Is ESG a Sideshow? ESG Perceptions, Investment, and Firms' Financing Decisions *

Roman Kräussl[1], Joshua Rauh[2], and Denitsa Stefanova[3]

[1]*Bayes Business School (formerly Cass), Hoover Institution at Stanford University, and CEPR*

[2]*Stanford Graduate School of Business, Hoover Institution, and NBER*

[3]*Department of Finance, University of Luxembourg*

December 2024

ABSTRACT

We study the effects of market ESG perceptions, as proxied by ESG ratings, on public firms' security issuance and asset accumulation decisions. Higher ESG scores are followed by capital structure adjustments, specifically increases in equity issuance and decreases in net debt issuance of similar magnitude. These are driven completely by the "E" component of ESG. There are no effects of ESG assessments on capital expenditures or non-cash asset accumulation, supporting the hypothesis that ESG perceptions are a sideshow for capital investment. To address the endogeneity of firms' decisions to raise equity, we consider industry-wide rating changes and decompose the ESG ratings into an industry- and a firm-specific component. The response to the industry component of equity and debt issuance is highly significant, indicating that our findings are not explained by firms' decisions. As many ratings products use restated or backfilled ratings, our results focus on a point-in-time (PIT) ratings panel that we develop. We document that if using a standard ratings product instead of PIT data, researchers might falsely infer that higher ESG ratings lead to asset accumulation, due in particular to the use of restated ESG scores in standard ratings data products.

Keywords: Capital structure, equity issues, debt issues, ESG ratings.

JEL classification codes: G15, G31, G32, G34

*For comments and suggestions, we thank seminar and conference participants at Stanford University, Frankfurt School of Finance & Management, University of Amsterdam, the 7th Annual GRASFI Conference at Singapore Management University, the 2024 Exeter Sustainable Finance Conference, the 2024 Conference on Sustainable Finance at NEOMA Business School, and ICMAIF 2024. Denitsa Stefanova is supported by the Luxembourg National Research Fund (FNR), project code 16141291. Roman Kräussl (roman.kraussl@city.ac.uk). Joshua Rauh (rauh@stanford.edu). Denitsa Stefanova (denitsa.stefanova@uni.lu).

1. Introduction

The past decade has seen a rapid increase in investments in assets deemed as sustainable, usually defined as having positive environmental, social and governance (ESG) qualities. According to the United States Sustainable Investment Forum, US sustainable investments reached $8.4 trillion in 2022, and one recent report estimates that global ESG assets could reach $53 trillion globally by 2025 (European Commission, 2022). This increased interest in securities associated with firms that have certain sustainability characteristics suggests that such firms are experiencing a large increase in demand for their debt and equity securities, for reasons that may or may not reflect firms' financial fundamentals (Baker, Egan, and Sarkar, 2022).

Increased investor demand for stocks with better ESG properties versus others that have worse ESG properties but the same fundamentals could affect firms' financing and investment decisions. On the investment side, there are many theories that predict that an expansion of demand or increases in share prices not due to fundamentals would lead to an expansion of firm assets, and there are many settings in which this happens, particularly for financially constrained and equity-dependent firms (Baker, Stein, and Wurgler, 2003; Baker, 2009). However, modern corporate finance begins from the basic tenet that firms will accept all positive NPV projects and reject all negative ones, based on project-specific costs of capital (Modigliani and Miller, 1958). Under this logic, the ability to issue securities at a cost below the project-based cost of capital of new projects would not lead to asset accumulation by financially unconstrained firms. Morck, Shleifer, and Vishny (1990) famously asked whether the stock market was a sideshow for firm investment, and Blanchard, Rhee, and Summers (1993) found a limited role of market valuations conditional on fundamentals. This line of thinking emphasizes that firms do not have to invest in negative NPV projects in order to take advantage of overvalued equity, as they can issue equity and engage in financial transactions such as paying down debt or buying Treasury bills, consistent with empirical findings of firms exploiting fluctuations in equity market valuations in setting their leverage (Baker and Wurgler, 2002).

In this paper, we study whether the market's perception of a firm's ESG qualities affects total capital accumulation, or whether it is merely a sideshow for investment that might nonetheless affect a firm's financing decisions. To do this, we examine the effects of ESG ratings from leading ratings provider Refinitiv on firms' security issuance and asset accumulation decisions. We develop a dataset based on Refinitiv's point-in-time (PIT) ratings product that ensures that we are only considering ratings actually available to investors as of the time of financial decisions.

We test the effects that higher or lower ESG ratings have on firm equity and debt issuance decisions, as well as on valuation ratios (Tobin's Q) and on total capital. On the one hand, if an increase in ESG perception (and the individual "E", "S" and "G" components) shifts out the total available supply to a firm of investor capital, we would observe increased capital as long as the firm's demand for capital is not completely inelastic. On the other hand, such a change in capital availability does not change the opportunity cost of capital for a given project, so under the benchmark framework, there should be no increase in the firm's assets or overall capital. Berk and van Binsbergen (2023) find that strategies such as divestiture are unlikely even to have an impact on the cost of capital.

Our central finding is that higher ESG ratings and especially environmental scores (the "E" component of ESG) are followed by increases in equity issuance and decreases in net debt issuance of similar magnitude, a result that is robust to the simultaneous inclusion of both firm and industry-by-time fixed effects. There is no effect of ESG ratings on asset accumulation, nor is there an effect on capital expenditures. We find that "E" ratings changes also affect valuation as measured by Tobin's Q, suggesting that firms are exploiting higher non-fundamental equity valuations to rebalance their capital structures without increasing the firm's overall investment or capital. In other words, firms respond to the valuation effects of higher environmental ratings by shifting the firm's capital structure towards equity and away from debt, but not by increasing their non-cash assets. ESG is therefore a sideshow for corporate investment. This is what would be expected if the firms treated by ratings changes are financially unconstrained, taking all projects and only those projects that have positive NPV, while at the same time experiencing non-fundamental changes in the prices of the securities that they issue. We find that the "S" and "G" scores are not significantly associated with subsequent changes in either equity or debt issuance, or with asset accumulation.

To address the possibility that firms endogenously prepare for equity issues by altering their ESG properties in advance of such transactions, we make use of the fact that ratings adjustments have a significant industry component, one which our main specifications remove via industry-time fixed effects. In this alternative analysis, we observe Refinitiv's tendency to make systematic ratings changes that affect all firms in a given industry, without any specific changes undertaken by those firms, most likely reflecting changes in evolving ratings methodology. Decomposing ratings into an industry-specific component and a firm-specific component, we show that the responses of equity and debt issuance to the industry component are highly significant; when

Refinitiv makes changes in ratings that affect entire groups of firms at once, the capital structure adjustments are even stronger. This approach of course does not allow for the inclusion of industry-time fixed effects as in our main analysis, but it does demonstrate that to the extent that industry-wide ratings changes are the result of methodological changes or timing of such methodological changes unrelated to firm decisions, firms respond to these in the same way as in our baseline within-industry analysis, and on an even larger scale.

The use of scores that were actually available to investors as of the time of financial decisions is critical for valid inference. Standard ESG data products, including the standard product offered by Refinitiv that does not include point-in-time (PIT) ratings, have two drawbacks. First, as has been shown by Berg, Fabisik, and Sautner (2020), there are non-trivial instances of ex-post overwritten ratings in the standard Refinitiv database. Second, our comparison of the standard Refinitiv product to the Refinitiv PIT ratings illustrates that using the standard Refinitiv product will lead to an additional mistake of using ratings information that was not available to investors at all for a given firm-quarter. This is because it takes time for the ratings applicable to a given quarter to be generated by Refinitiv and made available to investors. We document false inferences that would have been made about capital raising if using the standard Refinitiv product instead of the PIT data. We show that restatements of past ESG ratings seem to occur specifically for growing firms and bias upward coefficients in the asset accumulation regressions. That is, the use of the standard product would lead to inference that assets grow upon an ESG score upgrade, and primarily because it includes different ratings than those that were available to investors at a given time.

This paper contributes to several areas of research on both corporate debt and equity structure as well as how both are influenced by ESG metrics. Primarily, the results of our paper contribute to a growing literature looking at how changes in ESG scores affect capital and debt structure specifically. Several studies have noted leverage effects of ESG score changes (Verwijmeren and Derwall, 2010; Bae, Kang, and Wang, 2011; Huang and Shang, 2019; Ho, Bai, Lu, and Qin, 2021; Asimakopoulos, Asimakopoulos, and Li, 2023). Several papers have also considered the impact of ESG on the cost of capital (Sharfman and Fernando, 2008; Menz, 2010; El Ghoul, Guedhami, Kwok, and Mishra, 2011; Oikonomou, Brooks, and Pavelin, 2014; Chava, 2014; Ng and Rezaee, 2015; Hasan, Hoi, Wu, and Zhang, 2017). Tao (2021) finds that CSR ratings reflect a higher capacity for firms to take on debt, similar to Adeneye, Kammoun, and Ab Wahab (2023). Similarly, high-governance firms are more likely to issue equity than debt (Akhtar, Akhtar, and Ye, 2017).

Berg, Kölbel, and Rigobon (2022) and Dimson, Marsh, and Staunton (2020) document substantial divergence of ESG scores across ratings providers. Berg, Heeb, and Kölbel (2024) study how ESG ratings impact fund holdings, stock returns, and firm behavior, finding that ratings effect ESG holdings by funds with an ESG mandate but not capital expenditures. Our paper considers the securities issuance decision and specifically how it responds to changes in ESG ratings that might change firms' access to capital. Beyond looking at the underlying theory of capital formation, the results also develop the firm-specific effects on capital formation. In particular, our study controls for other firm-level characteristics to assess what particular ESG qualities have on equity issuance, similar to the analysis Baker and Xuan (2016) perform on CEOs.

Our paper is not meant to imply that firm securities issuance in response to a supply shock would never impact asset growth. Indeed, there is substantial evidence from prior literature of a strong link between equity valuation levels and balance sheet growth, as well as evidence that financially constrained firms increase investment in response to cash shocks. However, in the setting of ESG, we find that ESG changes affect valuation and securities issuance, leading to firms issuing equity and retiring debt, but not to capital investment or non-cash asset accumulation.

This paper proceeds as follows. Section 2 explains our data and ESG scores. Section 3 presents our estimates of the impact of ESG ratings on firms' security issuance decisions using both PIT and static ESG information. Section 4 concludes.

2. Data

Our sample includes publicly-held U.S. and Canadian companies covered by Compustat North America with quarterly fundamentals history from 2017 until May 2023. The sample is restricted further to firms rated by Refinitiv on their environmental, social and governance performance, reflected in ESG scores that were published over that period.

2.1. ESG Ratings

For each firm in the sample, we obtain ESG scores from Refinitiv. Refinitiv publishes annual scores for the firms it covers. The overall ESG scores reflect the sustainability standing of a firm evaluated by Refinitiv for any given fiscal year. The scores measure a company's relative ESG performance within industry peer groups, based on company-reported data. The aggregate ESG ratings are obtained by aggregating environmental, social and governance pillar scores per company. Each of the pillar scores aggregates several sub-categories of scores. The environmental score reflects company's resource use, emissions, and innovation. The social score comprises

the categories human rights, workforce, community, and product responsibility. Management, shareholders and corporate social responsibility (CSR) strategy constitute the governance pillar score. Individual ESG metrics, ratios and analytics from company reporting are used to aggregate up to the different categories of scores. The data source for the ESG metrics are company reports as well as publicly available information, generated by the company.

Prior studies that rely on ESG ratings typically use a static snapshot of the time series of annual ESG ratings of firms as observed at the end of the sample period. However, Berg, Fabisik, and Sautner (2020) document that changes in the historical ESG ratings of firms are widespread and have significant implications on the relationship between firms' stock market performance and their ratings. While a positive and significant link between firms' stock market performance and their ESG scores exists in the static, restated data, no such relationship can be established when using the original ratings.

To address the issue of ESG score restatements, we use point-in-time (PIT) ESG analytics from Refinitiv that contain the complete history of ESG scores of firms, as they are originally reported and later restated over time. These restatements occur at a weekly frequency and concern not only the latest fiscal year but the entire history of ESG scores of any given firm. The restatement of a firm's score could be triggered by new information that becomes available about the firm. However, as scores are reported relative to an industry peer group, a restatement of one firm's score leads to readjustments of all scores within the industry group. ESG ratings are also backfilled, resulting in a retroactively extended ESG ratings coverage. The PIT dataset we use allows us to identify all restated and backfilled scores. It includes the entire history of all reported values by Refinitiv, time-stamped to the moment they were made available to the market. The rich PIT dataset allows us to be consistent with the investor information set in our analyses. We are able to trace back the ESG scores that were originally available to investors at a given point in time, and that are neither reclassified nor restated.

Using the high-frequency data, we develop a time series of quarterly PIT ESG ratings per company. The PIT dataset contains the full histories of ESG score updates per company and per fiscal year, as of the date that they are published and become available to investors. Let $PITscore_{i,FY_m,d}$ denote the ESG score for company i, corresponding to fiscal year FY_m, and published by Refinitiv at date d. To aggregate weekly score updates to a quarterly frequency, we proceed as follows: For each fiscal quarter-end q of year t, we set the quarterly ESG score $ESG_{i,t,q}$ equal to the latest available PIT score for company i for the most recent fiscal year FY_m, published on or before the

quarter-end q of year t:

$$\begin{aligned} ESG_{i,t,q} &= PITscore_{i,FY_m,d} \\ \text{s.t.} \quad FY_m &= max(FY_{i,t,d}) \end{aligned} \tag{1}$$

where $FY_{i,t,d}$ is the set of all fiscal years prior to and including year t for which there is a published ESG score for company i and the publication date d of that score is on or before quarter-end q of year t. Refinitiv would typically publish ESG scores for a new fiscal year after the release of companies' annual reports. Therefore, the quarter-end scores $ESG_{i,t,q}$ would typically reflect the PIT scores relative to fiscal year $t-1$ or even an earlier year. That delay in publishing the scores, however, has not always been uniform over the sample period. In 2017, the year when Refinitiv started reporting point-in-time data, the median company received a rating 234 days *after* the fiscal year-end, while 5% of the companies were rated a month before the fiscal year end. In 2020, however, the median company received a rating 140 days *before* its fiscal year end, suggesting that Refinitiv used information from quarterly reports to update the rating of the companies during the year. That pattern reverses again in 2021 when the median company receives a rating 120 days *after* its fiscal year-end, with the left end of the distribution still allowing for at least a month after the fiscal year-end before the rating becomes published. Regardless of this heterogeneity in the delay in publishing ESG scores, our quarterly measures $ESG_{i,t,q}$ are always consistent with the information set of investors at the end of quarter q of year t.

Refinitiv's ESG coverage spans fiscal years starting from 2002. However, PIT data for aggregate and category scores starts only in 2017. We therefore constrain the sample period to 2017—2022. Table 1 summarizes the changes in firms' quarterly ESG scores published over the years. With the exception of 2020, firms generally experience more upgrades than downgrades.

The Refinitiv ESG ratings we use in our analyses are percentile scores that measure a company's relative ESG performance, benchmarked against the industry group it belongs to. The ESG scores are constructed using a 'materiality' matrix that maps each sustainability metric or data point to an industry-specific weight. This matrix is meant to reflect differences in the relevance of sustainability metrics across industries. The level of company's disclosure (or the extent to which a company is transparent with respect to its ESG policies) also affects its ESG score. The extent to which reporting transparency is important is conditional on the 'materiality' of the ESG data points a company reports on. Not reporting on a 'material' data point negatively affects a company's ESG score, while failing to report on 'immaterial' data points has a negligible impact

on the score.

The relative weight of a data point is determined as its median value within an industry group relative to the sum of all industry group medians, given the latest data for all companies with ESG coverage. Therefore, the relative importance of ESG data points is time varying, reflecting updated company public disclosures. In addition, only large- and mid-cap companies are considered when calculating these relative weights, as small-cap companies tend to report less data. Data points with a yes/no input on the presence of a particular sustainability policy (e.g., 'Does the company have a water efficiency policy?') are assigned 'transparency weights'. These are meant to reflect the level of disclosure of each data point in a particular industry group.

According to the Refinitiv ESG methodology, a high ESG score of a company reflects a high relative ESG performance and a high degree of reporting transparency on company ESG policies. To obtain a company-level ESG score, a selection of 186 company-level data points are associated with industry-specific weights to compute 10 category scores that reflect a company's performance relative to industry peers on 10 dimensions of sustainability. These category scores are further combined to arrive to the three pillar scores that measure the environmental, social and governance performance of a company. The pillar scores and the aggregate ESG score are computed as weighted averages of the constituent category scores, where weights vary per industry and over time for the E and the S category scores, while for governance the weights remain the same across industries. For example, in 2021 the *Emissions* category score has the highest decile rank and corresponding weight towards calculating the overall ESG score (20%) for companies in the Coal industry group, while it has the lowest decile rank and a weight of 3% in the ESG score for companies in Software and IT services.

Figure 1 plots the average PIT ESG scores by industry group. Average ESG scores vary across industries. Interestingly, Utilities have the highest overall ESG score, while companies in the Education sector have the lowest. To understand whether the difference in overall scores can be attributed to the weighting scheme or to the level of the category scores, we decompose the difference in the ESG score into a component score and weight effects. Figure A.1 in the Appendix shows this decomposition for different pairs of industries. The difference in scores is overwhelmingly driven by differences in the levels of the category scores themselves, rather than by differences in their associated weights in the overall score.

The overall ESG score of a company aggregates its performance along the environmental, social and governance pillars. The relative weight of each pillar varies across industries and over

time. While Refinitiv reports PIT data for the overall ESG score and the ten category scores from 2017 onwards, this data is not available for the E, S and G pillar scores. Relative industry weights are also not reported. In order to supplement this data limitation, we obtain "synthetic" E, S and G scores as follows: We group all firm scores (that is, the overall ESG score and the ten category scores) into 501,666 date $\times$ industry $\times$ year-of-reporting groups. We then regress the ESG score on all ten of the category scores for each one of these groups in order to obtain category weights.[1] The estimated category weights are then used to calculate each pillar score (E, S and G).[2] The E score is obtained as a weighted average of the Emissions, Resource Use, and Innovation PIT category scores. The S score is obtained as a weighted average of the Community, Human Rights, Product Responsibility, and Workforce PIT category scores. The G score represents the weighted average of the Shareholders, CSR strategy, and Management PIT category scores.

Figure 2 plots the composition of the PIT E, S and G scores across industry groups, as well as the overall ESG components. The environmental component, for example, carries relatively higher weight for Utilities and Basic Materials, and lower weight for Financials, Healthcare, and Technology.

