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ORIGINAL PAPER

Do ESG Rating Agencies Improve ESG Performance?

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Abstract
We examine the effect of coverage by ESG rating agencies on firm ESG performance. We find that, when firm ESG coverage intensifies, its toxic emissions decline and its outstanding ESG ratings improve. ESG coverage is associated with fewer government enforcement actions for environmental and social violations and higher institutional ownership, especially by institutions with revealed preferences for high-ESG stocks. We also show that more covered firms disclose more ESG information in their annual reports. The effect of coverage is enduring and pronounced across both more and less competitive industries. Our results suggest that ESG rating agencies increase the amount of ESG information in the market. The source of this information could be attributed to the agencies' expertise in evaluating ESG performance.

Keywords ESG · ESG rating agencies · Toxic emissions · Institutional ownership

JEL Classification G14 · G40 · K42

Introduction

Fueled by deepening environmental problems and recent corporate governance scandals, the demand for information on the environmental, social, and governance (ESG) performance of firms has been increasing in recent years (Baldini et al. 2018; Christensen, Serafeim, and Sikochi 2022; Van Duuren, Plantinga, and Scholtens 2016). In response to this demand, private entities (rating agencies) have started evaluating firms' ESG performance. Currently, there is a perception that the ESG raters play an important role in the economy. For example, many institutional investors rely on ESG ratings to evaluate the ESG performance of firms (e.g., Bauer et al. 2021; GSIA 2016; USSIF 2020). The Council of the European Union and the European Parliament also recently reached an agreement on a proposal for the regulation of ESG rating agencies, stating that "ESG ratings have an increasingly important impact on the operation of capital markets and on investor trust in sustainable products."[1] Yet the real impact of ESG rating agencies has remained understudied by academics. This paper explores whether coverage by rating agencies affects firm ESG performance.

We contend that, if firm stakeholders value ESG and believe ESG ratings are informative, then coverage by rating agencies should improve ESG performance. The inability of firm stakeholders to assess ESG performance decreases firm incentives to invest in improving ESG performance. By

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[1] See *Environmental, social and governance (ESG) ratings: Council and Parliament reach agreement*, Council of the European Union, press release, 5 February 2024.

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introducing new metrics and monitoring firm performance along these metrics (e.g., Escrig-Olmedo et al. 2019), rating agencies incentivize firms to invest in ESG activities. Consistent with this idea is the fact that, when the quality of ESG reporting improves, firms pursue more ESG activities (e.g., El Ghoul et al. 2019; Jackson et al. 2020). Coverage by ESG rating agencies also may prompt all firms to improve aspects of their ESG performance. Low-rated firms may experience immediate pressure to invest in ESG. Having rational expectations, high-rated firms will also internalize the increased competition and respond to increased coverage as well.[2]

ESG rating agencies could increase the amount of ESG information in the market in two possible ways: by reducing *information processing* costs for firm stakeholders and by *standardizing* ESG information. Although stakeholders can obtain ESG information from various public sources, information processing costs may be prohibitive. ESG rating agencies employ highly qualified staff and sophisticated methodologies to construct their scores (e.g., Escrig-Olmedo et al. 2019). As a result, they may be able to process ESG information more efficiently than other market participants. ESG rating agencies could also increase the usability of information by standardizing it and making it comparable across firms. Currently, the term "ESG" encompasses many activities and policies, which creates the need for standardization, and ESG rating agencies could fill this need.

To evaluate the implications of ESG coverage for firms, we focus on the times when four major ESG rating agencies—MSCI KLD, Refinitiv, Sustainalytics, and Bloomberg—initiated coverage of large groups of firms. Firms do not solicit this coverage. Focusing on coverage initiations of large groups of stocks also mitigates concerns that coverage could reflect particular firm events, such as additions to major market indices and acquisitions. The rating agencies, however, could be biased toward stocks with certain characteristics. To control for this, we study the effect of coverage initiation on treated firms relative to a propensity score-matched sample of control firms. Specifically, we construct a stacked sample where the treated firms in each event (cohort) are matched to similar control firms. Each cohort is a 10-year panel centered around the coverage event. To construct our main sample, we stack all cohorts on top of each other (Baker et al. 2022; Cengiz et al. 2019; Gormley and Matsa 2011).[3]

We start by evaluating changes in the toxic emissions of firms upon receiving coverage by an ESG rating agency. We base this analysis on data from the Environmental Protection Agency's (EPA) Toxics Release Inventory (TRI) and Pollution Prevention (P2) datasets. TRI provides facility-level information about the toxic emissions of U.S. manufacturers, while P2 reports activities implemented by firms to reduce their production waste. We find that, when coverage of a firm by ESG rating agencies increases, its total toxic releases decline. Firms damp their toxic emissions by reducing both the number of high-pollution facilities and the average toxic emissions per facility. Firms with greater ESG coverage are also more likely to reduce their waste by adopting cleaner production technologies.

