand fluctuations as a significant portion of its shares is not actively traded in the open market. Thus, if taste-based investors were driving stock returns, β_3 of Equation 1 would differ for firms with a large versus small share of public floating stocks.

[**Table 2 about here**]

The results are shown in Table 2. As indicated by the coefficient for r^E_{it}, the sensitivity of CDS spreads to equity returns is estimated at around -1.7 for a firm with an ESG score of zero, and this estimate is pretty much constant across the different specifications presented in Table 2.

The effect, however, is different for firms with different ESG ratings. The coefficient for the interaction effect $r^E_{it} \times ESG_{it-1}$ is estimated as 0.016, again in a remarkably stable fashion across the different regression setups. This implies that the sensitivity of CDS spreads to equity returns in absolute terms is the lower the higher the firm's ESG rating.

This implies that, for high ESG firms, higher positive equity returns do not seem to imply a decrease in overall firm risk to the same degree for high ESG firms as they do for firms with lower ESG ratings. The point estimate of the interaction term of the equity return and the ESG score is economically quite large. Our results imply that on average, an increase in equity prices by 1 percentage point for a firm with a low ESG score (a firm at the 10^{th} percentile of the ESG rating distribution) is associated with a decrease of the CDS spread by 1.05 basis points, while the same increase in equity returns leads only to a reduction of CDS spreads by 0.41 basis points for high ESG score firms (firms at the 90^{th} percentile of the ESG rating distribution).

[**Table 3 about here**]

[**Table 4 about here**]

[**Table 5 about here**]

We next analyze the three components of the ESG rating separately. The results are shown in Table 3, Table 4, and Table 5, and suggest that the sensitivity of CDS spreads to equity returns is different for firms with different environmental and social ratings, while the sensitivity of CDS spreads to equity returns does not depend on the governance score.

[**Table 6 about here**]

When enlarging the sample period starting from 2010 on, we observe that ESG ratings matter for the CDS spread-equity sensitivity only since 2017, when ESG ratings have garned more widespread attention, as shown in Table 6. There is no significant difference in the CDS spread-equity sensitivity prior to 2017. After 2017, however, we observe increasing equity returns that are only moderately accompanied by a decrease in CDS spreads for high ESG-rated firms. We visualize the moderating effect of ESG performance on the CDS spread-equity sensitivity over time in Figure 2, where we plot the interaction term $r_{it}^E \times ESG_{it-1}$

from a regression as described in Equation 1 using weekly return data of one calendar year. As suggested by the results in Table 6, CDS changes move with equity returns independent of the ESG performance of firms before 2016. However, after 2017, we find a CDS spread-equity sensitivity that is less strong for firms with a high ESG performance.

[**Figure 2 about here**]

Our results thus support the existence of heterogeneous ESG investors as described in Pástor et al. (2021) and Pedersen et al. (2021) and suggest that some investors have a taste for ESG investing, supporting the survey evidence in Giglio et al. (2023). This increased demand for ESG-aligned firms on the equity market, however, does not translate to a reduction in firm risk. One alternative explanation that might account for our finding could potentially be the difference in the term structure of CDS and equity. In particular, investors might price long-term risks as for example ESG-transition risks only into equity, but not into CDS contracts with a 5 year maturity. To rule out that investors' expectation about the time horizon of ESG risks drive results, we repeat the analysis using CDS contracts with a 10 year maturity. The results presented in Table 7 document an identical point estimate as in the 5Y CDS regression, suggesting that expectations about the materialization of ESG risks do not explain the heterogeneous sensitivity of CDS spreads to equity for high versus low ESG firms.

[**Table 7 about here**]

To provide further evidence for taste-based investors on the equity market, we differentiate between firms with a small versus a large share of free floating stocks: Investors taste-based preferences might be able to move equity prices the less (independent of firm risk), the fewer stocks are free floating.

We generate a dummy variable that equals zero if a firm has only few free floating stocks, defined as the bottom $25th$ percentile of the sample distribution of the percentage of free floating stocks.[6] We include this dummy into Equation(1) to investigate whether the CDS spread-equity sensitivity depends on firms' ESG performance more for firms with sufficient free floating stocks. The results are shown in Table 8. We observe that the comovement of equity and debt prices is not present for firms with few free floating stocks, but only for firms with sufficient supply of stocks. Moreover, in line with our expectation, we find that the ESG performance of firms matters only for the comovement of equity and debt prices if a sufficient number of stocks is free floating.