The ESG ratings represent a weighted average of ten individual component scores, where weights are industry-specific and vary over time. Therefore, the differences in ESG ratings across industries can be driven by the heterogeneity across category scores or can be attributed to differences in the industry-specific weighting schemes applied to those category scores. To understand the source of these differences, we decompose the difference in ESG ratings between two industries into a component score and weight effects. We calculate the average marginal effect that a difference in the component scores or a difference in weights might have, holding constant one or the other. We plot the decomposition of ESG score differences across industry pairs in Figure A.1. The differences in average ESG scores across industries are mainly driven by differences in average component scores rather than by differences in weights.

We report summary statistics of the ESG ratings and the E, S and G pillar scores in Table 2. The average ESG score across all companies in our sample is 0.45. The environmental pillar has a lower mean, at 0.37, while the governance score is 0.5 on average.

[1] Groups of ten firms or fewer are dropped. The regression both suppresses the constant and is constrained by the limitation that all coefficients (category weights) must sum to exactly 1

[2] The estimated category weights allow us also to obtain a "synthetic" ESG score. To test the validity of our inference, we regress the observed ESG score on this "synthetic" ESG score. Across all 63,793,180 daily observations in our data set, the beta on the "synthetic" ESG score is 1.000107 and is highly significant. The "synthetic" ESG score explains 99.98% of the variation in the reported ESG score. The mean absolute difference between the two ESG measures is 0.0018. The 1st percentile of the distribution of this difference is 0, and the 99th percentile is 0.034.

2.2. Equity Issues, Debt Issues, and Control Variables

We merge the quarterly ESG data from Refinitiv with the Compustat quarterly files. We connect the *Organization IDs* that Refinitiv uses to identify each firm i in its sample to Compustat's *gvkey* using companies' ISINs. For the cases where ISINs are not available, we supplement the merging procedure with fuzzy name matching based on company names in both datasets.

For each firm-quarter, we compute the following set of issuance metrics. In line with Baker and Xuan (2016), we compute *Equity Issuance* as quarterly changes in *External Equity*, scaled by Total Assets. *External Equity* is defined as *Book Equity* minus *Retained Earnings* (Compustat Fundamentals Quarterly item *req*). *Book Equity* is the sum of Total Assets (item *atq*) and Deferred Taxes (Compustat Quarterly balance sheet item *txdbq*) less the sum of Total Liabilities (item *ltq*) and Preferred Stock (item *pstkq*). We then scale the quarterly changes in *External Equity* by previous quarter's Total Assets. We further define *Debt Issuance* as the quarterly change in debt (defined as the sum of long-term debt (item *dlttq*) and debt in current liabilities (item *dlcq*)) net of cash, scaled by previous quarter's Total Assets. To measure the change in total supply of investor capital, we compute *Asset Growth* as the change in Total Assets, scaled by Total Assets in $q-1$. In our analyses, we use *Asset Growth* net of cash. Tobin's Q is defined as Total Assets A plus the market value of equity less the book value of equity, standardized by Total Assets A. The book value of equity is defined as A plus deferred taxes (item *txdbq*) less the sum of total liabilities (item *ltq*) and preferred stock (item *pstkq*).

In addition, we obtain a number of control variables. *Profitability* is defined as the ratio of operating income before depreciation (item *oibdpq*) and Total Assets A. Leverage is the ratio of debt and total assets. Summary statistics are reported in Table 2. Particularly relevant for our analyses are the distributions of equity issuance (mean = 0.0164, standard deviation = 0.0853), net debt issuance (mean = 0.0061, standard deviation = 0.0639), and ESG score (mean = 0.4519, standard deviation = 0.1936).

3. Discussion of Results

3.1. Equity and Debt Issuance and Point-in-Time ESG Ratings

To test whether higher ESG ratings contribute to more capital issued by firms, we consider quarterly changes in two issuance metrics, equity and debt issuance. We also consider asset growth and changes in Tobin's Q as left-hand side variables, and estimate the following specifi-

cation:

$$Issuance_{i,q} = a + bESG_{i,q-2} + cX_{i,q-1} + f_i + \delta_{j(i),q} + u_{i,q} \tag{2}$$

where the independent variable $ESG_{i,q}$ is the ESG score of firm i belonging to 2-digit SIC industry j, and observed at the end of quarter q.[3] We have suppressed the subscript t reflecting the corresponding fiscal year for ease of exposition. The control variables $X_{i,q}$ are firm profitability $(EBITDA/A_q)$, leverage (D/A_q), assets $(ln(A_q))$, and Tobin's Q. The regression includes the following two high-dimension group fixed effects: firm fixed effects f_i and industry-by-time fixed effects $\delta_{j(i)),q}$. All variables are winsorized at their 1% tails. Standard errors are adjusted for clustering at the firm and month level. We also estimate 3 other specifications, where we either drop all fixed effects, consider firm and year-month fixed effects, or 2-digit SIC industry and year-month fixed effects.

The E, S and G components of the aggregate ESG score are not necessarily aligned with each other and tend to display a substantial degree of disparity. The disparity across pillar scores may be reflected in differential outcomes relative to firms' capital raising. We thus consider the implications of each individual dimension of the ESG score on firms' financing decisions. We therefore estimate the following specification:

$$\begin{aligned} Issuance_{i,q} = a + b_1 E_{i,q-2} + b_2 S_{i,q-2} + b_3 G_{i,q-2} \\ + cX_{i,q-1} + f_i + \delta_{j(i),q} + u_{i,q} \end{aligned} \tag{3}$$

where $E_{i,q}$, $S_{i,q}$ and $G_{i,q}$ are the environmental, social and governance pillar score of firm i as of the end of quarter q.

We first focus on equity issuance as the dependent variable. The left-hand side variable $EquityIssuance_{i,j,q}$ is defined as the quarterly change in the book equity of firm i belonging to 2-digit SIC industry j minus the change in its retained earnings, standardized by its total assets as of the end of the previous quarter. Parameter estimates of the models in Eq. (2) and Eq. (3) are reported in Table 3.

In the cross-section (column (1)), the ESG rating available to investors by the end of the previous quarter is positively associated with next-quarter equity issuance. Within firms of the same industry (column (2)), the ESG rating coefficient loses its significance and magnitude, while re-

[3]Our main specifications use a two-quarter lag for the ESG rating to reflect information available to the firm and investors at the start of the previous quarter, though we also show robustness with respect to using a one-quarter lag for the ESG variable.

maining positive. The positive association retains its significance if we account for heterogeneity across firms and time. Within the firm, a unit increase of its ESG rating is associated with a subsequent increase in equity issuance by about a quarter standard deviation (column (3)). The result remains robust to the inclusion of industry-by-time fixed effects in addition to firm fixed effects (column (4)). These results imply that a one standard-deviation increase in the ESG score corresponds to 0.0042 and 0.0025 increases in equity issuance, which amount to approximately 5% and 3% respectively of a standard deviation of the outcome variable. As shown in columns (5) and (6), the effect of ratings on subsequent equity issuance decisions appears to be driven entirely by the E component. Decomposing the ESG rating into its environmental, social and governance components reveals a clear pattern. Firms with higher E scores engage significantly more in equity issuance, whereas S and G scores show no effects. Overall, we find consistent evidence that firms respond to positive changes in their ESG ratings, and the environmental component in particular, by issuing more equity.

Next, we consider changes in debt issuance following rating updates. We define debt issuance as the quarterly change in net debt, scaled by total assets as of the end of the previous quarter. Net debt is defined as the sum of long-term debt (Compustat item *dlttq*) and debt in current liabilities (item *dlcq*), net of cash. Table 4 presents the results from estimating the specifications in in Eq. (2) and Eq. (3). We find robust evidence of debt issuance being negatively associated with past ESG scores, even after including industry-by-month fixed effects (columns (3) and (4)). Columns (5) and (6) in Table 4 report the coefficient estimates of quarterly changes in net debt issuance on the firm's E, S and G pillar scores. The E score emerges as significantly and robustly negatively associated with changes in next quarter debt issuance. In line with our findings on equity issuance, changes in social and governance scores do not appear to be associated with subsequent changes in debt issuance.

The results for equity issuance in models with firm and industry-by-time fixed effects point to a positive correlation between issuance and firms' ESG ratings or their environmental component. These models also reveal a negative association between debt issuance and ratings. These results, which remain robust to the inclusion of high-dimension group fixed effects, are more likely consistent with our hypothesis of a change in firm capital structure rather than with an increase of the total supply of investor capital following an ESG ratings change. To test the hypothesis whether positive changes in scores are associated with a shift in investor capital, we estimate the specifications in Eq. (2) and Eq. (3) with the firm's asset growth as the dependent

variable. The latter is defined as quarterly changes in total assets, net of cash and scaled by lagged A.

Results of the asset growth specification are reported in Table 5. In the cross-section, asset growth appears to be negatively correlated with ESG ratings. Significance disappears, however, after adding firm fixed effects. Overall, we do not find support for the hypothesis that a higher ESG rating obtained in the previous quarter is associated with a shift in available investor capital.

The results we document for the pillar scores on equity and debt issuance are reflected in the outcome for firms asset growth. As reported in columns (5) and (6) of Table 5, and consistent with the results on the overall ESG ratings, there is no effect on firm's total assets. Receiving a higher environmental rating shifts firm's capital structure towards equity and away from debt, and has no overall effect on asset growth. The same holds for firms receiving a higher social or governance score. The results are robust to the inclusion of firm and industry-by-time fixed effects.

We further investigate whether changes in asset composition rather than changes in the level of net assets are associated with prior ESG ratings. We consider a decomposition of total assets into investments in property, plant and equipment (PP&E) and all other assets. Results are reported in Table A.5. Consistent with the overall asset growth result, changes in investments in PP&E are not associated with ESG ratings once firm, time or industry-by-time fixed effects are taken into account. The same holds for asset growth excluding these investments, indicating that changes in asset composition do not explain this result.

Similarly, capital expenditures are also not associated with the level of a firm's ESG rating in previous quarters. Table A.6 repeats the analysis with firms' capital expenditures scaled by total assets as the left-hand-side variable. Neither the ESG score nor any of its components shows a significant relationship with capital expenditures once the heterogeneity across firms and industries over time is taken into account. We also find no robust effects on firms' research and development (R&D) expenditures (Table A.7). Note that the lower observation count comes from considering only firms that report R&D. Similarly, selling, general and administrative (SG&A) expenditures do not appear to be robustly associated with a firm's ESG rating in previous quarters (see Table A.8).

The evidence we document suggests that market perceptions related to the ESG qualities of a firm do not affect the firm's capital accumulation. Rather, they have implications on the financing decisions of a firm. Following an increase in ESG ratings, firms rebalance their capital structures,

without increasing their overall capital.

Observing such effects naturally raises the question of whether firms exploit changes in equity valuations to shift their capital structures towards equity and away from debt. Depending on the speed with which firms engage in such capital structure arbitrage in response to ESG-driven valuation impacts, one might or might not expect to observe such valuation impacts in regression specifications. To investigate the effects of ESG ratings on valuation, we consider Tobin's Q as a left-hand-side variable in Eq. (2) and Eq. (3). Estimation results are reported in Table 6.

In the cross-section, high ESG ratings are associated with higher equity valuations as measured by Tobin's Q. The effect persists after accounting for heterogeneity across firms and industries. While the result for the overall ESG score is not robust to the inclusion of firm and industry-by-time fixed effects, environmental rating changes show a robust negative association with Tobin's Q in such models. Consistent with our previous findings, changes in the S and G scores do not affect valuation. Their loadings are negative and mostly imprecisely estimated. This evidence suggest that market's perceptions about the improved environmental performance of a firm, rather than other ESG aspects, have a positive effect on firm's valuation ratios, as represented by Tobin's Q.

Overall, we find no effect of ESG ratings on asset accumulation. Instead, firms appear to be exploiting increased asset valuations following ESG or E ratings changes to rebalance their capital structures, issuing equity and retiring debt. These changes are not accompanied by an increase in firm's overall investments or capital.

Our baseline analyses are conducted based on a two-quarter lag between the publication of ESG ratings and firms' issuance decisions. To test the robustness of our findings with respect to the choice of the lag structure, we conduct two sets of analyses. First, we re-estimate the specifications in Eq. (2) and Eq. (3) with one-quarter lags for the ESG ratings and the individual E, S and G scores. Results are reported in the Appendix. Tables A.1 through A.4 document results for equity, net debt issuance, net asset growth and Tobin's Q. Our findings remain largely unchanged. Changes in ESG ratings and their environmental component are associated with subsequent shifts in the capital structure rather than an increase in firm's capital. The valuation effects also remain unchanged at a one-quarter lag.

Second, we augment our baseline specification with multiple lags of the ESG variables or their E, S and G components. In addition to the two-quarter lag, we include four-, six- and eight-quarter lags in Eq. (2) and Eq. (3). Estimates for the ESG ratings are reported in Table A.9.

The inclusion of multiple lags of the ESG rating does not change our baseline findings. An ESG ratings increase two quarters prior to issuance decisions is associated with a subsequent shift in the capital structure of the firm towards equity and away from debt (Panels A and B of Table A.9). We find no effect of lagged ESG ratings on asset accumulation (Panel C) or firm valuation ratios (Panel D), in line with our baseline findings.

Table A.10 reports the results for multiple lags of the E component of the rating. The inclusion of lags up to two years leads to similar findings: Firms retire debt and issue more equity following an improvement in market's perceptions of a firm's environmental standing. It takes longer, however, relative to changes in the overall ESG rating for a significant effect of an E improvement on issuance decisions to take place. It takes a year for changes in environmental ratings to be reflected in firms' equity and debt issuance (Panels A and B). Improved environmental qualities of firms as seen by the market also affect firm valuation ratios. Significance is established at longer lags of the E variable, as six- and eight-quarter lags are associated with high Tobin's Q (Panel D). The lack of effect of environmental ratings on asset accumulation remains consistent across all lags of the variable up to two years (Panel C).

The results on asset growth that we have established so far measure asset accumulation as a quarterly change in *net* assets. To evaluate the effect of firms' ESG properties, as perceived by the market, on firms' cash holdings, we estimate the models in Eq. (2) and Eq. (3) with quarterly changes in cash as the dependent variable. The results are presented in Table A.11. Interestingly, higher ESG ratings are associated with a subsequent increase in cash. This finding is consistent with the idea that firms exploit fluctuation in market valuations not by investing in negative NPV projects but rather by issuing equity and engaging in financial transactions, such as buying Treasury bills. Consistent with this result, the improvement in the perceived ESG standing of firms does not affect subsequent *gross* debt issuance, as reported in Table A.12, columns (1)–(4). Contrary to the overall ESG qualities of a firm, the E component does not have an effect on cash, but is significantly negatively associated with subsequent gross debt issuance. The S and G components even display a marginally significant relationship with gross debt issuance, which explains the lack of an effect for the overall ESG rating (columns (5) and (6) of Table A.12). Contrary to the results on gross debt, the ESG qualities of a firm and its perceived environmental standing in particular affect negatively firm's net debt issuance. This result remains robust to different model specifications or lag structures of ESG ratings.

Increased demand for the securities of firms that have certain sustainability characteristics

could lead to an increase in firms' equity issuance as information asymmetries are reduced once firms become ESG rated. To test that hypothesis, we consider the firm's ESG rating status as an independent variable in Eq. (2). It takes the value of one if a firm is rated by Refinitiv and zero otherwise. To determine the start of a firm's ESG rating history, we use the date at which PIT ESG scores are published and hence become available to investors. Table A.16 reports the results for equity issuance (columns 1-2), net debt issuance (columns 3-4), net asset growth (columns 5-6) and Tobin's Q (columns 7-8). Across all specifications, firms' ESG rating status does not display any significant association with subsequent equity issuance. Firms that have received an ESG rating do not appear to issue more equity two quarters later. Net debt issuance, however, increases significantly two quarters after a firm receives its first ESG rating.

3.2. Capital Raising and ESG Ratings in Different Time Periods

In the following, we analyze time variations in the relationship between lagged ESG scores and subsequent equity issuance, net debt issuance, asset accumulation and firm valuation ratios. Figure 3a reports the point estimates of the year–ESG score interaction coefficients in the equity and debt issuance regressions. We note that in general, over the years, firms with a higher ESG score appear to engage significantly more in equity issuance. For net debt issuance, year interactions are negative and highly significant, with the exception of 2020. Consistent with our results on asset accumulation over the whole sample, firms that are perceived by the market as having good ESG performance do not accumulate more capital in any given year. In line with the results documented in Table 6, the overall ESG rating of a firm is generally not associated with higher firm valuation. The year 2022 is again an exception, where the ESG rating of a firm has a strongly significant effect on subsequent Tobin's Q.

The coefficient estimates of the E component over the years are plotted in Panel (b) of Figure 3a. Results are largely similar to those of the overall ESG rating. Our finding that firms with high environmental scores shift more into equity and away from debt, leaving total assets unchanged, is confirmed over the years. Figure 3b plots the year-to-year evolution of the E score coefficient estimates. With the exception of 2020, when equity and debt issuance lose significance, we observe a prevalent shift in capital structure from debt to equity for firms with higher E scores and no subsequent impact on asset growth.

3.3. Capital Raising and ESG Scores Across Industries

In this subsection, we investigate the extent to which our findings are occurring only within certain industries. We assign firms to three industry groups according to their SIC divisions: Manufacturing, Services and Transportation & Trade. Figure 4a plots the ESG score–industry interactions in our baseline regressions for equity and debt issuance, net asset growth and changes in Tobin's Q.

Manufacturing firms (which constitute the largest group in our sample) tend to issue significantly more equity and less debt following an increase in their ESG rating. A significant increase in equity issuance is also observed for firms in the Transportation & Trade group, while firms in Services retain a positive but imprecisely estimated interaction coefficient. The net debt issuance pattern is confirmed for the other two industry groups as well, with firms in Services showing a significant effect. Consistent with our baseline results, none of the industry groups shows a significant relationship between the ESG ratings of firms and their net asset growth or valuation ratio.

Figure 4b replicates to a large extent the industry-specific results for the E component. The equity issuance pattern is strongest for firms in Manufacturing, while firms in Services show the most pronounced negative effect of environmental scores on net debt issuance. Overall net asset growth remains unaffected by the E performance of firms across industries. Firms in Manufacturing and Transportation & Trade show a significant increase in Tobin's Q following an improvement in their environmental qualities as perceived by the market and reflected in their E scores.

3.4. Industry Decomposition of ESG Ratings

It may be that firms take action to improve their ESG ratings (e.g., by improving reporting on sustainability-related issues) in anticipation of security issuance. To address this concern, we decompose a firm's ESG and E ratings into industry-predicted and residual components, observing that there is a strong industry-specific component of ratings changes. To the extent that the industry-predicted component reflects changes in ratings methodologies as opposed to ESG fundamentals, it removes the component of ratings changes that is endogenous to firms' financing and investment decisions.