Next, we explore whether coverage by ESG rating agencies reduces the number of government enforcement actions against the firm. The Violation Tracker database provided by the non-profit organization *Good Jobs First* documents the law violations assessed by over 50 US federal agencies. Based on this information, we identify enforcement actions related to environmental, employment, consumer, and financial irregularities. We then count the number of violations within each category for a firm each year and use this count as a dependent variable. We find that, when a firm's ESG coverage increases, its environmental and consumer violations decrease.

We also find that greater ESG coverage improves the ESG ratings of covered firms. To examine the relative importance of rating disagreement on the coverage effect, we sort firms into four groups based on the level of disagreement between their outstanding ratings and the new rating. We observe that additional coverage improves firm ESG performance, independent of the level of disagreement between the old and the new rating agencies. Both real ESG performance and existing ratings increase across disagreement quartiles. The only exception is when a higher rating is followed by a lower one. In this case, the legacy rating agencies adjust their ratings downward following the new rating. This adjustment, however, is not reflected in real ESG performance. One plausible explanation is that, because assigning a low rating to a highly rated firm could be controversial, the new rating agency performs more due diligence in these cases. As a result, these new ratings are more informative and lead the market.

Our baseline results are consistent with the idea that ESG rating agencies provide additional information to firm stakeholders. As noted above, we consider two ways rating agencies could generate this information—the processing and standardization of ESG information. To evaluate the relative importance of processing, we assess the response of institutional investors to coverage initiation. Institutional investors are expected to be particularly sensitive to information processing costs, given that they manage

[2] Some highly rated firms could be constrained because they may be already operating at ESG ceilings, or they may face diminishing returns on ESG investment.

[3] Baker et al. (2022) show that stacked samples could correct the potential biases of staggered difference-in-differences estimators caused by heterogeneous treatment effects.

portfolios of many stocks. Thus, if rating agencies improve ESG information processing, firms experiencing additional coverage by an agency would also experience an increase in the ownership of ESG-conscious institutional investors. Consistent with this idea, we find that ESG coverage attracts more institutional investors, especially investors with revealed preferences for ESG stocks.

To assess the relative importance of standardization, we evaluate the coverage effect, conditional on the competitiveness of the firm's industry. If rating standardization facilitates peer comparisons, then the coverage effect would strengthen in more competitive markets. We show, however, that this is not the case, as the effect remains equally strong among firms in both highly and less competitive industries. This suggests that the effect of coverage by ESG rating agencies goes beyond the facilitation of comparisons across firms.

We then assess the effect of coverage on ESG disclosures. We find that coverage by ESG rating agencies increases the disclosure of ESG information in firm annual reports. This effect is consistent with the fact that rating agencies reward better disclosures with higher ratings (e.g., Drempetic, Klein, and Zwergel 2020). However, this also raises the question of whether the higher ratings of more covered firms simply reflect their increased disclosures. We show that this is not true. Although firms with greater disclosures do receive higher ratings, disclosure alone cannot account for the effect of coverage on ESG performance.

In sum, we find that firm coverage by ESG rating agencies is associated with better ESG performance. Our results suggest that rating agencies do provide information to the market. Our results are also consistent with the evidence that improvements in the information quality of ESG reporting in other settings intensify ESG activities. For example, Jackson et al. (2020) show that firms in countries mandating non-financial disclosure adopt significantly more socially responsible activities. El Ghoul et al. (2019) find that firms pursue more socially responsible activities if they are in countries where the media is freer. Krueger et al. (2024) also show that ESG disclosure requirements increase both the availability and the quality of ESG reporting. We find that rating agencies exhibit an effect on ESG outcomes beyond other established mechanisms, such as mandatory ESG disclosures and media coverage.