[**Table 8 about here**]

4 Conclusion

This paper investigates the motives for sustainable investments. While several paper document a risk channel (see, e.g., Hsu et al., 2023), there is only survey evidence that also investor preferences over and above a risk channel matters (Giglio et al., 2023). We provide evidence for a taste-based channel using a fairly simple identification strategy that is build on the comovement of debt and equity prices, as suggested by the Merton (1974) model.

We observe that in general, an increase in firm equity translates into a reduction in firm CDS. However, this effect is non-linear in the ESG performance of firms. Firms with a high ESG rating show increasing equity prices that are only partially accompanied with a reduction in CDS spreads. Moreover, this heterogeneity in the sensitivity of debt to equity with respect to the ESG rating is only present for firms in the two tails of the ESG rating distribution and only present for firms with a sufficient number of free floating stocks.

These results suggest that some equity investors care about the ESG performance of firms over and above a risk channel and support the theoretical work by Pástor et al. (2021) and Pedersen et al. (2021).

[6] The share of free floating stocks is rather homogeneous, with a median value of 98.7%. We therefore chose the $25th$ percentile as a threshold for the dummy as the share of free floating stocks at the $25th$ percentile is only 84.6%.

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Table 1: Summary statistics

This table shows descriptive statistics of the variables used in the analysis.

Variable	Obs.	Mean	Std. Dev.	Min	P10	P50	P90	Max
ΔCDS_{it}	45,101	-.19	9.9	-566	-5.2	-.055	4.8	248
$\Delta CDS_{it}(winsorized)$	45,101	-.19	8.9	-118	-5.2	-.055	4.8	128
$\Delta 10YCDS_{it}$	39,767	-.21	11	-399	-6.1	-.11	5.6	236
$\Delta 10YCDS_{it}(winsorized)$	39,767	-.2	9.7	-120	-6.1	-.11	5.6	130
r_{it}^{E}	45,101	.22	3.8	-37	-3.9	.33	4.2	76
ESG_{it}	45,101	68	16	16	44	71	85	95
$ClimateChangeExposure_{it}$	45,101	.0019	.0041	0	0	.00045	.005	.044
$Leverage_{it}$	45,101	53	214	1	1.9	3.1	11	991
$\Delta Treasury10Y_{t}$	45,101	-.00037	.015	-.047	-.018	-.002	.02	.038
$\Delta Slope_{t}$	45,101	-.00097	.011	-.03	-.014	-.002	.013	.04
ΔVIX_{t}	45,101	-.022	.59	-1.9	-.63	-.05	.57	2.4
$\Delta CorpYieldSpread_{t}$	45,101	-.00083	.01	-.022	-.012	-.002	.012	.04

Table 2: Debt-to-Equity Sensitivity

This table presents coefficients of linear regressions of Equation 1. The dependent variable is ΔCDS_{it}, defined as the absolute weekly change in the 5Y CDS of firm i in week t measured in basis points. r_{it}^{E} is the equity return of firm i in week t (in %), and ESG_{it-1} is the ESG rating of firm i available at time t (i.e. published in year $t-1$). The vector of control variables contains the Sautner et al. (2023) measure of climate change exposures, firm leverage, the change in the 10-year Treasury rate, the change in the slope of the Treasury curve, the change in the Moody's Seasoned Baa Corporate Bond Yield Spread, and the change in the VIX. Fixed effects are included as indicated. t-statistics are given in parentheses. Standard errors are clustered at the time and firm dimensions. ***, **, * indicate significance at the 1%, 5% and 10% levels.