Specifically, each quarter, we regress firms' ESG (or E) ratings on a constant and a vector of industry dummies. We take Refinitiv's TRBC industry classification of 61 industry 6-digit group

codes, which is the industry classification used by Refinitiv to define industry peer groups when determining the relative importance of sustainability metrics to the ESG ratings of firms within the same industries. We obtain industry-predicted and residual ESG (E) rating components. Table A.13 presents the industry-months with the largest industry-clustered ratings changes, by ranking industry-months according to the average ESG rating change divided by its standard deviation. Table A.14 does the same for "E" ratings changes. Figures A.4 and A.5 illustrate the top four ratings downgrades and upgrades.

We then estimate the issuance regressions in Eq. (2) and Eq. (3), where the ESG and E ratings are replaced by their corresponding industry-predicted and residual components. Results are presented in Table 7. The table shows strong industry-component equity issuance coefficients of 0.0981 and 0.0386 for ESG and E respectively, compared to 0.0215 and 0.0141 in columns (3) and (5) of Table 3. Net debt and Tobin's Q coefficients also show a similar pattern to the baseline estimates, and with larger magnitude. To illustrate the economic magnitude, an ESG coefficient of 0.0981 implies that a one-standard deviation (0.1936) change in the ESG score would bring a change in equity issuance of 0.019 or approximately 22% of a standard deviation. Relative to the smaller standard deviation of the industry component of ESG only (0.0729), this amounts to approximately 8% of a standard deviation.

The fact that the magnitude of response is larger to changes that affect an entire industry group could reflect the approach that portfolio managers take to the ESG composition of their investments or their perceptions about the signal content of individual versus industry-clustered ratings. Finally, noting that many industry downgrades apparently occurred in 2020Q2, we repeat the analysis in Table A.15 excluding this quarter and find substantially similar results.

As this analysis relies on industry-level variation, it cannot include industry-time fixed effects and thus is subject to the possibility of industry-time shocks affecting both Refintiive ratings and issuance. We view it as complementary to our main results, which are estimated within industry-time cells and show statistically robust patterns of within-industry-time ratings changes on securities issuance decisions.

3.5. Static ESG Scores

In the results reported so far, we have characterized the ESG qualities of firms perceived by the market based on firms' ESG ratings as they become available to investors at the time of their financial decisions. Standard ESG datasets, including the standard ESG product of Refinitiv, do not include such PIT ratings. Rather, they provide a "current" snapshot of firms' ESG ratings

histories. However, using current ESG ratings histories would have two drawbacks. First, ratings tend to get restated over time, so that the ESG scores published in the current version of an ESG dataset would not reflect information on the ESG rating of a firm actually belonging to the investors' information set at the moment financing decisions are taken. Second, rating histories tend to get backfilled, leading to the retrospective inclusion of year-months of ESG scores. False inferences about firms' capital raising may result from such departures from the actual information set of investors.

Each year, firms receive ESG scores reflecting their most recent fiscal year end. However, part of the scores from previous fiscal years also get restated — partly because of company restatements or data collection errors. In Table 8, we document the extent of ESG score restatements in our sample. The ESG ratings of firms undergo retrospective changes that span a significant portion of their rating histories. The average length of updated ESG coverage across firms each year ranges between 6.7 and 8.6 years of score history being updated every year. It is not only the time span of coverage that gets updated on a continuous basis, but also the scores themselves. While some score restatements may be rather small, a non-negligible part of these restatements triggers a change in the score grade of the firm. Refinitiv associates 12 grade categories between A+ and D- to ESG scores ranging from 1 to 0. To appreciate the extent of score changes that trigger a category upgrade or downgrade, we report the number of upgrades and downgrades per company and per fiscal year, published each year. We define upgrades (downgrades) as an upwards (downwards) change in the ESG score that triggers a change in the score grade. Considering the full score histories published in any given year, the average number of restatements that take place in a given year and that result in an upgrade over the entire rating history of a firm ranges between 0.26 and 0.60. Downgrades take place at a similar rate. Significant changes in scores are about twice as likely when they concern the latest fiscal year, with upgrades being more frequent.

In the following, we document the implications of using the current snapshot of Refinitiv's ESG data. We consider two datasets. First, we take the ESG dataset of Refinitiv as of May 2023. The ESG score of a company for any given fiscal year is the latest published ESG score for that company for that fiscal year. In this "current" version of the ESG dataset, the ESG scores of a firm are the same across all the quarters of any fiscal year. Second, to isolate the effect of expanded backfilled coverage, we build a dataset, where we remove all year-months from the "current" data for which there is no coverage according to the PIT data. In this "current restricted" dataset,

ESG scores reflect all restatements, while any backfilled coverage is removed.

Results for the overall ESG scores are reported in Table 9 for equity issuance, net debt issuance, net asset growth and changes in Tobin's Q. Panel A reflects the results for the "current" dataset that includes both restated ESG scores and backfilled coverage. Panel B reports the results for the restricted "current" dataset where all backfilled year-months are removed. We also report the results of estimating the model in Eq. (3) for the individual E, S and G components of the rating in Table 10. For all issuance metrics, we report estimates obtained after the inclusion of firm and industry-by-time fixed effects.

Across both samples, we find that higher ESG scores are significantly associated with subsequent higher equity issuance. However, this result cannot be traced back to any of the individual component scores in the restated and backfilled sample. Removing the backfilled coverage results in significantly estimated positive association between both the E and the S score on equity issuance. The net debt issuance effect is significantly estimated in the backfilled and restated sample only. Interestingly, the backfilled sample reveals a significant and positive effect of ESG ratings on asset growth. The effect is attributed mostly to the social score of a firm, whereas firms with increased S ratings are significantly associated with asset accumulation. Asset valuations also exhibit a positive association with ESG ratings in the backfilled and restated sample, contrary to our PIT result.

We also consider the implications of receiving an ESG score in the backfilled sample. We estimate a version of the model in Eq. (2), where instead of the ESG score we use a dummy variable to define the ESG rating status of a firm. That variable takes the value one if a firm is rated and zero otherwise. Table A.17 reports the results for equity issuance, net debt issuance, net asset growth and changes in Tobin's Q. In the "static" dataset, to determine the start of a firm's ESG rating history, we use the first quarter of the fiscal year for which ESG scores are available. The variable *ESG Rated* takes the value of one if the firm has a rating in any given year-quarter as of May 2023, and zero otherwise. Across all specifications within firm and industry-by-year cells, having an ESG rating is not significantly associated with higher subsequent equity and debt issues, as well as net asset growth. Instead, rated firms have consistently and significantly higher valuations as captured by Tobin's Q.

4. Conclusion

This paper investigates the effects of ESG ratings on firms' security issuance decisions. We develop a dataset based on Refinitiv's point-in-time (PIT) ratings product that ensures we are

only considering ratings available to investors as of the time of financial decisions. We document false inferences about asset growth that would have been made about capital raising if using the standard Refinitiv product instead of the PIT data, which are primarily driven by the fact that the coverage of the standard Refinitiv dataset extends ratings back to time periods when investors did not actually have the information available in the scores.

We find that higher environmental scores shift the firm's capital structure towards equity and away from debt, but not that greater investor capital supply leads to increased total capital in equilibrium. Separately, we find that governance and social scores are not significantly associated with subsequent changes in either equity or debt issuance. Our findings are consistent with the hypothesis that changes in ESG scores neither affect a firm's opportunity cost of capital for new investment projects nor relax financing constraints, although firms behave as if the changes in ESG scores (particularly E scores) change the relative prices of issuing different types of securities.

Our findings are not meant to imply that firm securities issuance in response to a supply shock would never impact asset growth. However, in the setting of ESG, we find neither that ESG upgrades raise firm valuation ratios nor that they lead to balance sheet growth. Rather, they lead to firms issuing equity to reduce net debt.

References

Adeneye, Y. B., I. Kammoun, and S. N. A. Ab Wahab (2023): "Capital structure and speed of adjustment: the impact of environmental, social and governance (ESG) performance," *Sustainability Accounting, Management and Policy Journal*, 14(5), 945–977.

Akhtar, S., F. Akhtar, and Y. Ye (2017): "Does Corporate Governance Influence the Utilisation of Proceeds from External Financing? Evidence from Equity and Debt Issuance Activities," *Available at SSRN 2892500*.

Asimakopoulos, P., S. Asimakopoulos, and X. Li (2023): "The combined effects of economic policy uncertainty and environmental, social, and governance ratings on leverage," *The European Journal of Finance (forthcoming)*.

Bae, K.-H., J.-K. Kang, and J. Wang (2011): "Employee treatment and firm leverage: A test of the stakeholder theory of capital structure," *Journal of Financial Economics*, 100(1), 130–153.

Baker, M. (2009): "Capital Market-Driven Corporate Finance," *Annual Review of Financial Economics*, 1, 181–205.

Baker, M., M. Egan, and S. Sarkar (2022): "How Do Investors Value ESG?," *NBER Working Paper No. 30708*.

Baker, M., J. Stein, and J. Wurgler (2003): "When Does the Market Matter? Stock Prices and the Investment of Equity-Dependent Firms," *Quarterly Journal of Economics*, 118(3), 969–1006.

Baker, M., and J. Wurgler (2002): "Market Timing and Capital Structure," *The Journal of Finance*, 57(1), 1–32.

Baker, M., and Y. Xuan (2016): "Under new management: Equity issues and the attribution of past returns," *Journal of Financial Economics*, 121(1), 66–78.

Berg, F., K. Fabisik, and Z. Sautner (2020): "Is History Repeating Itself? The (Un)Predictable Past of ESG Ratings," *European Corporate Governance Institute – Finance Working Paper 708/2020*.

Berg, F., F. Heeb, and J. Kölbel (2024): "The Economic Impact of ESG Ratings," *available at SSRN 4088545*.

Berg, F., J. Kölbel, and R. Rigobon (2022): "Aggregate Confusion: The Divergence of ESG Ratings*," *Review of Finance*, 26(6), 1315–1344.

Berk, J., and J. van Binsbergen (2023): "The Impact of Impact Investing," *Available at SSRN 3909166*.

Blanchard, O., C. Rhee, and L. Summers (1993): "The Stock Market, Profit, and Investment," *The Quarterly Journal of Economics*, 108(1), 115–136.

Chava, S. (2014): "Environmental Externalities and Cost of Capital," *Management Science*, 60(9), 2223–2247.

Dimson, E., P. Marsh, and M. Staunton (2020): "Divergent ESG ratings," *The Journal of Portfolio Management*, 47(1), 75–87.

El Ghoul, S., O. Guedhami, C. C. Kwok, and D. R. Mishra (2011): "Does corporate social responsibility affect the cost of capital?," *Journal of Banking and Finance*, 35(9), 2388–2406.

European Commission (2022): "Final Report on Social Taxonomy," .

Hasan, I., C. K. Hoi, Q. Wu, and H. Zhang (2017): "Social Capital and Debt Contracting: Evidence from Bank Loans and Public Bonds," *The Journal of Financial and Quantitative Analysis*, 52(3), 1017–1047.

Ho, L., M. Bai, Y. Lu, and Y. Qin (2021): "The effect of corporate sustainability performance on leverage adjustments," *The British Accounting Review*, 53(5).

Huang, K., and C. Shang (2019): "Leverage, debt maturity, and social capital," *Journal of Corporate Finance*, 100(C), 26–46.

Menz, K. M. (2010): "Corporate Social Responsibility: Is it Rewarded by the Corporate Bond Market? A Critical Note," *Journal of Business Ethics*, 96(1), 117–134.

Modigliani, F., and M. H. Miller (1958): "The Cost of Capital, Corporation Finance and the Theory of Investment," *The American Economic Review*, 48, 261–297.

Morck, R., A. Shleifer, and R. Vishny (1990): "The Stock Market and Investment: Is the Market a Side Show?," *Journal of Finance*, 45(1), 31–48.

Ng, A., and Z. Rezaee (2015): "Business sustainability performance and cost of equity capital," *Journal of Corporate Finance*, 34(C), 128–149.

Oikonomou, I., C. Brooks, and S. Pavelin (2014): "The Effects of Corporate Social Performance on the Cost of Corporate Debt and Credit Ratings," *The Financial Review*, 49(1), 49–75.

Sharfman, M., and C. Fernando (2008): "Environmental Risk Management and the Cost of Capital," *Strategic Management Journal*, 29(6), 569–592.

Tao, R. (2021): "Do Companies Take Advantage of Lower Debt Costs from CSR Initiatives?," *Available at SSRN 3829740*.

Verwijmeren, P., and J. Derwall (2010): "Employee well-being, firm leverage, and bankruptcy risk," *Journal of Banking Finance*, 34(5), 956–964.

Table 1

Changes in ESG Ratings

This table summarizes the number of quarterly ESG rating upgrades and downgrades over the years. The first column reports the number of firms with at least one quarterly rating within any given year. *Upgrades* and *Downgrades* refer to changes in ESG ratings in excess of one standard deviation ($> \sigma$) or two standard deviations ($> 2\sigma$) of ESG, E, S or G ratings calculated each year.

	NbFirms	Upgrades ($> \sigma$)	Downgrades ($> \sigma$)	Upgrades ($> 2\sigma$)	Downgrades ($> 2\sigma$)
Panel A. ESG Ratings					
2017	1069	212	65	80	18
2018	2141	415	334	230	135
2019	2283	451	380	243	133
2020	2397	380	570	137	329
2021	2817	518	280	336	114
2022	2123	452	251	279	84
Panel B. E Ratings					
2017	1069	135	67	60	30
2018	2141	313	248	196	130
2019	2283	337	258	223	149
2020	2397	213	620	88	391
2021	2817	401	126	279	66
2022	2123	374	93	273	48
Panel C. S Ratings					
2017	1069	125	77	59	19
2018	2141	394	327	233	131
2019	2283	442	359	241	146
2020	2397	445	490	206	201
2021	2817	466	176	316	58
2022	2123	367	161	250	49
Panel D. G Ratings					
2017	1069	168	86	74	39
2018	2141	412	381	218	175
2019	2283	448	448	247	177
2020	2397	445	483	184	277
2021	2817	462	400	269	226
2022	2123	467	358	271	183

Table 2

Summary Statistics

This table summarizes quarterly equity and debt issuance as well as other quarterly financial variables and ESG scores for the firms in our sample for the period 2017—2023. *Equity Issuance* is defined as the quarterly change in *External Equity*, divided by Total Assets A. A is the Total Assets variable *atq* from Compustat Fundamentals Quarterly. *External Equity* is defined as *Book Equity* minus *Retained Earnings* (item *req*). *Book Equity* is the sum of Total Assets and Deferred Taxes (Compustat Quarterly balance sheet item *txdbq*) less the sum of Total Liabilities (item *ltq*) and Preferred Stock (item *pstkq*). *Net Debt Issuance* is the quarterly change in debt (defined as the sum of long-term debt (item *dlttq*) and debt in current liabilities (item *dlcq*)) net of cash, scaled by Total Assets. *Asset Growth* is the change in Total Assets, scaled by A. *Maket Value Change* is the quarterly change in the sum of *Total Assets* and *Market Equity* less *Book Equity*, scaled by previous quarter's *Total Assets*. The market value of equity is defined as the product of the end-of-quarter price (item *prccq*) and the end-of-quarter number of shares outstanding (item *cshoq*). *Profitability* is defined as the ratio of operating income before depreciation (item *oibdpq*) and Total Assets A. Q is defined as Total Assets A plus the market value of equity less the book value of equity, standardized by Total Assets A. The book value of equity is defined as A plus deferred taxes (item *txdbq*) less the sum of total liabilities (item *ltq*) and preferred stock (item *pstkq*). Leverage is the ratio of debt and total assets. *ESG score* is the PIT ESG score. *Environmental Score*, *Social Score* and *CorpGov Score* are the three pillar subscores. All variables are winsorized at the 1st and the 99th percentile.

	N	Mean	SD	Median	P25	P75
Equity Issuance	46,365	0.0164	0.0853	0.0018	-0.0024	0.0097
Debt Issuance	46,365	0.0095	0.0639	-0.0000	-0.0070	0.0104
Net Debt Issuance	46,365	0.0061	0.0901	0.0012	-0.0191	0.0279
Change in Cash	46,365	0.0039	0.0815	-0.0001	-0.0174	0.0144
Asset Growth	46,365	0.0232	0.1239	0.0070	-0.0208	0.0380
Asset Growth (excl. cash)	46,365	0.0169	0.0792	0.0060	-0.0123	0.0301
PP&E Growth	46,365	0.0055	0.0258	0.0006	-0.0029	0.0080
Assets Growth (excl.PP&E)	46,365	0.0235	0.4107	0.0032	-0.0212	0.0298
Capex	45,945	0.0259	0.0356	0.0146	0.0059	0.0321
Tobin's Q	46,365	2.3490	2.0269	1.6156	1.1414	2.7286
Profitability	46,365	0.0145	0.0525	0.0247	0.0085	0.0388
Leverage	46,365	0.3155	0.2262	0.3017	0.1422	0.4426
Assets	46,365	7.8576	1.7836	7.7700	6.6341	9.0289
ESG Score	46,365	0.4519	0.1936	0.4252	0.3017	0.5958
Environmental Score	46,365	0.3684	0.2701	0.3405	0.1486	0.5752
Social Score	46,365	0.4634	0.2123	0.4332	0.2952	0.6116
CorpGov Score	46,365	0.5029	0.2239	0.5065	0.3206	0.6844

Table 3

ESG Ratings and Equity Issuance

This table reports the results of a regression of quarterly equity issuance on firms' lagged ESG, E, S and G pillar ratings, and a set of controls. The environmental rating is obtained as a weighted average of the emissions, resource use, and innovation PIT category scores. The social rating is obtained as a weighted average of the community, human rights, product responsibility's, and workforce PIT category scores. The corporate governance rating represents the weighted average of the shareholders, CSR strategy, and management PIT category scores. *Equity Issuance* is defined as the quarterly change in book equity minus the change in retained earnings, divided by previous quarter's total assets. *ESG score* is the PIT ESG score of a firm observed at the start of each quarter. Controls include *Profitability*, *Leverage*, *Total Assets*, and *Q* at the end of quarter $q-2$. Standard errors clustered by firm and year-month are reported in parentheses. *,**, *** indicates significance at the 0.10, 0.05, and 0.01 level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
ESG	0.0065*	0.0047	0.0215***	0.0127**		
	(0.0036)	(0.0075)	(0.0072)	(0.0062)		
E					0.0141**	0.0112**
					(0.0059)	(0.0049)
S					-0.0008	-0.0034
					(0.0061)	(0.0057)
G					0.0014	0.0019
					(0.0031)	(0.0031)
Profitability	-0.4772***	-0.4455***	-0.1920***	-0.2325***	-0.1923***	-0.2324***
	(0.0301)	(0.0588)	(0.0413)	(0.0413)	(0.0412)	(0.0413)
Leverage	-0.0027	-0.0022	0.0643***	0.0678***	0.0650***	0.0682***
	(0.0031)	(0.0028)	(0.0092)	(0.0101)	(0.0092)	(0.0101)
Assets	-0.0031***	-0.0033***	-0.0605***	-0.0632***	-0.0600***	-0.0631***
	(0.0006)	(0.0010)	(0.0060)	(0.0065)	(0.0059)	(0.0064)
Q	0.0060***	0.0065***	0.0132***	0.0130***	0.0132***	0.0130***
	(0.0005)	(0.0015)	(0.0012)	(0.0012)	(0.0012)	(0.0012)
Fixed Effects						
Year-month	N	Y	Y	N	Y	N
Firm	N	N	Y	Y	Y	Y
2-digit SIC	N	Y	N	N	N	N
YrMth*SIC	N	N	N	Y	N	Y
N	46,365	46,364	46,278	45,691	46,278	45,691
adj.R^2	0.1371	0.1438	0.2267	0.2138	0.2266	0.2138