A recent article in the journal summarizes editorial commentaries on the interactions between business and ethics (Dacin et al. 2022). The article notes the increased importance of ESG issues for corporate boards and major firm stakeholders. The editors also argue that, as emerging ESG standards are discussed and implemented, "business ethics scholars must help guide such legislation by examining its effectiveness in changing corporate behavior and identifying necessary reforms." Firm behavior, however, is guided not only by the legal institutions but also by social norms and business practices (Peterson et al. 2010; Astrachan et al. 2020). Our results suggest that ESG rating agencies have become an important information provider and their coverage influences firms' ESG performance.

Some researchers have expressed concerns about the fact that the ESG ratings by different agencies often diverge (Mackintosh 2018; Wigglesworth 2018; Berg, Koelbel, and Rigobon 2022). Our results suggest that, regardless of divergence, ESG rating agencies generate relevant information about the ESG performance of firms. Consistent with the idea that diverse opinions are informative, Christensen, Serafeim, and Sikochi (2022) show that greater ESG disclosure leads to greater ESG rating disagreement across providers. In this regard, our results echo the evidence on information production in other settings. For example, an extensive literature shows that more and better accounting disclosures can lead to tangible capital-market benefits for firms (e.g., Christensen, Hail, and Leuz 2021). Bond ratings also can provide value (Hand et al. 1992; Kliger and Sarig 2000). Our overall conclusion is that ESG rating agencies incentivize firms to improve their ESG performance.

ESG rating agencies assign higher scores to firms with more detailed ESG disclosures. For example, Drempetic, Klein, and Zwergel (2020) show that more available data, positive or negative, raises the overall sustainability assessment of companies by Thomson Reuters. The Bloomberg ESG rating agency also explicitly states that it penalizes companies for missing ESG data.[4] We find that ESG coverage by rating agencies intensifies firm ESG disclosures. Our results suggest that the rating agencies incentivize firms to disclose more, which in turn increases the amount of ESG information in the market.

The remainder of the paper is organized as follows. The next section presents the main hypotheses, and the one after that outlines the empirical methodology. We then report the results on the implications of ESG coverage for firm ESG performance and finally conclude.

Hypotheses Development

If ESG rating agencies provide information about firm ESG performance, their coverage should motivate firms to pursue ESG activities. Investing in ESG is costly, and firms are more likely to do it when they can communicate their ESG performance reliably to the market. As an independent third party, rating agencies could help firm stakeholders better assess the ESG performance of firms and, in the process, incentivize firms to improve their ESG performance. The

[4] See https://corpgov.law.harvard.edu/2017/07/27/esg-reports-and-ratings-what-they-are-why-they-matter/

initial pressure would be on the firms with the worst ESG performance, but it would quickly flow upward toward better-performing firms. In anticipation of the market response, even firms with strong ESG performance might respond promptly and intensify their investment in ESG upon receiving the additional coverage. Thus, we propose the following hypothesis.

H1. *Coverage by ESG rating agencies is expected to improve the real ESG performance of covered firms.*

In our analysis, we focus on the toxic emissions and pollution prevention measures of firms using data from the Environmental Protection Agency's (EPA) Toxics Release Inventory (TRI) and Pollution Prevention (P2). We also evaluate the link between ESG coverage and the number of environmental, social, and financial violations of covered firms. The term "ESG," however, encompasses many activities and policies.[5] With this in mind, we also assess the implications of coverage by ESG rating agencies for the outstanding ESG ratings of firms. Raters usually consider a wide range of factors when constructing their scores. If ratings are informative and coverage pressures firms to perform better, then additional coverage by an agency is also expected to increase the firm's outstanding ESG scores as well.

The conjecture that rating agencies improve performance has been corroborated elsewhere, such as in the restaurant business.[6] Currently, most US states inspect the hygiene quality of restaurants and require them to display their rating on their windows (Roberts 2016). A study by Jin and Leslie (2003) shows that, upon the introduction of the rating system, restaurant health inspection scores improve, consumer demand sensitivity to rating changes increases, and the number of foodborne illness hospitalizations in a state declines. Restaurants also respond to rating coverage by private agencies, such as the Michelin Guide, Forbes Travel Guide, and Zagat. For example, two recent studies by Gergaud, Storchmann, and Verardi (2015) and Favaron, Di Stefano, and Durand (2022) show that Michelin-reviewed restaurants are more likely to improve their food, wine list, and nonfood characteristics, independent of their reputation.