	ΔCDS_{it}				
	(1)	(2)	(3)	(4)	(5)
r_{it}^{E}	-1.747***	-1.744***	-1.740***	-1.715***	-1.710***
	(-4.24)	(-4.24)	(-4.23)	(-4.15)	(-4.14)
ESG_{it-1}	-0.006	-0.009**	-0.019	-0.008*	-0.009
	(-1.44)	(-2.04)	(-1.15)	(-1.95)	(-1.00)
$r_{it}^{E} \times ESG_{it-1}$	0.016***	0.016***	0.016***	0.016***	0.016***
	(2.78)	(2.77)	(2.76)	(2.81)	(2.80)
$ClimateChangeExposure_{it}$	26.050	34.024	8.200	37.929	16.411
	(1.11)	(1.34)	(0.43)	(1.50)	(1.17)
$Leverage_{it}$	-0.000	-0.000	0.000	-0.000	0.000
	(-0.54)	(-0.71)	(0.12)	(-0.60)	(0.32)
$\Delta Treasury10Y_{t}$	0.605	0.612	0.164		
	(0.03)	(0.03)	(0.01)		
$\Delta Slope_{t}$	-2.090	-2.162	-1.770		
	(-0.11)	(-0.12)	(-0.10)		
ΔVIX_{t}	1.209***	1.208***	1.207***		
	(3.38)	(3.38)	(3.37)		
$\Delta CorpYieldSpread_{t}$	98.305***	98.322***	98.426***		
	(4.02)	(4.03)	(4.06)		
Observations	45101	45101	45101	45101	45101
R^2	0.164	0.166	0.172	0.229	0.235
Time FE	No	No	No	Yes	Yes
Industry FE	No	Yes	No	Yes	No
Firm FE	No	No	Yes	No	Yes

Table 3: Debt-to-Equity Sensitivity - Environmental Score

This table presents coefficients of linear regressions of Equation 1. The dependent variable is ΔCDS_{it}, defined as the absolute weekly change in the 5Y CDS of firm i in week t measured in basis points. r_{it}^E is the equity return of firm i in week t (in %), and Env_{it-1} is the environmental rating of firm i available at time t (i.e. published in year $t-1$). The vector of control variables contains the Sautner et al. (2023) measure of climate change exposures, firm leverage, the change in the 10-year Treasury rate, the change in the slope of the Treasury curve, the change in the Moody's Seasoned Baa Corporate Bond Yield Spread, and the change in the VIX. Fixed effects are included as indicated. t-statistics are given in parentheses. Standard errors are clustered at the time and firm dimensions. ***, **, * indicate significance at the 1%, 5% and 10% levels.

	ΔCDS_{it}				
	(1)	(2)	(3)	(4)	(5)
r_{it}^E	-1.432***	-1.430***	-1.426***	-1.395***	-1.391***
	(-5.63)	(-5.63)	(-5.63)	(-5.48)	(-5.48)
Env_{it-1}	-0.005	-0.005*	-0.022*	-0.005	-0.015
	(-1.57)	(-1.68)	(-1.95)	(-1.56)	(-1.49)
$r_{it}^E \times Env_{it-1}$	0.012***	0.012***	0.012***	0.012***	0.012***
	(3.50)	(3.50)	(3.49)	(3.54)	(3.54)
$ClimateChangeExposure_{it}$	26.661	34.723	8.274	38.541	16.067
	(1.13)	(1.36)	(0.42)	(1.51)	(1.16)
$Leverage_{it}$	-0.000	-0.000	0.000	-0.000	0.000
	(-0.54)	(-0.72)	(0.17)	(-0.61)	(0.32)
$\Delta Treasury10Y_t$	0.918	0.969	0.355		
	(0.05)	(0.05)	(0.02)		
$\Delta Slope_t$	-2.222	-2.339	-1.763		
	(-0.12)	(-0.13)	(-0.10)		
ΔVIX_t	1.236***	1.235***	1.233***		
	(3.46)	(3.46)	(3.45)		
$\Delta CorpYieldSpread_t$	98.562***	98.612***	98.607***		
	(4.03)	(4.04)	(4.06)		
Observations	45101	45101	45101	45101	45101
R^2	0.167	0.168	0.175	0.232	0.238
Time FE	No	No	No	Yes	Yes
Industry FE	No	Yes	No	Yes	No
Firm FE	No	No	Yes	No	Yes

Table 4: Debt-to-Equity Sensitivity - Social Score

This table presents coefficients of linear regressions of Equation 1. The dependent variable is ΔCDS_{it}, defined as the absolute weekly change in the 5Y CDS of firm i in week t measured in basis points. r_{it}^E is the equity return of firm i in week t (in %), and Soc_{it-1} is the social rating of firm i available at time t (i.e. published in year $t-1$). The vector of control variables contains the Sautner et al. (2023) measure of climate change exposures, firm leverage, the change in the 10-year Treasury rate, the change in the slope of the Treasury curve, the change in the Moody's Seasoned Baa Corporate Bond Yield Spread, and the change in the VIX. Fixed effects are included as indicated. t-statistics are given in parentheses. Standard errors are clustered at the time and firm dimensions. ***, **, * indicate significance at the 1%, 5% and 10% levels.