Table 4

ESG Ratings and Net Debt Issuance

This table reports the results of a regression of quarterly debt issuance on firms' lagged ESG, E, S and G pillar ratings, and a set of controls. The environmental rating is obtained as a weighted average of the emissions, resource use, and innovation PIT category scores. The social rating is obtained as a weighted average of the community, human rights, product responsibility's, and workforce PIT category scores. The corporate governance rating represents the weighted average of the shareholders, CSR strategy, and management PIT category scores. *Debt Issuance* is the quarterly change in debt (defined as the sum of long-term debt (item *dlttq*) and debt in current liabilities (item *dlcq*)) net of cash, scaled by previous quarter's *Total Assets*. *ESG score* is the PIT ESG score of a firm observed at the start of each quarter. Controls include *Profitability*, *Leverage*, *Total Assets*, and *Q* at the end of quarter $q-2$. Standard errors clustered by firm and year-month are reported in parentheses. *,**, *** indicates significance at the 0.10, 0.05, and 0.01 level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
ESG	-0.0045	-0.0040	-0.0203***	-0.0171***		
	(0.0051)	(0.0031)	(0.0055)	(0.0054)		
E					-0.0180***	-0.0132**
					(0.0067)	(0.0057)
S					0.0038	0.0001
					(0.0054)	(0.0059)
G					0.0011	-0.0003
					(0.0051)	(0.0041)
Profitability	-0.0928**	-0.1064***	0.0411	0.0480	0.0416	0.0478
	(0.0427)	(0.0369)	(0.0364)	(0.0365)	(0.0366)	(0.0365)
Leverage	-0.0067*	-0.0066	-0.1639***	-0.1608***	-0.1649***	-0.1613***
	(0.0035)	(0.0057)	(0.0172)	(0.0150)	(0.0171)	(0.0149)
Assets	-0.0003	-0.0001	0.0218***	0.0225***	0.0212***	0.0224***
	(0.0009)	(0.0007)	(0.0052)	(0.0053)	(0.0052)	(0.0053)
Q	-0.0015***	-0.0018*	-0.0090***	-0.0093***	-0.0090***	-0.0092***
	(0.0004)	(0.0011)	(0.0012)	(0.0012)	(0.0012)	(0.0012)
Fixed Effects						
Year-month	N	Y	Y	N	Y	N
Firm	N	N	Y	Y	Y	Y
2-digit SIC	N	Y	N	N	N	N
YrMth*SIC	N	N	N	Y	N	Y
N	46,365	46,364	46,278	45,691	46,278	45,691
adj.R^2	0.0045	0.0390	0.0862	0.0959	0.0863	0.0960

Table 5

ESG Ratings and Asset Growth (excl. Cash)

This table reports the results of a regression of quarterly asset growth on on firms' lagged ESG, E, S and G pillar ratings, and a set of controls. The E rating is obtained as a weighted average of the emissions, resource use, and innovation PIT category scores. The S rating is obtained as a weighted average of the community, human rights, product responsibility's, and workforce PIT category scores. The G rating represents the weighted average of the shareholders, CSR strategy, and management PIT category scores. *Asset Growth* is the quarterly change in *Total Assets*, net of cash and scaled by lagged A. Controls include *Profitability*, *Leverage*, *Total Assets*, and *Q* observed at the end of quarter $q-1$. Standard errors clustered by firm and year-month are reported in parentheses. *,**, *** indicates significance at the 0.10, 0.05, and 0.01 level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
ESG	-0.0226***	-0.0153***	-0.0060	-0.0072		
	(0.0045)	(0.0052)	(0.0053)	(0.0050)		
E					-0.0015	-0.0022
					(0.0044)	(0.0037)
S					-0.0022	-0.0066
					(0.0059)	(0.0056)
G					0.0013	0.0009
					(0.0043)	(0.0034)
Profitability	0.1076***	0.0831***	0.0620*	0.0033	0.0620*	0.0029
	(0.0172)	(0.0293)	(0.0366)	(0.0305)	(0.0366)	(0.0305)
Leverage	-0.0139***	-0.0129***	-0.0350**	-0.0241**	-0.0350**	-0.0242**
	(0.0029)	(0.0048)	(0.0145)	(0.0093)	(0.0145)	(0.0092)
Assets	0.0004	-0.0004	-0.0530***	-0.0516***	-0.0531***	-0.0516***
	(0.0006)	(0.0006)	(0.0058)	(0.0053)	(0.0058)	(0.0053)
Q	0.0055***	0.0055***	0.0081***	0.0076***	0.0081***	0.0076***
	(0.0005)	(0.0004)	(0.0007)	(0.0006)	(0.0007)	(0.0006)
Fixed Effects						
Year-month	N	Y	Y	N	Y	N
Firm	N	N	Y	Y	Y	Y
2-digit SIC	N	Y	N	N	N	N
YrMth*SIC	N	N	N	Y	N	Y
N	46,365	46,364	46,278	45,691	46,278	45,691
adj.R^2	0.0279	0.0672	0.1129	0.1586	0.1129	0.1586

Table 6

ESG Ratings and Tobin's Q

This table reports the results of a regression of quarterly Tobin's Q on firms' lagged ESG, E, S and G pillar PIT ratings, and a set of lagged controls. The environmental rating is obtained as a weighted average of the emissions, resource use, and innovation PIT category scores. The social rating is obtained as a weighted average of the community, human rights, product responsibility's, and workforce PIT category scores. The corporate governance rating represents the weighted average of the shareholders, CSR strategy, and management PIT category scores. Controls include *Profitability*, *Leverage*, and *Total Assets*. Standard errors clustered by firm and year-month are reported in parentheses. *,**, *** indicates significance at the 0.10, 0.05, and 0.01 level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
ESG	1.0721***	0.8951***	0.0777	0.0392		
	(0.2488)	(0.2857)	(0.1442)	(0.1364)		
E					0.4222***	0.3110**
					(0.1524)	(0.1276)
S					-0.1411	-0.0954
					(0.1406)	(0.1232)
G					-0.1509*	-0.1111
					(0.0784)	(0.0735)
Profitability	1.0258	2.6108	3.2967***	2.8687***	3.2855***	2.8716***
	(0.9947)	(2.6139)	(0.6196)	(0.5923)	(0.6117)	(0.5894)
Leverage	-0.2128	0.0725	-0.3897**	-0.2624	-0.3614**	-0.2492
	(0.2045)	(0.2330)	(0.1541)	(0.1646)	(0.1529)	(0.1642)
Assets	-0.3383***	-0.2689***	-0.7058***	-0.7285***	-0.6948***	-0.7255***
	(0.0358)	(0.0372)	(0.0979)	(0.0922)	(0.0959)	(0.0916)
Fixed Effects						
Year-month	N	Y	Y	N	Y	N
Firm	N	N	Y	Y	Y	Y
2-digit SIC	N	Y	N	N	N	N
YrMth*SIC	N	N	N	Y	N	Y
N	46,365	46,364	46,278	45,691	46,278	45,691
adj.R^2	0.0590	0.2018	0.8389	0.8436	0.8393	0.8438

Table 7

Industry Component of Ratings

This table reports the results of a regression of quarterly equity issuance, net debt issuance, asset growth (excl. cash) and Tobin's Q on firms' lagged ESG, E, S and G pillar ratings, and a set of controls. The industry and non-industry components of ESG (E) ratings are obtained from quarterly regressions of ESG (E) ratings on industry dummies. Industries are defined according to industry groups in the Refinitiv TRBC industry classification. ESG is the PIT ESG score of a firm observed at the start of each quarter. E is the corresponding environmental pillar score. Controls include *Profitability*, *Leverage*, *Total Assets*, and Q at the end of quarter $q-2$. Standard errors clustered by firm and year-month are reported in parentheses. *,**, *** indicates significance at the 0.10, 0.05, and 0.01 level, respectively.

	(1)	(2)	(3)	(4)
Panel A.	Equity Issuance		Net Debt Issuance	
ESG Industry Component	0.0981***		-0.0848***	
	(0.0227)		(0.0236)	
ESG Non-Industry Component	0.0103		-0.0108*	
	(0.0063)		(0.0056)	
E Industry Component		0.0386**		-0.0378**
		(0.0156)		(0.0149)
E Non-Industry Component		0.0051		-0.0107*
		(0.0040)		(0.0056)
N	46,278	46,278	46,278	46,278
adj.R^2	0.2275	0.2270	0.0867	0.0865
Panel B.	Asset Growth (Excl. Cash)		Tobin's Q	
ESG Industry Component	-0.0147		1.0668***	
	(0.0202)		(0.3787)	
ESG Non-Industry Component	-0.0047		-0.0672	
	(0.0051)		(0.1406)	
E Industry Component		0.0064		0.8609***
		(0.0113)		(0.3198)
E Non-Industry Component		-0.0045		0.2615**
		(0.0041)		(0.1203)
N	46,278	46,278	46,278	46,278
adj.R^2	0.1129	0.1129	0.8391	0.8395
Fixed Effects				
Year-month	Y	Y	Y	Y
Firm	Y	Y	Y	Y
2-digit SIC	N	N	N	N
YrMth*SIC	N	N	N	N

Table 8

Historical Changes of ESG Ratings

This table summarizes the updates in firms' ESG ratings and their coverage over the years. The first column refers to the year in which an ESG rating is published, regardless of the fiscal year it corresponds to. For each year, this table reports the number of firms for which at least one ESG rating was published or updated that year. *Coverage updates* represent the average number of years of ESG coverage across firms that is published each year. The table documents the number of ESG rating upgrades and downgrades that the average firm receives each year over its entire ESG ratings history. *Upgrades* (*Downgrades*) refer to substantial upward (downward) changes in ESG ratings that trigger a change in categorical scores. The last two columns report the number of upgrades (downgrades) of ESG ratings relative to the past fiscal year that the average firm receives each year.

Year	Nb firms	Coverage updates (yrs)	Upgrades (per year)	Downgrades (per year)	Upgrades FY(t-1)	Downgrades FY(t-1)
2017	2,256	6.7	0.26	0.35	0.39	0.45
2018	2,484	7.8	0.30	0.25	0.50	0.39
2019	2,606	8.5	0.26	0.23	0.51	0.51
2020	3,116	8.1	0.60	0.67	0.91	1.00
2021	3,514	7.5	0.47	0.35	1.18	1.04
2022	3,531	7.1	0.26	0.22	0.65	0.50

Table 9

Inferences If Using Firms' Restated and Backfilled ESG Ratings

This table reports the regression results of quarterly issuance on lagged ESG ratings and a set of controls including *Profitability*, *Leverage*, *Total Assets* and *Q* at the end of quarter $q-2$. Columns (1) to (4) correspond to regressions of equity issuance, net debt issuance, and net asset growth and Tobin's Q. Panel A reports the results for ESG ratings in the current snapshot of the Refinitiv sample as of May 2023. Panel B reports results for ESG ratings of the current Refinitiv snapshot, constrained to mimic the availability of PIT scores for each year and quarter in the sample. All models include firm and year-month-by-industry fixed effects. Standard errors clustered by firm and year-month are reported in parentheses. *,**, *** indicates significance at the 0.10, 0.05, and 0.01 level, respectively.

	Equity Issuance	Debt Issuance	Assets excl. Cash	Tobin's Q
Panel A. Restated Ratings and Backfilled Coverage				
ESG Score	0.0309**	-0.0228**	0.0106	0.4050**
	(0.0143)	(0.0108)	(0.0088)	(0.1790)
Profitability	-0.5580***	0.2506***	0.0413	1.0520*
	(0.0436)	(0.0373)	(0.0249)	(0.5602)
Leverage	0.1296***	-0.2009***	-0.0327***	-0.1786
	(0.0144)	(0.0170)	(0.0078)	(0.1591)
Assets	-0.1029***	0.0528***	-0.0415***	-0.8356***
	(0.0122)	(0.0095)	(0.0039)	(0.0814)
Q	0.0281***	-0.0205***	0.0067***	
	(0.0024)	(0.0020)	(0.0005)	
N	61,382	61,382	61,382	61,382
adj.R^2	0.2790	0.0939	0.1444	0.7823
Panel B. Restated Ratings and Point-in-Time Coverage				
ESG Score	0.0249***	-0.0041	0.0164**	0.2705
	(0.0085)	(0.0087)	(0.0076)	(0.1702)
Profitability	-0.2324***	0.0495	0.0049	2.8640***
	(0.0414)	(0.0367)	(0.0304)	(0.5919)
Leverage	0.0678***	-0.1609***	-0.0241**	-0.2604
	(0.0102)	(0.0150)	(0.0093)	(0.1646)
Assets	-0.0637***	0.0222***	-0.0522***	-0.7331***
	(0.0065)	(0.0053)	(0.0054)	(0.0914)
Q	0.0130***	-0.0094***	0.0076***	
	(0.0012)	(0.0011)	(0.0006)	
N	45,590	45,590	45,590	45,590
adj.R^2	0.2144	0.0960	0.1591	0.8437
Firm FE	Y	Y	Y	Y
YrMth*2-dig SIC FE	Y	Y	Y	Y

Table 10

Firm's Restated ESG Pillar Ratings

This table reports the regression results of quarterly issuance on lagged E, S and G ratings and a set of controls including *Profitability*, *Leverage*, *Total Assets* and *Q* at the end of quarter $q-2$. Columns one to four correspond to regressions of equity issuance, net debt issuance, net asset growth and Tobin's Q. Panel A reports the results for ESG ratings in the current snapshot of the Refinitiv sample as of May 2023. Panel B reports results for ESG ratings of the current Refinitiv snapshot, constrained to mimic the availability of PIT scores for each year and quarter in the sample. All models include firm and year-month-by-industry fixed effects. Standard errors clustered by firm and year-month are reported in parentheses. *,**, *** indicates significance at the 0.10, 0.05, and 0.01 level, respectively.

	Equity Issuance	Debt Issuance	Assets excl. Cash	Tobin's Q
Panel A. Restated Ratings and Backfilled Coverage				
Environmental Score	0.0158	-0.0273***	-0.0175***	0.1404
	(0.0110)	(0.0101)	(0.0058)	(0.1414)
Social Score	0.0187	0.0138	0.0312***	0.2361
	(0.0135)	(0.0113)	(0.0086)	(0.1625)
CorpGov Score	-0.0010	-0.0101	-0.0033	0.1068
	(0.0095)	(0.0073)	(0.0041)	(0.1057)
N	61,382	61,382	61,382	61,382
adj.R^2	0.2791	0.0941	0.1448	0.7823
Panel B. Restated Ratings and Point-in-Time Coverage				
Environmental Score	0.0091*	-0.0142*	-0.0091	0.0280
	(0.0053)	(0.0072)	(0.0067)	(0.1311)
Social Score	0.0201**	0.0090	0.0271***	0.1121
	(0.0078)	(0.0065)	(0.0087)	(0.1721)
CorpGov Score	-0.0031	0.0017	-0.0007	0.1722*
	(0.0054)	(0.0055)	(0.0046)	(0.0961)
N	45,590	45,590	45,590	45,590
adj.R^2	0.2145	0.0961	0.1593	0.8437
Firm FE	Y	Y	Y	Y
YrMth*2-dig SIC FE	Y	Y	Y	Y

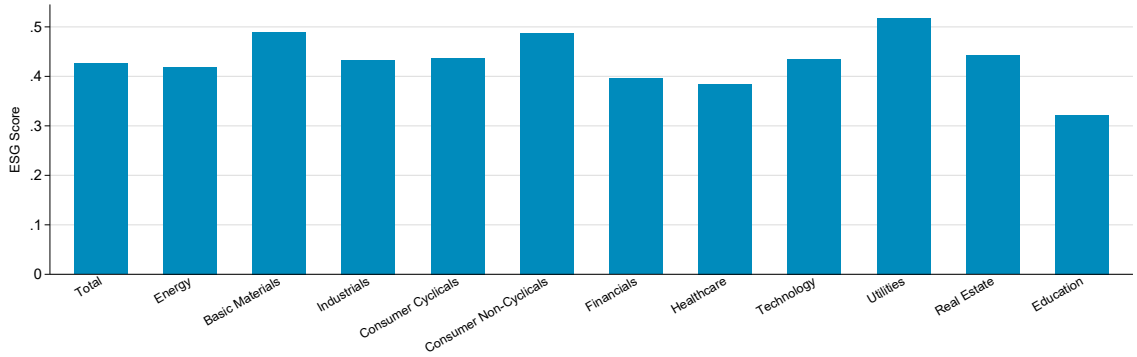


Figure 1

ESG Ratings by Industry Group

This figure plots average PIT ESG scores by Refinitiv industry groups. For each time t, we consider the latest available PIT score for a given company for the most recent fiscal year. The sample period spans 2017–2022.