We consider two ways ESG rating agencies could increase the amount of ESG-related information in the market—*information processing* and *standardization*. Currently firm stakeholders can obtain ESG-related information via various sources, including corporate disclosures. The information in these sources, however, is fragmented, which substantially decreases its usefulness to market participants (Blankespoor, deHaan, and Marinovic 2020). ESG rating agencies could lower the information processing costs for firm stakeholders, particularly for institutional investors because they manage large portfolios. If so, coverage by ESG rating agencies would attract institutional investors who focus on ESG issues. Thus, we offer the following hypothesis.

H2.a. *If ESG rating agencies facilitate the processing of ESG information, then their coverage is expected to increase the equity ownership of institutional investors with preferences for ESG.*

Interestingly, ESG-conscious investors could intensify the pressure on firms to improve their ESG performance even further—either by voting with their feet or asking for better corporate governance. For example, Chen, Dong, and Lin (2020) show that institutional ownership can improve firm ESG performance through ESG-related proposals. In a recent study, Li, Patel, and Ramani (2021) also find that CSR-friendly mutual funds improve firms' CSR standing. Activist stakeholders can also pressure laggard firms to improve their ESG performance (Dimson, Karakas, and Li 2015). In all these cases, however, investors need a reliable estimation of firm ESG performance, and ESG rating agencies could provide this.

ESG rating agencies could also increase the amount of information in the market by standardizing information available from public sources. Because agencies use the same methodology to evaluate firms, their ratings facilitate the comparisons of firms (based on ratings by the same agency). We expect that the standardization effect will strengthen in more competitive industries because these industries provide stakeholders with more choices. With this in mind, we propose the following hypothesis:

H2.b. *If ESG rating agencies facilitate comparisons of ESG-performance across firms, then the effect of their coverage would strengthen in more competitive industries.*

Finally, coverage by ESG rating agencies could incentivize firms to disclose more ESG-related information. Rating agencies reward firms with higher ratings for providing more disclosures (e.g., Drempetic, Klein, and Zwergel 2020). Some of them also explicitly state that they penalize companies with less ESG data.[7] As a result, coverage by ESG rating agencies may increase the amount of available ESG information disclosed by firms.

[5] For example, Sethi, Martell, and Demir (2017) argue that the voluntary nature of ESG disclosures has led to inconsistencies in reporting formats and a lack of robust measures pertaining to the quality and accuracy of the reports' content. See Christensen, Hail, and Leuz (2021) (for review of the literature on ESG disclosures and the adoption of ESG standards.

[6] Although the stakeholder pressure mechanisms analyzed here (e.g., investor preferences, regulatory scrutiny) differ from the consumer-driven dynamics in restaurants, it is reasonable to anticipate that firms would respond similarly.

[7] See https://corpgov.law.harvard.edu/2017/07/27/esg-reports-and-ratings-what-they-are-why-they-matter/

Empirical Design

Coverage Initiation Events

Assessing the impact of ESG rating agencies requires comprehensive data about firm coverage, independent of the information that the actual ratings provide. To address this challenge, we identify the times four major ESG rating agencies—MSCI KLD, Refinitiv, Sustainalytics, and Bloomberg—initiated coverage.

Several reasons motivate us to focus on these data providers. First, they have been recognized as important sources of ESG information by third parties. For example, ERM, the largest global sustainability consultancy, includes all four providers in its 2020 report.[8] The Harvard Law School Corporate Governance Forum includes these agencies in the list of well-known third-party ESG rating providers.[9] Multiple advisory and consulting firms also consider these agencies as ESG data providers of primary relevance.[10] Finally, numerous institutional investors rely on their ratings.[11]

The above databases have also been used extensively in academic research. Overall, the MSCI KLD data appear to be the most used by researchers (e.g., Lins et al. 2017; Hartzmark and Sussman 2019; Ferrell et al. 2016; Di Giuli and Kostovetsky 2014; Deng et al. 2013; Engle et al. 2020). This is unsurprising, given that MSCI KLD is the oldest provider of ESG information. However, multiple studies also rely on Sustainalytics (e.g., Dyck et al. 2019; Engle et al. 2020), Refinitiv (former *ASSET4*) (Stellner et al. 2015), and Bloomberg disclosure scores (Ng and Rezaee 2020; Gualandris et al. 2021; Dyck et al. 2019). Two recent studies, Christensen et al. (2022) and Bolton and Kacperczyk (2021), employ all four datasets.