	ΔCDS_{it}				
	(1)	(2)	(3)	(4)	(5)
r_{it}^E	-1.497***	-1.494***	-1.490***	-1.470***	-1.466***
	(-4.57)	(-4.57)	(-4.56)	(-4.46)	(-4.45)
Soc_{it-1}	-0.005	-0.008**	-0.011	-0.008**	-0.008
	(-1.35)	(-2.26)	(-0.83)	(-2.27)	(-0.93)
$r_{it}^E \times Soc_{it-1}$	0.012***	0.012***	0.012***	0.012***	0.012***
	(2.71)	(2.70)	(2.69)	(2.76)	(2.75)
$ClimateChangeExposure_{it}$	25.173	31.964	6.367	35.870	15.290
	(1.09)	(1.28)	(0.32)	(1.44)	(1.08)
$Leverage_{it}$	-0.000	-0.000	0.000	-0.000	0.000
	(-0.58)	(-0.84)	(0.13)	(-0.72)	(0.38)
$\Delta Treasury10Y_t$	0.534	0.531	0.252		
	(0.03)	(0.03)	(0.01)		
$\Delta Slope_t$	-2.332	-2.395	-2.195		
	(-0.13)	(-0.13)	(-0.12)		
ΔVIX_t	1.214***	1.213***	1.213***		
	(3.41)	(3.40)	(3.40)		
$\Delta CorpYieldSpread_t$	98.388***	98.398***	98.602***		
	(4.02)	(4.02)	(4.05)		
Observations	45101	45101	45101	45101	45101
R^2	0.163	0.164	0.171	0.228	0.234
Time FE	No	No	No	Yes	Yes
Industry FE	No	Yes	No	Yes	No
Firm FE	No	No	Yes	No	Yes

Table 5: Debt-to-Equity Sensitivity - Governance Score

This table presents coefficients of linear regressions of Equation 1. The dependent variable is ΔCDS_{it}, defined as the absolute weekly change in the 5Y CDS of firm i in week t measured in basis points. r^E_{it} is the equity return of firm i in week t (in %), and Gov_{it-1} is the governance rating of firm i available at time t (i.e. published in year $t-1$). The vector of control variables contains the Sautner et al. (2023) measure of climate change exposures, firm leverage, the change in the 10-year Treasury rate, the change in the slope of the Treasury curve, the change in the Moody's Seasoned Baa Corporate Bond Yield Spread, and the change in the VIX. Fixed effects are included as indicated. t-statistics are given in parentheses. Standard errors are clustered at the time and firm dimensions. ***, **, * indicate significance at the 1%, 5% and 10% levels.

	ΔCDS_{it}				
	(1)	(2)	(3)	(4)	(5)
r^E_{it}	-0.914***	-0.912***	-0.914***	-0.857**	-0.857**
	(-2.76)	(-2.76)	(-2.76)	(-2.60)	(-2.59)
Gov_{it-1}	-0.001	-0.001	-0.000	-0.000	0.004
	(-0.64)	(-0.69)	(-0.03)	(-0.27)	(0.79)
$r^E_{it} \times Gov_{it-1}$	0.003	0.003	0.003	0.003	0.003
	(0.55)	(0.54)	(0.55)	(0.52)	(0.52)
$ClimateChangeExposure_{it}$	25.667	32.825	7.252	36.975	16.526
	(1.10)	(1.30)	(0.38)	(1.46)	(1.20)
$Leverage_{it}$	-0.000	-0.000	0.000	-0.000	0.000
	(-0.53)	(-0.72)	(0.21)	(-0.62)	(0.48)
$\Delta Treasury10Y_t$	0.030	0.089	-0.159		
	(0.00)	(0.00)	(-0.01)		
$\Delta Slope_t$	-2.257	-2.382	-2.241		
	(-0.13)	(-0.13)	(-0.12)		
ΔVIX_t	1.111***	1.111***	1.111***		
	(3.14)	(3.13)	(3.14)		
$\Delta CorpYieldSpread_t$	95.712***	95.779***	95.938***		
	(3.97)	(3.98)	(4.00)		
Observations	45101	45101	45101	45101	45101
R^2	0.153	0.154	0.161	0.217	0.223
Time FE	No	No	No	Yes	Yes
Industry FE	No	Yes	No	Yes	No
Firm FE	No	No	Yes	No	Yes