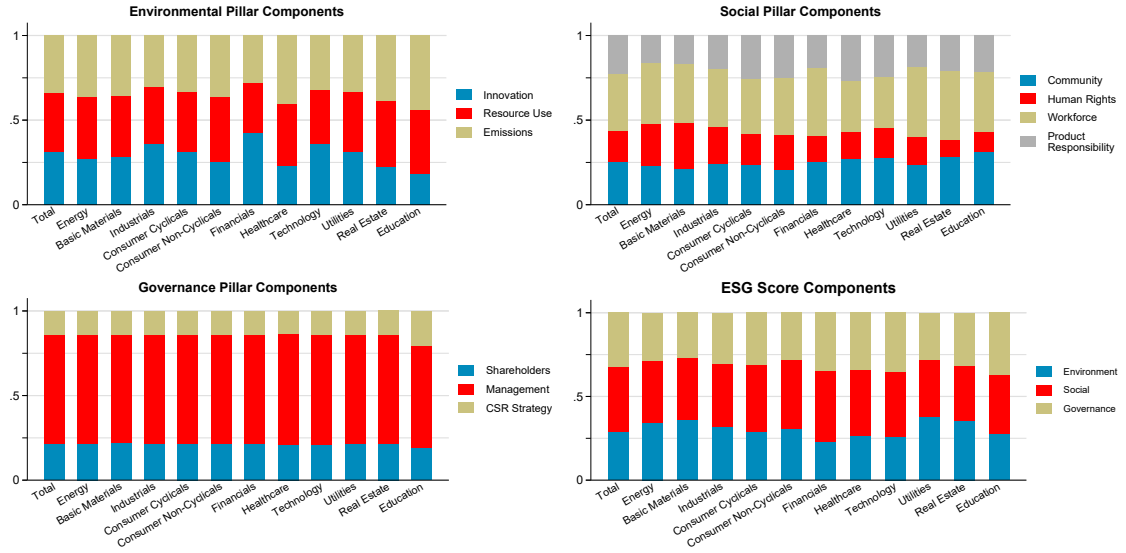
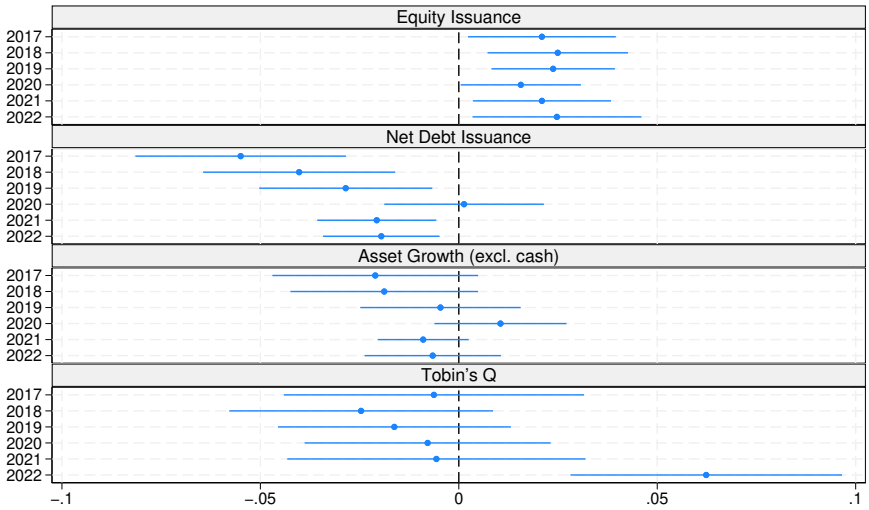


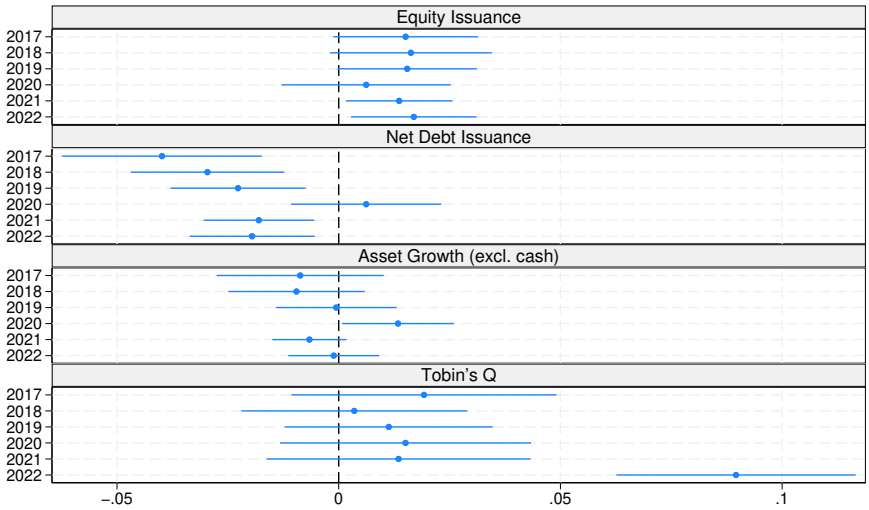
Figure 2

ESG Rating Composition by Industry Group

This figure plots the composition of the environmental, social and governance pillar scores, as well as the overall ESG score across industries. ESG pillar scores are obtained from PIT category scores by regressing the overall ESG score on the ten individual category scores for each unique fiscal year $\times$ industry $\times$ date group. The sample period covers 2017–2022.



(a) ESG Ratings

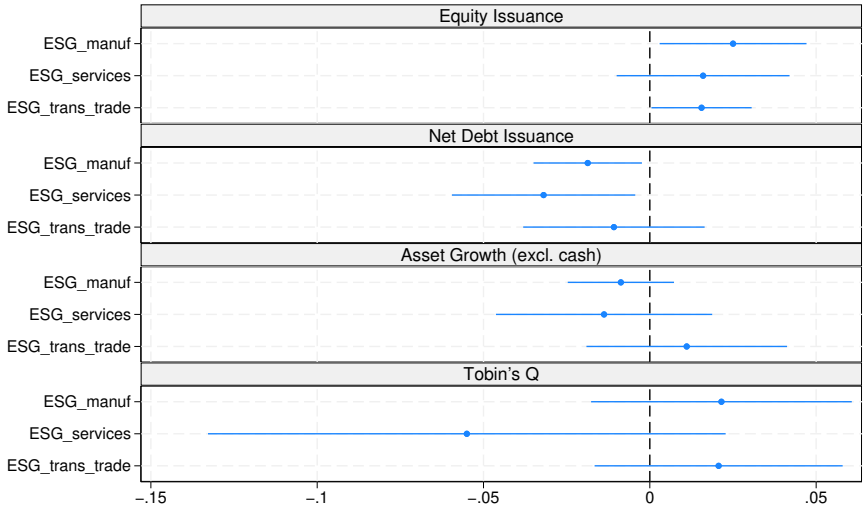


(b) Environmental Ratings

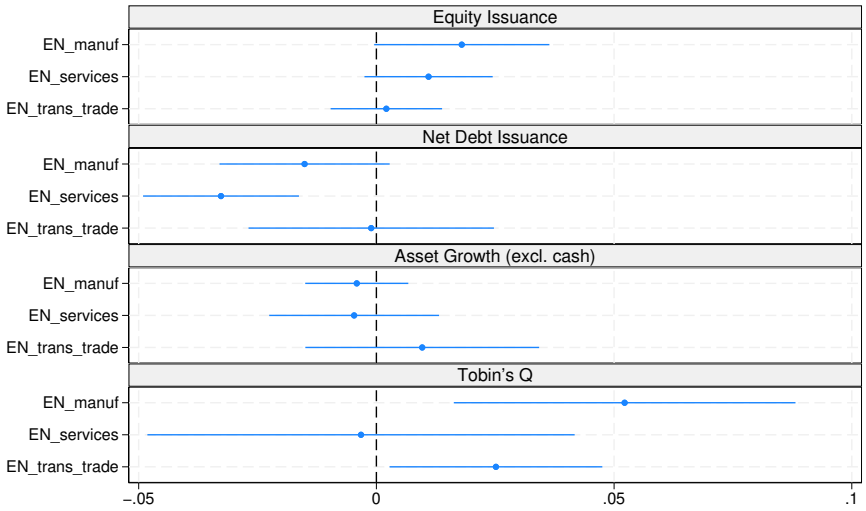
Figure 3

ESG Ratings and Issuance Over Time

The figure plots the year-to-year evolution of the point estimates of the ESG score coefficient (a) and the environmental score coefficient, and their corresponding 95% confidence intervals from our quarterly issuance regressions. The environmental score is obtained as a weighted average of firm's emissions, resource use, and innovation PIT category scores. The four panels in each subfigure correspond to the following three issuance variables: *Equity Issuance*, *Debt Issuance*, and *Asset Change* as well as *Tobin's Q*. The coefficient estimates in the Tobin's Q regression are divided by 10 to maintain the same scale as the estimates in the first three panels. *ESG score* is the point-in-time ESG score of a firm observed at the start of each quarter. Regressions include the following controls: *Profitability*, *Leverage*, *Total Assets* and *Q* observed at the end of the previous quarter. Standard errors are clustered by firm and year-month.



(a) ESG Ratings



(b) Environmental Ratings

Figure 4

ESG Ratings and Issuance Across Industries

This figure plots the point estimates (and the corresponding 95% confidence intervals) of the firms' ESG and E scores interacted with industry groups according to SIC divisions. Each panel includes the coefficient estimates corresponding to the regression models of *Equity Issuance*, *Debt Issuance*, *Asset Growth* and *Tobin's Q*. The coefficient estimates in the Tobin's Q regression are divided by 10 to maintain the same scale as the estimates in the first three panels. All regressions include the following controls: *Profitability*, *Leverage*, *Total Assets* and *Q* observed at the end of the previous quarter. Standard errors are clustered by firm and year-month.

Appendix

Table A.1

ESG Ratings and Equity Issuance (one-quarter lag)

This table reports the results of a regression of quarterly equity issuance on firms' lagged ESG, E, S and G pillar ratings, and a set of controls. The environmental rating is obtained as a weighted average of the emissions, resource use, and innovation PIT category scores. The social rating is obtained as a weighted average of the community, human rights, product responsibility's, and workforce PIT category scores. The corporate governance rating represents the weighted average of the shareholders, CSR strategy, and management PIT category scores. *Equity Issuance* is defined as the quarterly change in book equity minus the change in retained earnings, divided by previous quarter's total assets. *ESG score* is the PIT ESG score of a firm observed at the start of each quarter. Controls include *Profitability*, *Leverage*, *Total Assets* and *Q* at the end of quarter $q-2$. Standard errors clustered by firm and year-month are reported in parentheses. *,**, *** indicates significance at the 0.10, 0.05, and 0.01 level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
ESG	0.0048	0.0046	0.0184**	0.0139**		
	(0.0034)	(0.0072)	(0.0075)	(0.0069)		
E					0.0125**	0.0088*
					(0.0057)	(0.0046)
S					0.0019	0.0023
					(0.0058)	(0.0054)
G					0.0008	0.0026
					(0.0035)	(0.0034)
Profitability	-0.5032***	-0.4701***	-0.2225***	-0.2647***	-0.2223***	-0.2644***
	(0.0370)	(0.0628)	(0.0409)	(0.0404)	(0.0409)	(0.0404)
Leverage	-0.0029	-0.0024	0.0601***	0.0633***	0.0607***	0.0636***
	(0.0034)	(0.0034)	(0.0098)	(0.0110)	(0.0099)	(0.0111)
Assets	-0.0032***	-0.0035***	-0.0605***	-0.0634***	-0.0601***	-0.0633***
	(0.0006)	(0.0011)	(0.0068)	(0.0074)	(0.0068)	(0.0074)
Q	0.0066***	0.0071***	0.0139***	0.0135***	0.0139***	0.0135***
	(0.0006)	(0.0016)	(0.0013)	(0.0013)	(0.0013)	(0.0013)
Fixed Effects						
Year-month	N	Y	Y	N	Y	N
Firm	N	N	Y	Y	Y	Y
2-digit SIC	N	Y	N	N	N	N
YrMth*SIC	N	N	N	Y	N	Y
N	49,934	49,933	49,755	49,139	49,755	49,139
adj.R^2	0.1477	0.1562	0.2336	0.2234	0.2337	0.2233

Table A.2

ESG Ratings and Net Debt Issuance (one-quarter lag)

This table reports the results of a regression of quarterly debt issuance on firms' lagged ESG, E, S and G pillar scores, and a set of controls. The environmental rating is obtained as a weighted average of the emissions, resource use, and innovation PIT category scores. The social rating is obtained as a weighted average of the community, human rights, product responsibility's, and workforce PIT category scores. The corporate governance rating represents the weighted average of the shareholders, CSR strategy, and management PIT category scores. *Debt Issuance* is the quarterly change in debt (defined as the sum of long-term debt (item *dlttq*) and debt in current liabilities (item *dlcq*)) net of cash, scaled by previous quarter's *Total Assets*. *ESG score* is the PIT ESG score of a firm observed at the start of each quarter. Controls include *Profitability*, *Leverage*, *Total Assets* and *Q* at the end of quarter $q-2$. Standard errors clustered by firm and year-month are reported in parentheses. *,**, *** indicates significance at the 0.10, 0.05, and 0.01 level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
ESG	-0.0011	-0.0051*	-0.0146**	-0.0127**		
	(0.0047)	(0.0029)	(0.0065)	(0.0058)		
E					-0.0190***	-0.0131**
					(0.0068)	(0.0059)
S					0.0098*	0.0047
					(0.0056)	(0.0056)
G					-0.0015	-0.0023
					(0.0046)	(0.0039)
Profitability	-0.0697	-0.0843***	0.0626*	0.0739**	0.0631*	0.0739**
	(0.0464)	(0.0287)	(0.0349)	(0.0357)	(0.0349)	(0.0357)
Leverage	-0.0066*	-0.0072	-0.1538***	-0.1523***	-0.1548***	-0.1527***
	(0.0036)	(0.0054)	(0.0175)	(0.0157)	(0.0175)	(0.0157)
Assets	-0.0004	0.0001	0.0241***	0.0250***	0.0235***	0.0248***
	(0.0008)	(0.0007)	(0.0054)	(0.0057)	(0.0054)	(0.0057)
Q	-0.0019***	-0.0022*	-0.0095***	-0.0095***	-0.0094***	-0.0095***
	(0.0005)	(0.0012)	(0.0012)	(0.0011)	(0.0012)	(0.0011)
Fixed Effects						
Year-month	N	Y	Y	N	Y	N
Firm	N	N	Y	Y	Y	Y
2-digit SIC	N	Y	N	N	N	N
YrMth*SIC	N	N	N	Y	N	Y
N	49,934	49,933	49,755	49,139	49,755	49,139
adj.R^2	0.0035	0.0376	0.0769	0.0866	0.0771	0.0867

Table A.3

ESG Ratings and Asset Growth (excl. Cash, one-quarter lag)

This table reports the results of a regression of quarterly asset growth on on firms' lagged ESG, E, S and G pillar ratings, and a set of controls. The environmental rating is obtained as a weighted average of the emissions, resource use, and innovation PIT category scores. The social rating is obtained as a weighted average of the community, human rights, product responsibility's, and workforce PIT category scores. The corporate governance rating represents the weighted average of the shareholders, CSR strategy, and management PIT category scores. *Asset Growth* is the quarterly change in *Total Assets*, scaled by lagged A. Controls include *Profitability*, *Leverage*, *Total Assets* and Q at the end of quarter $q-2$. Standard errors clustered by firm and year-month are reported in parentheses. *,**, *** indicates significance at the 0.10, 0.05, and 0.01 level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
ESG	-0.0210***	-0.0144***	0.0003	-0.0013		
	(0.0044)	(0.0052)	(0.0053)	(0.0050)		
E					-0.0013	-0.0006
					(0.0047)	(0.0042)
S					0.0014	-0.0026
					(0.0061)	(0.0060)
G					0.0009	0.0016
					(0.0038)	(0.0034)
Profitability	0.1087***	0.0824***	0.0510	-0.0059	0.0511	-0.0061
	(0.0159)	(0.0277)	(0.0369)	(0.0307)	(0.0369)	(0.0308)
Leverage	-0.0141***	-0.0135***	-0.0314**	-0.0220**	-0.0315**	-0.0220**
	(0.0029)	(0.0048)	(0.0138)	(0.0092)	(0.0138)	(0.0092)
Assets	0.0002	-0.0006	-0.0494***	-0.0483***	-0.0494***	-0.0483***
	(0.0005)	(0.0006)	(0.0053)	(0.0050)	(0.0053)	(0.0050)
Q	0.0055***	0.0055***	0.0084***	0.0080***	0.0084***	0.0080***
	(0.0005)	(0.0004)	(0.0007)	(0.0007)	(0.0007)	(0.0007)
Fixed Effects						
Year-month	N	Y	Y	N	Y	N
Firm	N	N	Y	Y	Y	Y
2-digit SIC	N	Y	N	N	N	N
YrMth*SIC	N	N	N	Y	N	Y
N	49,934	49,933	49,755	49,139	49,755	49,139
adj.R^2	0.0280	0.0664	0.1121	0.1566	0.1121	0.1566

Table A.4

ESG Ratings and Tobin's Q (one-quarter lag)

This table reports the results of a regression of quarterly Tobin's Q on firms' lagged ESG, E, S and G pillar PIT ratings, and a set of lagged controls. Controls include *Profitability*, *Leverage* and *Total Assets*. Standard errors clustered by firm and year-month are reported in parentheses. *,**, *** indicates significance at the 0.10, 0.05, and 0.01 level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
ESG	1.1058***	0.9059***	0.1281	0.0699		
	(0.2397)	(0.2823)	(0.1379)	(0.1333)		
E					0.4044**	0.3047**
					(0.1547)	(0.1277)
S					-0.2000	-0.1447
					(0.1442)	(0.1236)
G					-0.1027	-0.0684
					(0.0745)	(0.0720)
Profitability	0.5407	2.1730	3.3812***	2.9701***	3.3694***	2.9694***
	(0.9499)	(2.5162)	(0.6070)	(0.5841)	(0.6001)	(0.5813)
Leverage	-0.2397	0.0420	-0.4014**	-0.2764*	-0.3757**	-0.2643
	(0.1992)	(0.2323)	(0.1548)	(0.1645)	(0.1531)	(0.1638)
Assets	-0.3444***	-0.2730***	-0.7109***	-0.7349***	-0.6982***	-0.7312***
	(0.0355)	(0.0373)	(0.0928)	(0.0873)	(0.0905)	(0.0864)
Fixed Effects						
Year-month	N	Y	Y	N	Y	N
Firm	N	N	Y	Y	Y	Y
2-digit SIC	N	Y	N	N	N	N
YrMth*SIC	N	N	N	Y	N	Y
N	49,934	49,933	49,755	49,139	49,755	49,139
adj.R^2	0.0637	0.2023	0.8313	0.8366	0.8317	0.8367

Table A.5

ESG Scores and Changes in Asset Composition: PP&E

This table reports the results of a regression of quarterly changes in investments in property, plant and equipment (PP&E) on lagged ESG, E, S and G pillar PIT ratings and a set of controls. PP&E growth is the quarterly change in PP&E, scaled by lagged A. The E rating is obtained as a weighted average of the emissions, resource use, and innovation PIT category scores. The S rating is obtained as a weighted average of the community, human rights, product responsibility's, and workforce PIT category scores. The G rating represents the weighted average of the shareholders, CSR strategy, and management PIT category scores. *ESG score* is the PIT ESG score of a firm observed at the start of each quarter. Controls include *Profitability*, *Leverage*, *Total Assets* and *Q* at the end of quarter $q-2$. Standard errors clustered by firm and year-month are reported in parentheses. *,**, *** indicates significance at the 0.10, 0.05, and 0.01 level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
ESG	-0.0071***	-0.0082***	0.0010	0.0006		
	(0.0023)	(0.0020)	(0.0018)	(0.0017)		
E					0.0007	-0.0003
					(0.0019)	(0.0014)
S					0.0016	0.0015
					(0.0017)	(0.0017)
G					-0.0006	-0.0006
					(0.0016)	(0.0010)
Profitability	0.0441***	0.0389**	0.0593***	0.0317***	0.0594***	0.0317***
	(0.0070)	(0.0151)	(0.0134)	(0.0112)	(0.0133)	(0.0112)
Leverage	-0.0045***	-0.0051***	-0.0233***	-0.0187***	-0.0233***	-0.0187***
	(0.0012)	(0.0009)	(0.0064)	(0.0043)	(0.0063)	(0.0043)
Assets	0.0000	-0.0001	-0.0102***	-0.0094***	-0.0102***	-0.0094***
	(0.0003)	(0.0002)	(0.0022)	(0.0017)	(0.0022)	(0.0017)
Q	0.0008***	0.0012***	0.0012***	0.0011***	0.0012***	0.0011***
	(0.0002)	(0.0003)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Fixed Effects						
Year-month	N	Y	Y	N	Y	N
Firm	N	N	Y	Y	Y	Y
2-digit SIC	N	Y	N	N	N	N
YrMth*SIC	N	N	N	Y	N	Y
N	46,365	46,364	46,278	45,691	46,278	45,691
adj.R^2	0.0141	0.1282	0.2132	0.2773	0.2132	0.2773