A few other agencies also provide ESG information, but their methodologies and coverage are irrelevant to our research design. For example, RepRisk is one of the leading data science companies focusing on ESG risks. Its business model is to evaluate the media coverage of all firms in the market as it relates to ESG issues and identify negative commentaries. As such, the concept of coverage here is not well defined. Another data provider, Corporate Knights Global 100, exhibits sparse U.S. coverage, as it focuses on the top 100 sustainable firms in the world. RobecoSAM invites firms to participate in the questionnaire for possible inclusion into the DJSI World Index and then uses these self-reported data for sustainability assessment. As a result, firm coverage is endogenous to the firm decision to participate in the survey.[12] In contrast, the four agencies in our study have a long history of comprehensive coverage and clear coverage criteria, allowing us to identify precisely shocks to ESG coverage.

Panel A of Table 1 lists the inclusion criteria for the 10 coverage initiations of domestic publicly traded companies analyzed here. (The timeline of the events is depicted in Fig. 1.) We observe that rating agencies prefer larger firms and members of major market indices. As a result, a good identification strategy needs to control for these preferences.

Constructing a Stacked Sample with Propensity-Score Matching

To control for the selection in coverage, we construct a sample of firms receiving coverage by some of the four ESG rating agencies as a result of a major coverage expansion event. We then evaluate the effect of coverage on these firms.[13] We exclude coverage initiations of isolated firms. Instead, we focus on the events when rating agencies expand their coverage of hundreds of new companies at once. This approach mitigates the selection effect since massive expansions would not depend on an individual firm's performance.

Even within this group, however, the selection of firms for coverage is not random. To control for this selection, we employ propensity-score matching as follows. First, for each coverage expansion, we identify all firms that receive coverage as treated firms. We then estimate a Logit regression predicting the probability of coverage based on firm characteristics sampled one year before the event. After estimating the conditional probabilities of treatment based on firm characteristics, we match with replacement each treated firm to five untreated ones with the closest propensity scores (if available). All matched firms constitute our control group.[14]

To estimate the propensity scores, we estimate the following Logit regression predicting the probability of coverage based on firm characteristics:

[8] See https://www.sustainability.com/globalassets/sustainability.com/thinking/pdfs/sustainability-ratetheraters2020-report.pdf

[9] See https://corpgov.law.harvard.edu/2017/07/27/esg-reports-and-ratings-what-they-are-why-they-matter/

[10] For example, see https://brokerchooser.com/how-to-invest/top-esg--rating-providers.

[11] For example, many institutional investors explicitly refer to the MSCI data. Morningstar incorporates Sustainalytics scores into its ESG fund rating computation. Bloomberg provides ESG data to the broad business community. And ASSET4 had the largest financial firms among its clients even before its eventual acquisition by Refinitiv.

[12] See, e.g., https://corpgov.law.harvard.edu/2017/07/27/esg-reports-and-ratings-what-they-are-why-they-matter/#2

[13] All firms in our initial sample are at least five years old to allow sufficient pre-event time series.

[14] We exclude a small number of matches that were covered by a larger number of agencies than the treated firm and matches with propensity scores difference exceeding 0.002.

Table 1 ESG coverage expansion chronology

Panel A: ESG inclusion criteria

Database	Inclusion year	Inclusion criteria
	(1)	(2)
MSCI KLD	1991	"Universe A": MSCI KLD 400 Social Index & the S&P 500 (as of August)
MSCI KLD	2001	"Universe C": MSCI KLD 400 Social Index and the top 1000 U.S. companies by market capitalization (as of December)
MSCI KLD	2003	"Universe D": top 3000 U.S. companies by market capitalization (as of December)
Refinitiv	2003	S&P500 and Nasdaq100 index members
Sustainalytics	2009	Undisclosed. Rating methodology was launched. Coverage is based on tracking several indices
Bloomberg	2010	Rating methodology was launched. Companies need to have publicly available data representing at least 80% of the company operations and at least 80% of the company's workforce. Full data transparency and access to the original documents.
Sustainalytics	2010	Undisclosed
Refinitiv	2011	Russell 1000 index constituents
Sustainalytics	2016	Undisclosed. Coverage expanded primarily from large cap US names. For North America, current coverage roughly aligns with the R1000, S&P500 and TSXCI.
Refinitiv	2017	Russell 2000 index constituents with Market Cap of at least $400 million