Table 6: Debt-to-Equity Sensitivity: Pre- vs Post-2017

This table presents coefficients of linear regressions of Equation 1. The dependent variable is ΔCDS_{it}, defined as the weekly change in the 5Y CDS of firm i in week t measured in basis points. r_{it}^E is the equity return of firm i in week t (in %), and ESG_{it-1} is the ESG rating of firm i available at time t (i.e. published in year $t-1$). $Post2017$ is a dummy variable that equals one after 2017. The vector of control variables contains the Sautner et al. (2023) measure of climate change exposures, firm leverage, the change in the 10-year Treasury rate, the change in the slope of the Treasury curve, the change in the Moody's Seasoned Baa Corporate Bond Yield Spread, and the change in the VIX. Fixed effects are included as indicated. In Column (1) and Column (2), the sample is restricted to the time period before 2017. t-statistics are given in parentheses. Standard errors are clustered at the time and firm dimensions. ***, **, * indicate significance at the 1%, 5% and 10% levels.

	ΔCDS_{it}			
	(1)	(2)	(3)	(4)
r_{it}^E	-1.013***	-0.927***	-1.015***	-0.927***
	(-3.71)	(-3.48)	(-3.71)	(-3.48)
ESG_{it-1}	-0.003	-0.014	-0.003	-0.003
	(-0.73)	(-1.59)	(-0.71)	(-0.58)
$r_{it}^E \times ESG_{it-1}$	-0.001	-0.001	-0.001	-0.001
	(-0.27)	(-0.19)	(-0.27)	(-0.19)
$ClimateChangeExposure_{it}$	-14.848	-37.512	5.229	10.287
	(-1.29)	(-1.21)	(0.41)	(0.44)
$Leverage_{it}$	-0.000	0.000	-0.000	-0.000
	(-0.97)	(0.27)	(-1.17)	(-0.84)
$\Delta Treasury10Y_t$	54.623***		44.205***	
	(3.34)		(3.24)	
$\Delta Slope_t$	-53.083***		-40.409***	
	(-3.50)		(-3.28)	
ΔVIX_t	0.855*		1.024***	
	(1.79)		(2.91)	
$\Delta CorpYieldSpread_t$	151.695***		141.870***	
	(5.71)		(6.35)	
$Post2017$=1			0.030	0.000
			(0.06)	(0.00)
$Post2017$=1 $\times r_{it}^E$			-0.709*	-0.761**
			(-1.94)	(-2.12)
$Post2017$=1 $\times ESG_{it-1}$			-0.001	-0.004
			(-0.20)	(-0.63)
$Post2017$=1 $\times r_{it}^E \times ESG_{it-1}$			0.016***	0.016***
			(3.16)	(3.15)
Observations	94401	94401	141364	141364
R^2	0.154	0.223	0.154	0.224
Time FE	No	Yes	No	Yes
Industry FE	No	No	No	No
Firm FE	No	Yes	No	Yes

Table 7: Debt-to-Equity Sensitivity for 10Y CDS

This table presents coefficients of linear regressions of Equation 1. The dependent variable is ΔCDS_{it}, defined as the weekly change in the 10Y CDS of firm i in week t measured in basis points. r^E_{it} is the equity return of firm i in week t (in %), and ESG_{it-1} is the ESG rating of firm i available at time t (i.e. published in year $t-1$). The vector of control variables contains the Sautner et al. (2023) measure of climate change exposures, firm leverage, the change in the 10-year Treasury rate, the change in the slope of the Treasury curve, the change in the Moody's Seasoned Baa Corporate Bond Yield Spread, and the change in the VIX. Fixed effects are included as indicated. t-statistics are given in parentheses. Standard errors are clustered at the time and firm dimensions. ***, **, * indicate significance at the 1%, 5% and 10% levels.