Table A.6

ESG Ratings and Changes in Asset Composition: Capital Expenditures

This table reports the results of a regression of quarterly capital expenditures scaled by *Total Assets* on lagged ESG, E, S and G pillar PIT ratings and a set of controls. The E rating is obtained as a weighted average of the emissions, resource use, and innovation PIT category scores. The S rating is obtained as a weighted average of the community, human rights, product responsibility's, and workforce PIT category scores. The G rating represents the weighted average of the shareholders, CSR strategy, and management PIT category scores. *ESG score* is the PIT ESG score of a firm observed at the start of each quarter. Controls include *Profitability*, *Leverage*, *Total Assets* and *Q* at the end of quarter $q-2$. Standard errors clustered by firm and year-month are reported in parentheses. *,**, *** indicates significance at the 0.10, 0.05, and 0.01 level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
ESG	-0.0090**	-0.0064	0.0022	-0.0011		
	(0.0034)	(0.0042)	(0.0024)	(0.0022)		
E					-0.0012	-0.0011
					(0.0026)	(0.0016)
S					0.0021	0.0011
					(0.0023)	(0.0016)
G					-0.0010	-0.0010
					(0.0013)	(0.0012)
Profitability	0.0990***	0.0736***	0.0259***	0.0134**	0.0260***	0.0134**
	(0.0126)	(0.0161)	(0.0096)	(0.0060)	(0.0096)	(0.0060)
Leverage	0.0032	0.0006	-0.0110***	-0.0054***	-0.0111***	-0.0054***
	(0.0020)	(0.0023)	(0.0022)	(0.0019)	(0.0022)	(0.0019)
Assets	0.0006	-0.0000	0.0002	-0.0010	0.0002	-0.0010
	(0.0004)	(0.0004)	(0.0010)	(0.0007)	(0.0010)	(0.0007)
Q	-0.0011***	0.0005*	0.0007***	0.0005***	0.0007***	0.0005***
	(0.0002)	(0.0003)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Fixed Effects						
Year-month	N	Y	Y	N	Y	N
Firm	N	N	Y	Y	Y	Y
2-digit SIC	N	Y	N	N	N	N
YrMth*SIC	N	N	N	Y	N	Y
N	45,947	45,946	45,854	45,259	45,854	45,259
adj.R^2	0.0414	0.3286	0.6861	0.7390	0.6862	0.7390

Table A.7

ESG Ratings and Changes in Asset Composition: R&D Expenditures

This table reports the results of a regression of quarterly R&D expenditures scaled by *Total Assets* on lagged ESG, E, S and G pillar PIT ratings and a set of controls. The E rating is obtained as a weighted average of the emissions, resource use, and innovation PIT category scores. The S rating is obtained as a weighted average of the community, human rights, product responsibility's, and workforce PIT category scores. The G rating represents the weighted average of the shareholders, CSR strategy, and management PIT category scores. *ESG score* is the PIT ESG score of a firm observed at the start of each quarter. Controls include *Profitability*, *Leverage*, *Total Assets* and *Q* at the end of quarter $q-2$. Standard errors clustered by firm and year-month are reported in parentheses. *,**, *** indicates significance at the 0.10, 0.05, and 0.01 level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
ESG	0.0247***	0.0187***	-0.0014	0.0001		
	(0.0028)	(0.0055)	(0.0026)	(0.0024)		
E					-0.0015	-0.0009
					(0.0019)	(0.0018)
S					0.0030	0.0027
					(0.0025)	(0.0025)
G					0.0011	0.0005
					(0.0012)	(0.0012)
Profitability	-0.3785***	-0.3179***	-0.1138***	-0.1141***	-0.1136***	-0.1140***
	(0.0140)	(0.0480)	(0.0144)	(0.0146)	(0.0144)	(0.0146)
Leverage	-0.0116***	-0.0064***	-0.0028	-0.0039	-0.0029	-0.0039
	(0.0022)	(0.0016)	(0.0034)	(0.0037)	(0.0034)	(0.0037)
Assets	-0.0036***	-0.0032***	-0.0087***	-0.0092***	-0.0088***	-0.0092***
	(0.0004)	(0.0007)	(0.0010)	(0.0011)	(0.0011)	(0.0011)
Q	0.0029***	0.0027***	0.0005*	0.0006*	0.0005*	0.0006*
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Fixed Effects						
Year-month	N	Y	Y	N	Y	N
Firm	N	N	Y	Y	Y	Y
2-digit SIC	N	Y	N	N	N	N
YrMth*SIC	N	N	N	Y	N	Y
N	24,576	24,575	24,500	24,054	24,500	24,054
adj.R^2	0.5771	0.6260	0.8659	0.8606	0.8659	0.8606

Table A.8

ESG Ratings and Changes in Asset Composition: SG&A Expenditures

This table reports the results of a regression of quarterly Selling, General and Administrative (SG&A) expenditures scaled by *Total Assets* on lagged ESG, E, S and G pillar PIT ratings and a set of controls. The E rating is obtained as a weighted average of the emissions, resource use, and innovation PIT category scores. The S rating is obtained as a weighted average of the community, human rights, product responsibility's, and workforce PIT category scores. The G rating represents the weighted average of the shareholders, CSR strategy, and management PIT category scores. *ESG score* is the PIT ESG score of a firm observed at the start of each quarter. Controls include *Profitability*, *Leverage*, *Total Assets* and *Q* at the end of quarter $q-2$. Standard errors clustered by firm and year-month are reported in parentheses. *,**, *** indicates significance at the 0.10, 0.05, and 0.01 level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
ESG	0.0301***	0.0270***	-0.0001	-0.0005		
	(0.0050)	(0.0055)	(0.0024)	(0.0022)		
E					-0.0007	-0.0007
					(0.0021)	(0.0018)
S					0.0022	0.0025
					(0.0019)	(0.0019)
G					-0.0009	-0.0016
					(0.0012)	(0.0012)
Profitability	-0.3411***	-0.3316***	-0.0654***	-0.0751***	-0.0653***	-0.0751***
	(0.0344)	(0.0544)	(0.0155)	(0.0174)	(0.0155)	(0.0174)
Leverage	-0.0002	0.0021	-0.0056	-0.0013	-0.0056	-0.0013
	(0.0039)	(0.0063)	(0.0037)	(0.0033)	(0.0036)	(0.0033)
Assets	-0.0106***	-0.0104***	-0.0215***	-0.0211***	-0.0216***	-0.0211***
	(0.0007)	(0.0010)	(0.0012)	(0.0012)	(0.0012)	(0.0012)
Q	0.0086***	0.0074***	0.0007**	0.0009**	0.0007**	0.0009**
	(0.0005)	(0.0006)	(0.0003)	(0.0003)	(0.0003)	(0.0004)
Fixed Effects						
Year-month	N	Y	Y	N	Y	N
Firm	N	N	Y	Y	Y	Y
2-digit SIC	N	Y	N	N	N	N
YrMth*SIC	N	N	N	Y	N	Y
N	40,520	40,519	40,439	39,840	40,439	39,840
adj.R^2	0.3947	0.5718	0.9310	0.9334	0.9310	0.9334

Table A.9

ESG Score Lags

This table reports the results of a regression of quarterly equity issuance (Panel A), net debt issuance (Panel B), asset growth excluding cash (Panel C) and Tobin's Q (Panel D) on firms' lagged ESG ratings, and a set of controls. *Equity Issuance* is defined as the quarterly change in book equity minus the change in retained earnings, divided by previous quarter's total assets. *Debt Issuance* is the quarterly change in debt (defined as the sum of long-term debt (item *dlttq*) and debt in current liabilities (item *dlcq*)) net of cash, scaled by previous quarter's *Total Assets*. *Asset Growth* is the quarterly change in *Total Assets*, scaled by lagged A. ESG_{q-k} is the PIT ESG score lagged by k quarters. Controls include *Profitability*, *Leverage*, *Total Assets* and Tobin's Q at the end of quarter $q-1$. Standard errors clustered by firm and year-month are reported in parentheses. *,**, *** indicates significance at the 0.10, 0.05, and 0.01 level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. Equity Issuance						
ESG_{q-2}	0.0215***	0.0127**	0.0306***	0.0200***	0.0271**	0.0180*
	(0.0072)	(0.0062)	(0.0091)	(0.0069)	(0.0120)	(0.0090)
ESG_{q-4}			-0.0061	-0.0037	0.0029	0.0069
			(0.0105)	(0.0088)	(0.0123)	(0.0112)
ESG_{q-6}					-0.0029	-0.0078
					(0.0099)	(0.0098)
ESG_{q-8}					-0.0039	0.0003
					(0.0122)	(0.0118)
N	46,278	45,691	39,457	38,930	27,725	27,313
adj.R^2	0.2267	0.2138	0.2207	0.2064	0.2076	0.1923
Panel B. Net Debt Issuance						
ESG_{q-2}	-0.0203***	-0.0171***	-0.0211***	-0.0160**	-0.0221**	-0.0148*
	(0.0055)	(0.0054)	(0.0070)	(0.0066)	(0.0093)	(0.0085)
ESG_{q-4}			-0.0055	-0.0102	-0.0117	-0.0172*
			(0.0079)	(0.0087)	(0.0097)	(0.0099)
ESG_{q-6}					0.0024	-0.0016
					(0.0133)	(0.0120)
ESG_{q-8}					0.0028	-0.0022
					(0.0117)	(0.0112)
N	46,278	45,691	39,457	38,930	27,725	27,313
adj.R^2	0.0862	0.0959	0.0826	0.0937	0.0844	0.0931
Fixed Effects						
Year-month	Y	N	Y	N	Y	N
Firm	Y	Y	Y	Y	Y	Y
YrMth*SIC	N	Y	N	Y	N	Y

Table A.9 Continued

	(1)	(2)	(3)	(4)	(5)	(6)
Panel C. Asset Growth (Excl. Cash)						
ESG_{q-2}	-0.0060	-0.0072	-0.0039	-0.0027	-0.0078	-0.0028
	(0.0053)	(0.0050)	(0.0072)	(0.0071)	(0.0088)	(0.0088)
ESG_{q-4}			-0.0034	-0.0087	-0.0025	-0.0079
			(0.0063)	(0.0062)	(0.0071)	(0.0056)
ESG_{q-6}					-0.0104	-0.0073
					(0.0100)	(0.0103)
ESG_{q-8}					0.0014	-0.0033
					(0.0107)	(0.0110)
N	46,278	45,691	39,457	38,930	27,725	27,313
adj.R^2	0.1129	0.1586	0.1223	0.1696	0.1347	0.1734
Panel D. Tobin's Q						
ESG_{q-2}	0.0777	0.0392	0.0006	-0.0358	0.0100	0.0036
	(0.1442)	(0.1364)	(0.1265)	(0.1212)	(0.1280)	(0.1216)
ESG_{q-4}			0.1975	0.1677	-0.0242	-0.0409
			(0.1535)	(0.1412)	(0.1658)	(0.1384)
ESG_{q-6}					0.2107	0.2582
					(0.2090)	(0.1798)
ESG_{q-8}					0.2426	0.1792
					(0.2133)	(0.2052)
N	46,278	45,691	39,457	38,930	27,725	27,313
adj.R^2	0.8389	0.8436	0.8527	0.8568	0.8752	0.8785
Fixed Effects						
Year-month	Y	N	Y	N	Y	N
Firm	Y	Y	Y	Y	Y	Y
YrMth*SIC	N	Y	N	Y	N	Y

Table A.10

Environmental Score Lags

This table reports the results of a regression of quarterly equity issuance (Panel A), net debt issuance (Panel B), asset growth excluding cash (Panel C) and Tobin's Q (Panel D) on firms' lagged E, S and G ratings, and a set of controls. *Equity Issuance* is defined as the quarterly change in book equity minus the change in retained earnings, divided by previous quarter's total assets. *Debt Issuance* is the quarterly change in debt (defined as the sum of long-term debt (item *dlttq*) and debt in current liabilities (item *dlcq*)) net of cash, scaled by previous quarter's *Total Assets*. *Asset Growth* is the quarterly change in *Total Assets*, scaled by lagged A. E_{q-k} is the PIT E score lagged by k quarters. Controls include *Profitability*, *Leverage*, *Total Assets* and Tobin's Q at the end of quarter $q-1$. Standard errors clustered by firm and year-month are reported in parentheses. *,**, *** indicates significance at the 0.10, 0.05, and 0.01 level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. Equity Issuance						
E_{q-2}	0.0141**	0.0112**	0.0057	0.0068	0.0052	0.0061
	(0.0059)	(0.0049)	(0.0072)	(0.0065)	(0.0061)	(0.0060)
E_{q-4}			0.0103	0.0037	0.0135***	0.0087*
			(0.0065)	(0.0058)	(0.0050)	(0.0048)
E_{q-6}					0.0059	0.0044
					(0.0070)	(0.0064)
E_{q-8}					-0.0011	-0.0012
					(0.0066)	(0.0059)
N	46,278	45,691	39,457	38,930	27,725	27,313
adj.R^2	0.2266	0.2138	0.2207	0.2063	0.2079	0.1923
Panel B. Net Debt Issuance						
E_{q-2}	-0.0180***	-0.0132**	-0.0064	-0.0041	-0.0066	-0.0033
	(0.0067)	(0.0057)	(0.0081)	(0.0071)	(0.0088)	(0.0081)
E_{q-4}			-0.0182**	-0.0144*	-0.0196**	-0.0174**
			(0.0081)	(0.0073)	(0.0074)	(0.0066)
E_{q-6}					-0.0135	-0.0138
					(0.0103)	(0.0097)
E_{q-8}					0.0096	0.0077
					(0.0107)	(0.0109)
N	46,278	45,691	39,457	38,930	27,725	27,313
adj.R^2	0.0863	0.0960	0.0829	0.0937	0.0854	0.0936
Fixed Effects						
Year-month	Y	N	Y	N	Y	N
Firm	Y	Y	Y	Y	Y	Y
YrMth*SIC	N	Y	N	Y	N	Y

Table A.10 Continued

	(1)	(2)	(3)	(4)	(5)	(6)
Panel C. Asset Growth (Excl. Cash)						
E_{q-2}	-0.0015	-0.0022	-0.0015	-0.0003	0.0010	0.0010
	(0.0044)	(0.0037)	(0.0046)	(0.0044)	(0.0044)	(0.0051)
E_{q-4}			-0.0001	-0.0039	0.0016	-0.0035
			(0.0057)	(0.0054)	(0.0065)	(0.0062)
E_{q-6}					-0.0045	-0.0052
					(0.0068)	(0.0062)
E_{q-8}					0.0006	-0.0020
					(0.0083)	(0.0078)
N	46,278	45,691	39,457	38,930	27,725	27,313
adj.R^2	0.1129	0.1586	0.1223	0.1696	0.1345	0.1733
Panel D. Tobin's Q						
E_{q-2}	0.4222***	0.3110**	0.0768	0.1126	0.0452	0.1262
	(0.1524)	(0.1276)	(0.1144)	(0.1021)	(0.1115)	(0.1012)
E_{q-4}			0.4522***	0.2340**	-0.0270	-0.0769
			(0.1291)	(0.1035)	(0.1284)	(0.1064)
E_{q-6}					0.4487***	0.2564***
					(0.1049)	(0.0920)
E_{q-8}					0.5478***	0.3854***
					(0.1301)	(0.1174)
N	46,278	45,691	39,457	38,930	27,725	27,313
adj.R^2	0.8393	0.8438	0.8533	0.8570	0.8765	0.8790
Fixed Effects						
Year-month	Y	N	Y	N	Y	N
Firm	Y	Y	Y	Y	Y	Y
YrMth*SIC	N	Y	N	Y	N	Y

Table A.11

ESG Ratings and Changes in Cash

This table reports the results of a regression of quarterly change in cash on firms' lagged ESG, E, S and G pillar ratings, and a set of controls. The E rating is obtained as a weighted average of the emissions, resource use, and innovation PIT category scores. The S rating is obtained as a weighted average of the community, human rights, product responsibility's, and workforce PIT category scores. The G rating represents the weighted average of the shareholders, CSR strategy, and management PIT category scores. *ESG score* is the PIT ESG score of a firm observed at the start of each quarter. Controls include *Profitability*, *Leverage*, *Total Assets* and *Q* at the end of quarter $q-2$. Standard errors clustered by firm and year-month are reported in parentheses. *,**, *** indicates significance at the 0.10, 0.05, and 0.01 level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
ESG	0.0028	0.0004	0.0222***	0.0161***		
	(0.0038)	(0.0038)	(0.0060)	(0.0054)		
E					0.0024	0.0004
					(0.0068)	(0.0052)
S					0.0048	0.0027
					(0.0047)	(0.0050)
G					0.0025	0.0046
					(0.0044)	(0.0039)
Profitability	0.0316	0.0240	-0.0926**	-0.1144***	-0.0927**	-0.1145***
	(0.0392)	(0.0244)	(0.0385)	(0.0390)	(0.0386)	(0.0391)
Leverage	-0.0021	-0.0066***	-0.0019	-0.0063	-0.0020	-0.0064
	(0.0026)	(0.0025)	(0.0064)	(0.0068)	(0.0063)	(0.0067)
Assets	-0.0000	-0.0002	-0.0554***	-0.0584***	-0.0552***	-0.0583***
	(0.0005)	(0.0003)	(0.0057)	(0.0062)	(0.0057)	(0.0062)
Q	0.0052***	0.0058***	0.0136***	0.0138***	0.0136***	0.0138***
	(0.0007)	(0.0015)	(0.0018)	(0.0018)	(0.0018)	(0.0018)
Fixed Effects						
Year-month	N	Y	Y	N	Y	N
Firm	N	N	Y	Y	Y	Y
2-digit SIC	N	Y	N	N	N	N
YrMth*SIC	N	N	N	Y	N	Y
N	46,365	46,364	46,278	45,691	46,278	45,691
adj.R^2	0.0172	0.0322	0.0743	0.0613	0.0740	0.0611