Panel B: Treated and control firms' repetitions

Times entering the sample	1	2	3	4	5	>5
Percent of Treated Firms	57.42	27.07	12.36	3.16	0	0
Percent of Control Firms	35.44	17.48	11.09	6.92	4.66	24.40
Percent of treated-control firm pairs	95.30	4.66	0.04	0	0	0
sdd						

Panel C: Number of included firms

Database	Inclusion year	Number of inclusion firms	Number of matched firms	Percentage of matched shocks
	(1)	(2)	(3)	(4)
MSCI KLD	1991	492	237	48.17
MSCI KLD	2001	324	102	31.48
MSCI KLD	2003	1199	663	55.30
Refinitiv	2003	385	123	31.95
Sustainalytics	2009	387	148	38.24
Bloomberg	2010	1919	1316	68.58
Sustainalytics	2010	202	123	60.89
Refinitiv	2011	252	66	26.19
Sustainalytics	2016	1242	449	36.15
Refinitiv	2017	780	370	47.44
Total		**7182**	**3597**	**50.08**

Panel A describes the coverage criteria associated with all major coverage initiations and expansions of the four major ESG rating agencies analyzed in the paper. Panel B reports the distributions of the number of appearances of treated firms across different agencies, the number treated firms corresponding to the same matched firms, and the number of the same treatment-control pairs across coverage events. Panel C reports the number of firms that were added for coverage in each case, the number of firms that were added for coverage and could be matched with a firm with similar industry and size and for which both the included firm and the matched firm have outstanding coverage from another agency at the time of the inclusion, and the percentage of matched firms relative to all added firms

$$Prob(Coverage)_{i,t+1} = \alpha + \beta.TotalAssets_{i,t} + \delta.MarketToBookratio_{i,t} + \theta.\#CoveringESGagencies + \eta.ReturnonAssets + \mu.ESGSCore + \Omega.Ownership\ \%\ ofinstitutionswithhighESGpreference + IndustryFE + \epsilon_{i,t} \quad (1)$$

The predictive variables include firm total assets, market-to-book ratio, number of covering agencies, return on assets (ROA), ESG scores (when available), ownership share of institutions with a revealed preference for ESG, and industry

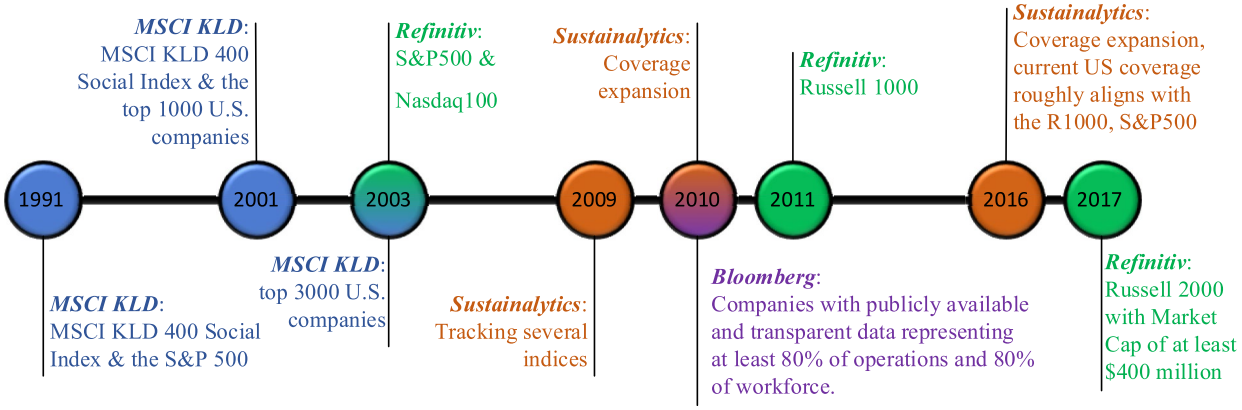

Fig. 1 ESG coverage expansion timeline This figure presents the timeline for ESG coverage initiations and expansions of the four major ESG rating providers analyzed in the paper. The circle indicates the year of coverage initiation or expansion for a specific group of firms, while the description states the inclusion criteria used

fixed effects. Table 2 reports the estimated coefficients from the Logit regressions corresponding to all 10 expansion events used here. We observe that the most consistent predictors of ESG coverage are firm size (total assets) and market-to-book ratio, while the significance of ROA varies across events. Interestingly, ESG coverage relates mostly positively to the probability of receiving additional coverage. (The only exception is the Sustainalytics expansion in 2009.)