	$\Delta 10YCDS_{it}$				
	(1)	(2)	(3)	(4)	(5)
r^E_{it}	-1.815***	-1.811***	-1.806***	-1.785***	-1.779***
	(-4.77)	(-4.76)	(-4.75)	(-4.67)	(-4.66)
ESG_{it-1}	-0.006	-0.009*	-0.022	-0.008*	-0.012
	(-1.16)	(-1.86)	(-1.40)	(-1.80)	(-1.30)
$r^E_{it} \times ESG_{it-1}$	0.016***	0.016***	0.016***	0.016***	0.016***
	(3.11)	(3.10)	(3.09)	(3.15)	(3.14)
$ClimateChangeExposure_{it}$	28.946	36.535	11.615	40.883	19.858
	(1.00)	(1.17)	(0.52)	(1.31)	(1.16)
$Leverage_{it}$	-0.000	-0.000	-0.000	-0.000	0.000
	(-0.22)	(-0.36)	(-0.15)	(-0.28)	(0.18)
$\Delta Treasury10Y_t$	-3.245	-3.234	-3.702		
	(-0.17)	(-0.17)	(-0.19)		
$\Delta Slope_t$	-3.514	-3.605	-3.157		
	(-0.18)	(-0.18)	(-0.16)		
ΔVIX_t	1.136***	1.137***	1.136***		
	(3.00)	(3.00)	(2.99)		
$\Delta CorpYieldSpread_t$	97.419***	97.488***	97.702***		
	(3.91)	(3.91)	(3.94)		
Observations	39767	39767	39767	39767	39767
R^2	0.148	0.149	0.155	0.208	0.215
Time FE	No	No	No	Yes	Yes
Industry FE	No	Yes	No	Yes	No
Firm FE	No	No	Yes	No	Yes

Table 8: Debt-to-Equity Sensitivity: Free Floating versus Locked-up Stocks

This table presents coefficients of linear regressions of Equation 1. The dependent variable is ΔCDS_{it}, defined as the weekly change in the 5Y CDS of firm i in week t measured in basis points. r^E_{it} is the equity return of firm i in week t (in %), and ESG_{it-1} is the ESG rating of firm i available at time t (i.e. published in year $t-1$). $D(FreeFloating)$ is a dummy variable that equals one if a firm has a large share of free floating stocks (above the $25th$ percentile). The vector of control variables contains the Sautner et al. (2023) measure of climate change exposures, firm leverage, the change in the 10-year Treasury rate, the change in the slope of the Treasury curve, the change in the Moody's Seasoned Baa Corporate Bond Yield Spread, and the change in the VIX. Fixed effects are included as indicated. t-statistics are given in parentheses. Standard errors are clustered at the time and firm dimensions. ***, **, * indicate significance at the 1%, 5% and 10% levels.

	ΔCDS_{it}				
	(1)	(2)	(3)	(4)	(5)
r^E_{it}	-0.504	-0.499	-0.496	-0.414	-0.410
	(-1.52)	(-1.50)	(-1.49)	(-1.20)	(-1.18)
ESG_{it-1}	-0.007**	-0.008***	0.006	-0.006**	0.015
	(-2.33)	(-3.42)	(0.38)	(-2.40)	(1.02)
$r^E_{it} \times ESG_{it-1}$	-0.002	-0.002	-0.002	-0.002	-0.002
	(-0.37)	(-0.38)	(-0.38)	(-0.44)	(-0.44)
$D(FreeFloating)$=1	0.099	0.095	0.000	0.231	0.000
	(0.37)	(0.35)	(0.00)	(0.98)	(0.00)
$D(FreeFloating)$=1 $\times r^E_{it}$	-1.448***	-1.450***	-1.448***	-1.513***	-1.511***
	(-2.64)	(-2.65)	(-2.64)	(-2.71)	(-2.71)
$D(FreeFloating)$=1 $\times ESG_{it-1}$	0.002	0.001	-0.029	-0.001	-0.029
	(0.47)	(0.18)	(-1.60)	(-0.30)	(-1.57)
$D(FreeFloating)$=0 $\times r^E_{it} \times ESG_{it-1}$	0.000	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)	(.)
$D(FreeFloating)$=1 $\times r^E_{it} \times ESG_{it-1}$	0.021**	0.021**	0.021**	0.022***	0.022**
	(2.57)	(2.57)	(2.56)	(2.62)	(2.61)
$ClimateChangeExposure_{it}$	27.608	35.138	8.260	38.999	16.453
	(1.17)	(1.37)	(0.43)	(1.52)	(1.16)
$Leverage_{it}$	-0.000	-0.000	0.000	-0.000	0.000
	(-0.66)	(-0.77)	(0.11)	(-0.59)	(0.31)
$\Delta Treasury10Y_t$	1.022	1.030	0.578		
	(0.06)	(0.06)	(0.03)		
$\Delta Slope_t$	-2.125	-2.194	-1.791		
	(-0.12)	(-0.12)	(-0.10)		
ΔVIX_t	1.220***	1.219***	1.218***		
	(3.40)	(3.39)	(3.39)		
$\Delta CorpYieldSpread_t$	98.307***	98.340***	98.483***		
	(4.01)	(4.01)	(4.05)		
Observations	45101	45101	45101	45101	45101
R^2	0.167	0.168	0.175	0.232	0.238
Time FE	No	No	No	Yes	Yes
Industry FE	No	Yes	No	Yes	No
Firm FE	No	No	Yes	No	Yes