Table A.12

ESG Ratings and Debt Issuance

This table reports the results of a regression of quarterly gross debt issuance on firms' lagged ESG, E, S and G pillar scores, and a set of controls. The environmental score is obtained as a weighted average of the emissions, resource use, and innovation PIT category scores. The social score is obtained as a weighted average of the community, human rights, product responsibility's, and workforce PIT category scores. The corporate governance score represents the weighted average of the shareholders, CSR strategy, and management PIT category scores. *Debt Issuance* is the quarterly change in debt (defined as the sum of long-term debt (item *dlttq*) and debt in current liabilities (item *dlcq*)) net of cash, scaled by previous quarter's *Total Assets*. *ESG score* is the PIT ESG score of a firm observed at the start of each quarter. Controls include *Profitability*, *Leverage*, *Total Assets* and *Q* at the end of quarter $q-2$. Standard errors clustered by firm and year-month are reported in parentheses. *,**, *** indicates significance at the 0.10, 0.05, and 0.01 level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
ESG	-0.0018	-0.0042	0.0012	-0.0007		
	(0.0040)	(0.0031)	(0.0049)	(0.0042)		
E					-0.0158***	-0.0123***
					(0.0040)	(0.0035)
S					0.0075*	0.0015
					(0.0044)	(0.0043)
G					0.0043	0.0049*
					(0.0034)	(0.0027)
Profitability	-0.0208	-0.0421**	-0.0342*	-0.0439***	-0.0339*	-0.0443***
	(0.0151)	(0.0172)	(0.0191)	(0.0165)	(0.0189)	(0.0164)
Leverage	-0.0085**	-0.0130***	-0.1598***	-0.1594***	-0.1609***	-0.1599***
	(0.0034)	(0.0047)	(0.0154)	(0.0128)	(0.0153)	(0.0128)
Assets	-0.0003	-0.0003	-0.0320***	-0.0337***	-0.0323***	-0.0338***
	(0.0006)	(0.0004)	(0.0044)	(0.0041)	(0.0043)	(0.0041)
Q	0.0030***	0.0033***	0.0039***	0.0039***	0.0039***	0.0039***
	(0.0004)	(0.0004)	(0.0008)	(0.0008)	(0.0008)	(0.0008)
Fixed Effects						
Year-month	N	Y	Y	N	Y	N
Firm	N	N	Y	Y	Y	Y
2-digit SIC	N	Y	N	N	N	N
YrMth*SIC	N	N	N	Y	N	Y
N	46,365	46,364	46,278	45,691	46,278	45,691
adj.R^2	0.0124	0.0587	0.1301	0.1692	0.1307	0.1695

Table A.13

Industry ESG Rating Upgrades and Downgrades

This table reports the months with top industry ESG rating upgrades and downgrades. For every industry according to the Refinitiv TRBC industry classification and for every month, we obtain the average ESG rating changes of the firms in that industry with a fiscal quarter end in the corresponding month. The average industry rating change in any given month is divided by its standard deviation to obtain a ranking variable for the industry in that month. Panel A reports the top 20 industry ESG downgrades according to that ranking variable. Panel B reports the top 20 industry ESG upgrades.

Quarter	Industry Group	Mean ESG Rating	Stdev ESG Rating	Ranking variable	Nb firms
Panel A. Top Industry Downgrades					
30-Jun-20	Media & Publishing	-0.136	0.045	-2.993	42
30-Apr-20	Software & IT Services	-0.143	0.053	-2.714	26
30-Jun-20	Software & IT Services	-0.133	0.068	-1.972	172
30-Jun-20	Natural Gas Utilities	-0.105	0.056	-1.861	13
30-Jun-20	Hotels & Entertainment Services	-0.106	0.063	-1.670	72
30-Apr-20	Diversified Retail	-0.088	0.053	-1.659	14
31-Dec-20	Biotechnology & Medical Research	-0.131	0.086	-1.516	169
30-Apr-20	Specialty Retailers	-0.124	0.084	-1.465	37
30-Jun-20	Oil & Gas Related Equipment and Services	-0.103	0.071	-1.450	77
30-Jun-20	Communications & Networking	-0.085	0.062	-1.386	29
30-Jun-20	Specialty Retailers	-0.089	0.066	-1.356	34
30-Jun-20	Healthcare Equipment & Supplies	-0.106	0.079	-1.353	99
30-Jun-20	Professional & Commercial Services	-0.096	0.072	-1.339	85
30-Jun-20	Oil & Gas	-0.091	0.069	-1.322	110
30-Jun-20	Aerospace & Defense	-0.086	0.066	-1.308	34
30-Jun-20	Metals & Mining	-0.077	0.063	-1.230	82
30-Jun-20	Food & Drug Retailing	-0.067	0.055	-1.218	17
30-Jun-20	Construction & Engineering	-0.074	0.063	-1.172	24
30-Jun-20	Personal & Household Products & Services	-0.068	0.062	-1.104	18
30-Jun-20	Homebuilding & Construction Supplies	-0.077	0.071	-1.080	36
Panel B. Top Industry Upgrades					
30-Sep-22	Leisure Products	0.011	0.010	1.104	18
31-Dec-17	Food & Tobacco	0.018	0.016	1.133	22
30-Jun-18	Paper & Forest Products	0.038	0.033	1.145	13
31-Dec-17	Communications & Networking	0.036	0.031	1.152	12
31-Dec-22	Computers, Phones & Household Electronics	0.024	0.020	1.179	11
30-Sep-20	Media & Publishing	0.059	0.049	1.197	43
31-Dec-21	Healthcare Provides & Services	0.014	0.011	1.281	47
31-Dec-17	Natural Gas Utilities	0.026	0.020	1.291	11
31-Dec-22	Healthcare Provides & Services	0.022	0.016	1.398	39
31-Dec-22	Multiline Utilities	0.039	0.027	1.417	12
31-Oct-22	Software & IT Services	0.022	0.015	1.417	20
31-Dec-17	Professional & Commercial Services	0.023	0.015	1.468	26
31-Dec-17	Automobiles & Auto Parts	0.019	0.012	1.533	16
30-Sep-20	Specialty Retailers	0.067	0.040	1.672	34
31-Dec-17	Healthcare Equipment & Supplies	0.029	0.017	1.684	31
30-Sep-22	Multiline Utilities	0.033	0.019	1.710	12
31-Jan-18	Specialty Retailers	0.022	0.012	1.882	27
31-Dec-17	Hotels & Entertainment Services	0.025	0.010	2.474	19
31-Dec-17	Aerospace & Defense	0.018	0.006	2.871	13
31-Dec-17	Homebuilding & Construction Supplies	0.027	0.007	3.811	14

Table A.14

Industry E Rating Upgrades and Downgrades

This table reports the months with top industry E rating upgrades and downgrades. For every industry according to the Refinitiv TRBC industry classification and for every month, we obtain the average E rating changes of the firms in that industry with a fiscal quarter end in the corresponding month. The average industry rating change in any given month is divided by its standard deviation to obtain a ranking variable for the industry in that month. Panel A reports the top 20 industry E downgrades according to that ranking variable. Panel B reports the top 20 industry E upgrades.

Quarter	Industry Group	Mean ESG Rating	Stdev ESG Rating	Ranking variable	Nb firms
Panel A. Top Industry Downgrades					
30-Apr-20	Software & IT Services	-0.282	0.073	-3.839	26
30-Jun-20	Media & Publishing	-0.294	0.084	-3.481	42
30-Jun-20	Software & IT Services	-0.286	0.105	-2.724	172
30-Jun-20	Biotechnology & Medical Research	-0.426	0.167	-2.545	153
30-Jun-20	Hotels & Entertainment Services	-0.235	0.095	-2.472	72
30-Jun-20	Professional & Commercial Services	-0.220	0.094	-2.325	85
30-Jun-20	Oil & Gas	-0.176	0.077	-2.280	110
30-Jun-20	Aerospace & Defense	-0.151	0.068	-2.232	34
30-Jun-20	Healthcare Equipment & Supplies	-0.264	0.120	-2.197	99
30-Jun-20	Freight & Logistics Services	-0.165	0.077	-2.131	43
30-Jun-20	Specialty Retailers	-0.224	0.107	-2.093	34
30-Jun-20	Oil & Gas Related Equipment and Services	-0.207	0.099	-2.089	77
30-Apr-20	Specialty Retailers	-0.252	0.121	-2.075	37
30-Jun-20	Natural Gas Utilities	-0.175	0.091	-1.923	13
30-Jun-20	Pharmaceuticals	-0.241	0.128	-1.877	83
30-Jun-20	Homebuilding & Construction Supplies	-0.163	0.088	-1.859	36
30-Jun-20	Food & Drug Retailing	-0.168	0.092	-1.819	17
30-Jun-20	Communications & Networking	-0.181	0.100	-1.818	29
30-Jun-20	Metals & Mining	-0.181	0.101	-1.796	82
30-Apr-20	Diversified Retail	-0.170	0.108	-1.579	14
Panel B. Top Industry Upgrades					
30-Jun-18	Paper & Forest Products	0.042	0.049	0.859	13
30-Jun-19	Textiles & Apparel	0.013	0.015	0.862	16
30-Sep-20	Homebuilding & Construction Supplies	0.038	0.044	0.872	36
30-Sep-22	Construction & Engineering	0.011	0.012	0.875	22
31-Dec-17	Chemicals	0.024	0.026	0.897	17
31-Dec-17	Electric Utilities & IPPs	0.021	0.023	0.902	12
30-Apr-18	Specialty Retailers	0.003	0.004	0.913	33
31-Dec-18	Beverages	0.017	0.018	0.929	14
31-Dec-17	Semiconductors & Semiconductor Equipment	0.029	0.031	0.946	22
30-Sep-22	Containers & Packaging	0.068	0.065	1.053	16
31-Dec-22	Specialty Retailers	0.011	0.010	1.068	26
31-Dec-20	Homebuilding & Construction Supplies	0.011	0.010	1.100	36
31-Dec-17	Homebuilding & Construction Supplies	0.030	0.026	1.120	14
31-Dec-17	Healthcare Equipment & Supplies	0.043	0.032	1.356	31
31-Dec-22	Multiline Utilities	0.054	0.038	1.401	12
31-Dec-20	Textiles & Apparel	0.023	0.016	1.418	16
30-Sep-22	Multiline Utilities	0.031	0.021	1.466	12
31-Dec-18	Automobiles & Auto Parts	0.017	0.011	1.524	47
31-Dec-17	Automobiles & Auto Parts	0.019	0.011	1.696	16
31-Dec-17	Hotels & Entertainment Services	0.018	0.006	2.746	19

Table A.15

Industry Component of Ratings (Excluding 2020 Q2)

This table reports the results of a regression of quarterly equity issuance, net debt issuance, asset growth (excl. cash) and Tobin's Q on firms' lagged ESG, E, S and G pillar ratings, and a set of controls. The industry and non-industry components of ESG (E) ratings are obtained from quarterly regressions of ESG (E) ratings on industry dummies. Industries are defined according to industry groups in the Refinitiv TRBC industry classification. ESG is the PIT ESG score of a firm observed at the start of each quarter. E is the corresponding environmental pillar score. Controls include *Profitability*, *Leverage*, *Total Assets* and *Q* at the end of quarter $q-2$. Observations in 2020Q2 are excluded from the analysis. Standard errors clustered by firm and year-month are reported in parentheses. *,**, *** indicates significance at the 0.10, 0.05, and 0.01 level, respectively.

	(1)	(2)	(3)	(4)
Panel A.	Equity Issuance		Net Debt Issuance	
ESG Industry Component	0.0930***		-0.0805***	
	(0.0233)		(0.0248)	
ESG Non-Industry Component	0.0098		-0.0105*	
	(0.0063)		(0.0054)	
E Industry Component		0.0280**		-0.0294**
		(0.0127)		(0.0128)
E Non-Industry Component		0.0051		-0.0098*
		(0.0041)		(0.0055)
N	44,041	44,041	44,041	44,041
adj.R^2	0.2253	0.2245	0.0853	0.0849
Panel B.	Asset Growth (Excl. Cash)		Tobin's Q	
ESG Industry Component	-0.0172		0.9892**	
	(0.0202)		(0.3763)	
ESG Non-Industry Component	-0.0042		-0.0846	
	(0.0051)		(0.1457)	
E Industry Component		0.0033		0.8088**
		(0.0115)		(0.3181)
E Non-Industry Component		-0.0043		0.2687**
		(0.0044)		(0.1238)
N	44,041	44,041	44,041	44,041
adj.R^2	0.1095	0.1094	0.8372	0.8376
Fixed Effects				
Year-month	Y	Y	Y	Y
Firm	Y	Y	Y	Y
2-digit SIC	N	N	N	N
YrMth*SIC	N	N	N	N

Table A.16

ESG Rated vs. Unrated Firms

This table reports the results of a regression of quarterly equity issuance on an indicator variable taking the value of 1 if the firm has received an ESG score in quarter $q-2$ and zero otherwise, and a set of controls. *Equity Issuance* is defined as the quarterly change in book equity minus the change in retained earnings, divided by previous quarter's total assets. *ESG score* is the PIT ESG score of a firm observed at the start of each quarter. Controls include *Profitability*, *Leverage*, *Total Assets* and *Q* at the end of the previous quarter. Standard errors clustered by firm and year-month are reported in parentheses. *,**, *** indicates significance at the 0.05, 0.01, and 0.001 level, respectively.

	Equity Issuance		Net Debt Issuance		Asset Growth (Excl. Cash)		Tobin's Q	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Rated	-0.0048	-0.0009	0.0156***	0.0119**	-0.0049***	-0.0049***	0.4067*	0.6069**
	(0.0094)	(0.0075)	(0.0054)	(0.0048)	(0.0018)	(0.0017)	(0.2363)	(0.2470)
Profitability	-0.2543***	-0.2646***	0.0334**	0.0337**	-0.0090	-0.0098*	-12.8501***	-12.6853***
	(0.0319)	(0.0314)	(0.0152)	(0.0154)	(0.0055)	(0.0053)	(1.3306)	(1.3548)
Leverage	0.0168*	0.0139	0.0012	0.0012	-0.0051***	-0.0047***	4.3904***	4.3074***
	(0.0098)	(0.0099)	(0.0039)	(0.0040)	(0.0015)	(0.0016)	(0.4802)	(0.4632)
Assets	-0.2131***	-0.2173***	0.0636***	0.0666***	-0.0417***	-0.0416***	-4.4232***	-4.4491***
	(0.0175)	(0.0189)	(0.0090)	(0.0096)	(0.0033)	(0.0035)	(0.4284)	(0.4171)
Q	0.0034***	0.0033***	-0.0004*	-0.0004*	0.0004***	0.0005***		
	(0.0005)	(0.0005)	(0.0002)	(0.0002)	(0.0001)	(0.0001)		
Fixed Effects								
Year-month	Y	N	Y	N	Y	N	Y	N
Firm	Y	Y	Y	Y	Y	Y	Y	Y
2-digit SIC	N	N	N	N	N	N	N	N
YrMth*SIC	N	Y	N	Y	N	Y	N	Y
N	124,392	123,790	124,371	123,769	124,315	123,713	125,676	125,078
adj.R^2	0.3818	0.3812	0.0587	0.0598	0.0667	0.0798	0.7630	0.7640

Table A.17

ESG Rated vs. Unrated Firms: Restated Sample

This table reports the regression results of quarterly equity issuance on an indicator variable taking the value of 1 if the firm has an ESG rating in the restated sample in quarter $q-2$ and zero otherwise, and a set of controls. *Equity Issuance* is defined as the quarterly change in book equity minus the change in retained earnings, divided by previous quarter's total assets. *ESG score* is the PIT (PIT) ESG rating of a firm observed at the start of each quarter. Controls include *Profitability*, *Leverage*, *Total Assets* and *Q* at the end of the previous quarter. Standard errors clustered by firm and year-month are reported in parentheses. *,**, *** indicates significance at the 0.10, 0.05, and 0.01 level, respectively.

	Equity Issuance		Net Debt Issuance		Asset Growth (Excl. Cash)		Tobin's Q	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Rated	0.0124	0.0194	-0.0005	-0.0049	0.0036	0.0041	1.0120***	1.0767***
	(0.0147)	(0.0134)	(0.0065)	(0.0059)	(0.0032)	(0.0034)	(0.3761)	(0.3890)
Profitability	-0.2609***	-0.2702***	0.0343**	0.0335**	-0.0079	-0.0088	-11.9173***	-11.8854***
	(0.0313)	(0.0309)	(0.0151)	(0.0153)	(0.0055)	(0.0054)	(1.4036)	(1.4178)
Leverage	0.0177*	0.0146	0.0013	0.0012	-0.0050***	-0.0047***	4.3181***	4.2469***
	(0.0102)	(0.0103)	(0.0041)	(0.0042)	(0.0015)	(0.0015)	(0.4826)	(0.4684)
Assets	-0.2122***	-0.2165***	0.0642***	0.0673***	-0.0421***	-0.0420***	-5.9356***	-5.8340***
	(0.0178)	(0.0193)	(0.0091)	(0.0098)	(0.0034)	(0.0036)	(0.5230)	(0.5224)
Q	0.0034***	0.0033***	-0.0004*	-0.0004*	0.0005***	0.0005***		
	(0.0005)	(0.0005)	(0.0002)	(0.0002)	(0.0001)	(0.0001)		
Fixed Effects								
Year-month	Y	N	Y	N	Y	N	Y	N
Firm	Y	Y	Y	Y	Y	Y	Y	Y
2-digit SIC	N	N	N	N	N	N	N	N
YrMth*SIC	N	Y	N	Y	N	Y	N	Y
N	123,899	123,292	123,899	123,292	123,899	123,292	123,899	123,292
adj.R^2	0.3810	0.3800	0.0571	0.0579	0.0676	0.0805	0.7663	0.7670

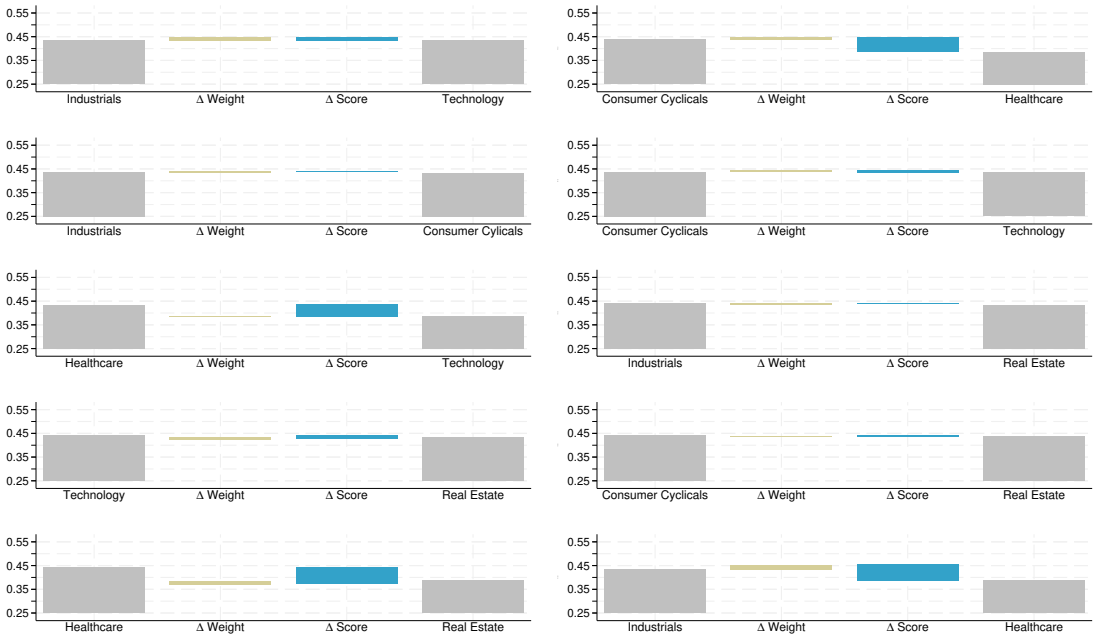
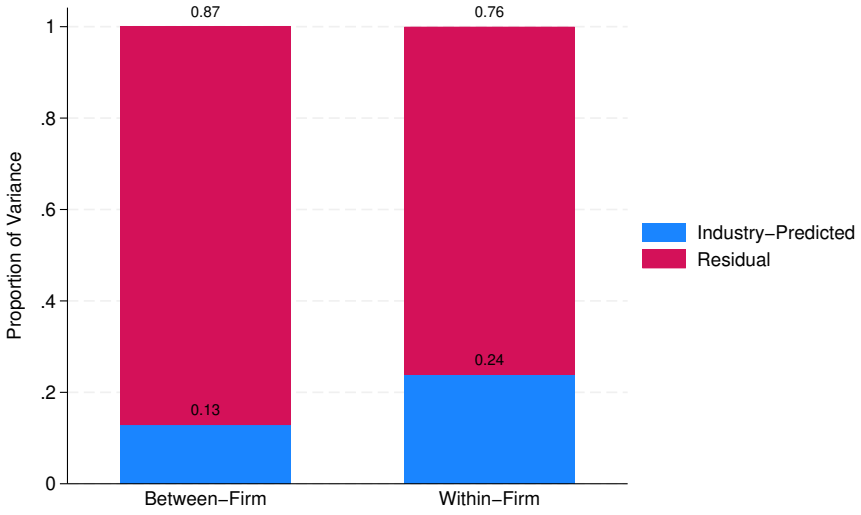


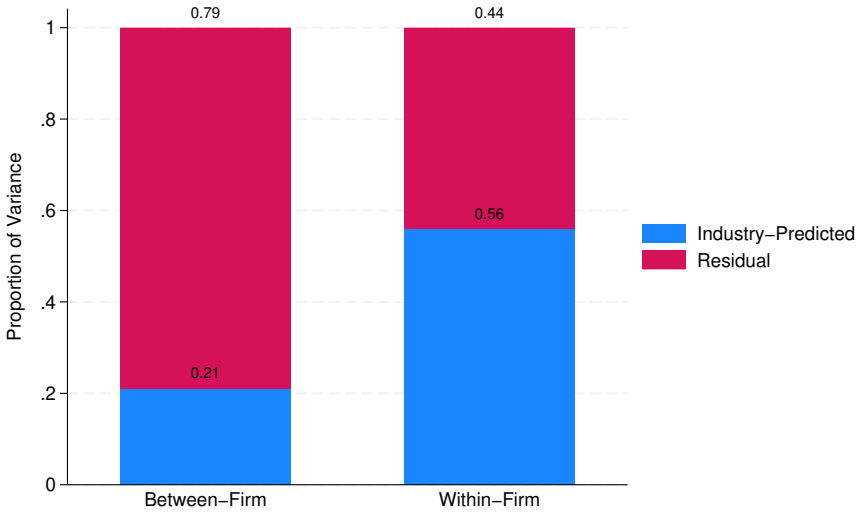
Figure A.1

ESG Ratings Differences Across Industries: Weighting And Score Effects

To decompose a difference in ESG scores into a component score and weight effects, we look at the average marginal effect that a change in score or a change in weight might have holding the other constant. Let $ESG_1 = s_1 * w_1$ and $ESG_2 = s_2 * w_2$, where s_i is the vector representing all of the ten category scores for the entity, i, in question, and w_i is the corresponding weight vector for said categories. The change in score can be expressed as: $s_1 * w_1 - s_2 * w_2 = \Delta w_{1,2} + \Delta s_{1,2}$ where $\Delta w_{1,2} = \frac{(s_1 * w_1 - s_1 * w_2) + (s_2 * w_1 - s_2 * w_2)}{2}$ and $\Delta s_{1,2} = \frac{(s_1 * w_1 - s_2 * w_1) + (s_1 * w_2 - s_2 * w_2)}{2}$



(a) ESG Ratings

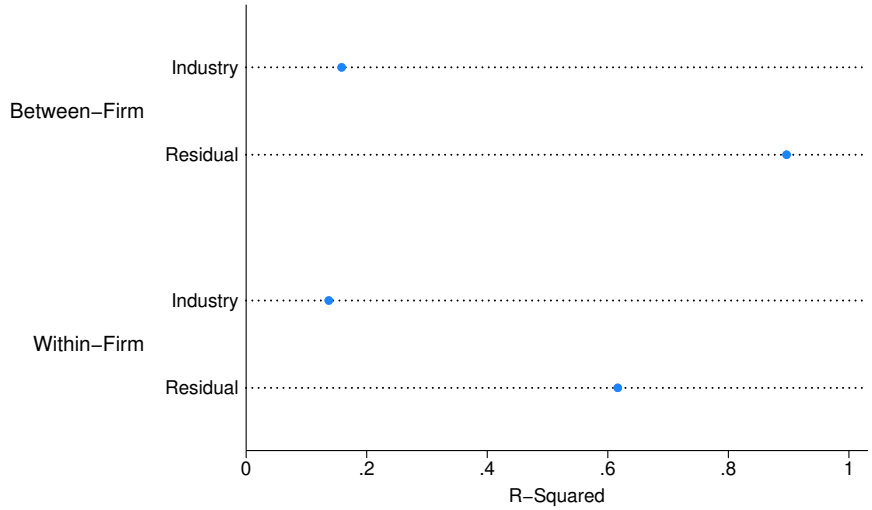


(b) Environmental Ratings

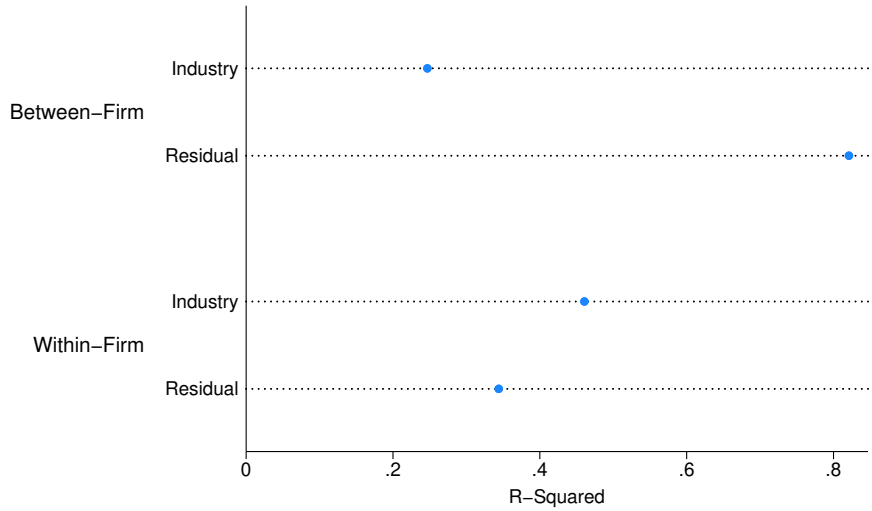
Figure A.2

ESG Ratings: Variance Decomposition

This figure plots the relative contribution of the industry-predicted and the residual component of ESG ratings (Panel a) and Environmental ratings (Panel b) between-firm and within-firm ESG ratings variance.



(a) ESG Ratings

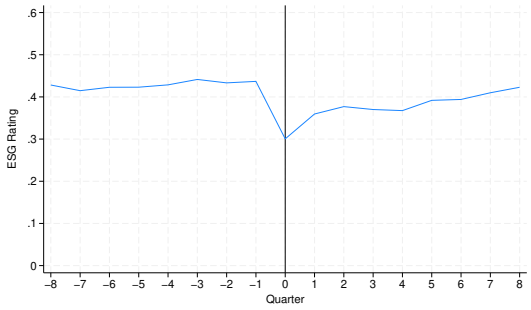


(b) Environmental Ratings

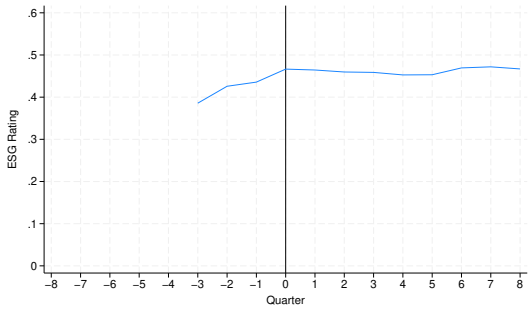
Figure A.3

ESG Ratings: Variance Decomposition Based on R^2

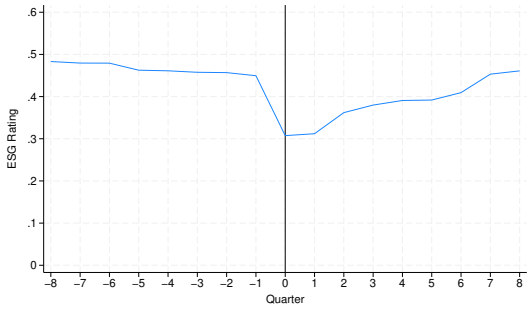
This figure plots the R^2 of a regression on the industry and the residual components for both within-firm and between-firm variations of ESG ratings (Panel a) and Environmental ratings (Panel b).



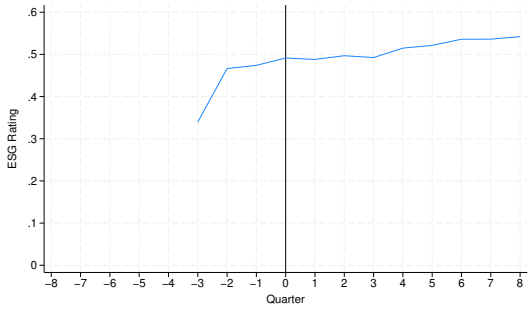
(a) Media & Publishing (Jun 2020)



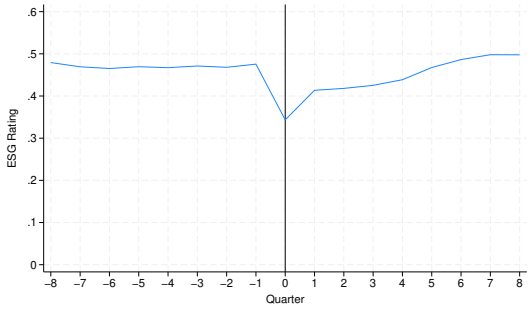
(b) Homebuilding & Construction Supplies (Dec 2017)



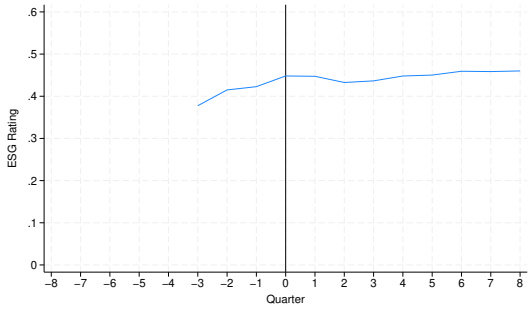
(c) Software & IT Services (Apr 2020)



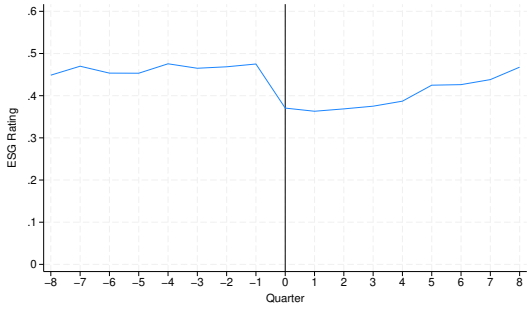
(d) Aerospace & Defense (Dec 2017)



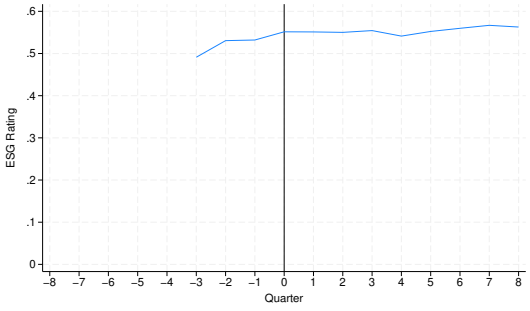
(e) Software & IT Services (Jun 2020)



(f) Hotels & Entertainment Services (Dec 2017)



(g) Natural Gas Utilities (Jun 2020)

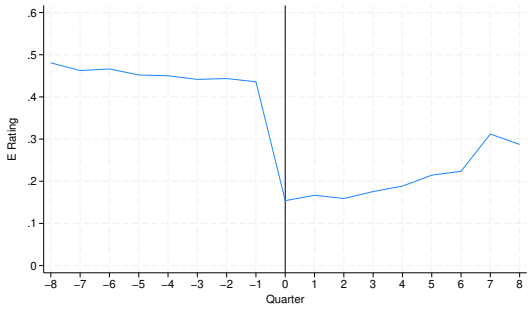


(h) Specialty Retailers (Jan 2018)

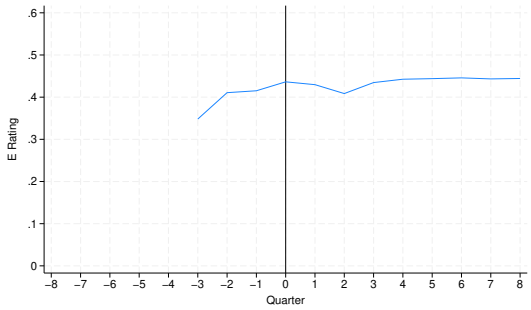
Figure A.4

Top Four Industry ESG Rating Downgrades and Upgrades

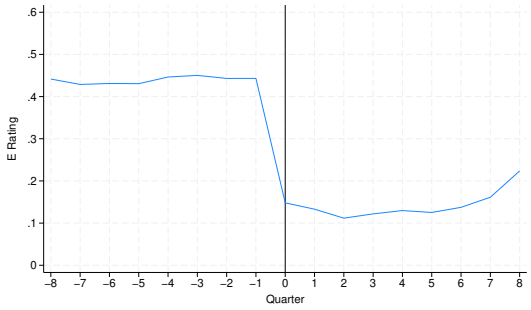
The figure plots the average industry ESG rating within an eight-quarter interval around the top four industry-wide ESG rating downgrades (left columnn) and upgrades (right column), corresponding to Table A.13.



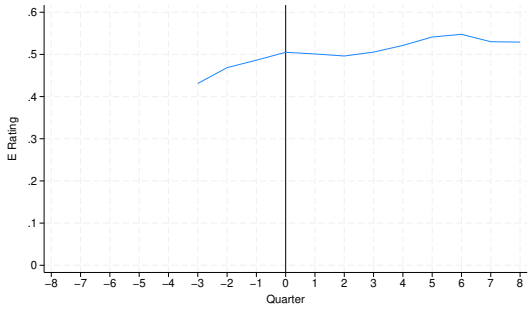
(a) Software & IT Services (Apr 2020)



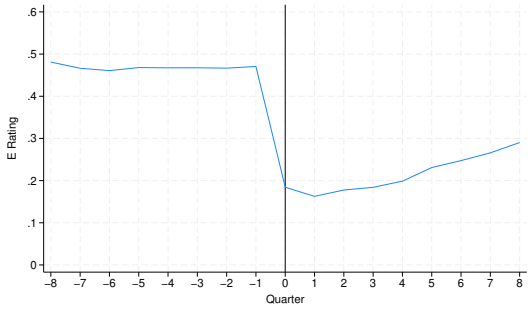
(b) Hotels & Entertainment Services (Dec 2017)



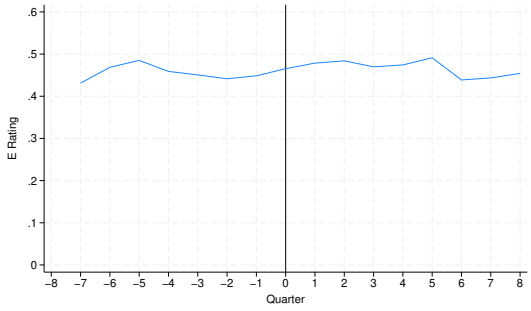
(c) Media & Publishing (Jun 2020)



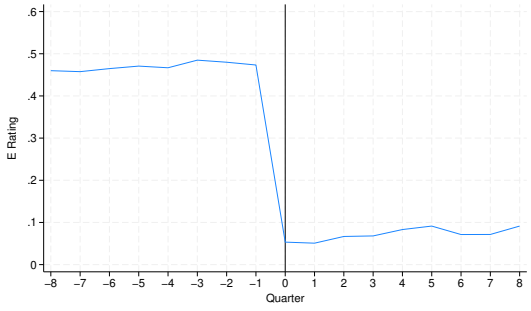
(d) Automobiles & Auto Parts (Dec 2017)



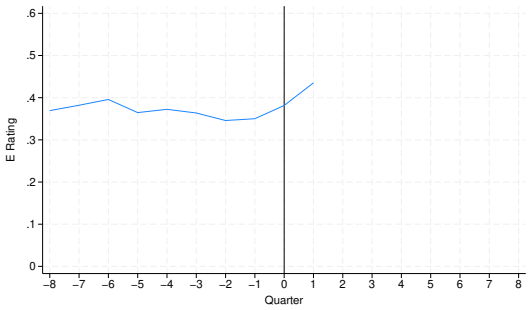
(e) Software & IT Services (Jun 2020)



(f) Automobiles & Auto Parts (Dec 2018)



(g) Biotechnology & Medical Research (Jun 2020)



(h) Multiline Utilities (Sep 2022)

Figure A.5

Top Four Industry E Rating Downgrades and Upgrades

The figure plots the average industry E rating within an eight-quarter interval around the top four industry-wide E rating downgrades (left columnn) and upgrades (right column), corresponding to Table A.14.