Figure 1: Google Trends search patterns for the term "ESG rating" over the time period 2010 - 2019

This figure plots the global search interest for the term "ESG rating" over the time period 01.01.2010 - 31.12.2019, derived from Google Trends.

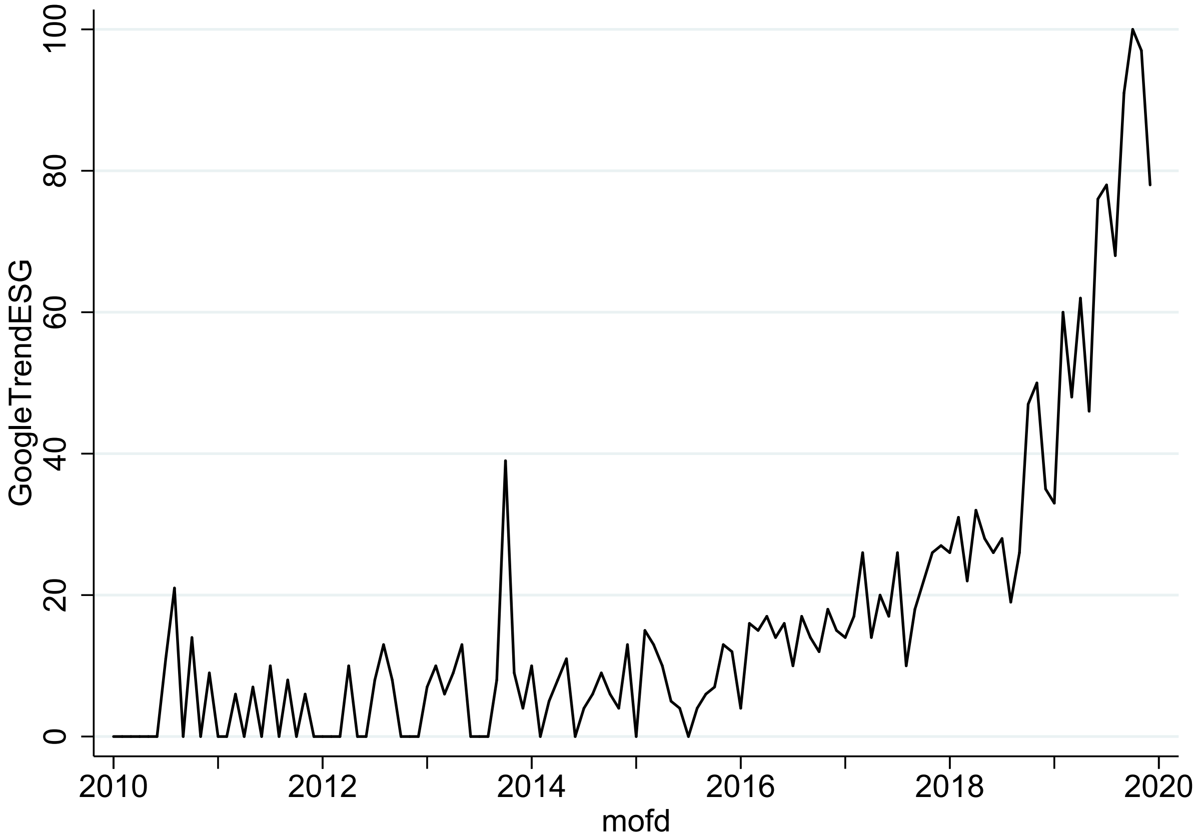

Figure 2: Interaction term $r^E_{it} \times ESG_{it-1}$ over time

This figure plots the coefficient of the interaction term $r^E_{it} \times ESG_{it-1}$ with the 90% confidence ban of a regression as in column (5) of Table 2 and described in Equation 1 using weekly data for one calendar year.