Panel B of Table 1 presents the summary statistics of the matching. Treated firms can potentially enter the sample up to four times if they receive coverage from all four rating agencies. However, we observe that most firms (57%) are treated only once, 27% are treated twice, and only around 3% receive coverage by all four agencies. Because of matching with replacement, different treated firms could be matched to the same control firm in a given treatment. The second row of the panel presents the percentages of control firms that match with multiple treated firms. Around 35% of the controls are matched to a single treated firm, and around 17% to two treated firms. Only 24% are matched to more than five treated firms. The last row of the panel shows that the treatment-control pairs are unique in 95% of the cases.

In our sample, the treatment events happen at different points. In a recent paper, Baker et al. (2022) argue that heterogeneous treatment effects could create biases in staggered difference-in-differences estimators. To address this concern, we construct a stacked sample, where, for each coverage expansion event, we keep all treated and control firms for 10 years, centered around the event. We refer to the resulting panels as *cohorts*. For each treated firm, we keep only control firm-year observations that remain untreated by the agency over the five years following the event—if a control firm receives treatment at a given point, it is dropped from the control group. After stacking all cohorts into a single sample, we estimate a difference-in-differences model with industry-cohort and year-cohort fixed effects (Baker et al. 2022; Cengiz et al. 2019; Gormley and Matsa 2011). We evaluate the impact of coverage on a firm (treated firm) relative to similar firms that did not receive coverage (control firms) based on the following model:

$$\begin{aligned} ESG_{i,t} &= \alpha \\ &+ \beta.Coverage_{i,t} + \gamma.Post_{i,t} + \delta.Coverage_{i,t} * Post_{i,t} \\ &+ \theta.\#ControlVariables + Industry * Cohort \\ &FE + Year * CohortFE + \epsilon_{i,t} \end{aligned} \tag{2}$$

The dependent variable, $ESG_{i,t}$, measures ESG-related characteristics of firm i at time t, such as toxic emissions, government enforcement actions, and average ESG ratings.[15] *Coverage* is an indicator variable equal to 1 for treated firms (those with initiated coverage by an agency) and 0 for control firms (those without initiated coverage by the same agency). *Post* is a variable indicating whether a particular firm-year observation (for both treated and control firms) is before or after the corresponding expansion of coverage. We also include the difference-in-differences term, the interaction term *Coverage* * *Post*. To estimate the model in (2), we follow each firm from *five years before* until *five years after* the coverage event.

Panel C of Table 1 reports the number of firms receiving coverage in each one of the 10 cases as well as the number of firms included in our sample. These are the stocks of firms that report at least five years of stock market history and can be matched with (up to five) similar firms. As a result of these filters, around 50 percent of the newly covered firms are included in our final sample. Being the oldest ESG rating

[15] For each outcome variable, we balance the sample to ensure each treated and control firm has at least one pre and post observation.

Table 2 Propensity score models for the probability to receive coverage by an ESG rating agency

	Cohorts									
	KLD 1990	KLD 2000	KLD 2010	Bloomberg 2009	Refinitiv 2002	Refinitiv 2010	Refinitiv 2016	Sustainalytics 2008	Sustainalytics 2009	Sustainalytics 2015
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Intercept	−−12.244	−18.9506	−9.9542***	−0.9353	−19.8172***	−−21.7607	−8.0806***	−21.000	−11.539***	−7.0248
	(12.1408)	(12.3846)	(0.4702)	(13.0536)	(1.3844)	(43.0161)	(0.6514)	(15.393)	(0.8253)	(14.6206)
Total assets	1.5871***	2.2331***	1.7153***	0.2534***	1.8178***	1.6943***	0.4045***	1.9415***	1.2367***	0.3861***
	(0.0799)	(0.1515)	(0.0864)	(0.0428)	(0.1425)	(0.1506)	(0.0685)	(0.1337)	(0.096)	(0.0777)
Market-to-book ratio	0.7946***	1.8888***	1.475***	0.3078***	1.6403***	1.3536***	0.7022***	1.3545***	0.6539***	0.379***
	(0.1389)	(0.1599)	(0.0973)	(0.0603)	(0.1884)	(0.1868)	(0.0998)	(0.1599)	(0.131)	(0.0997)
Return on assets	6.2944***	3.6099***	0.6126*	0.6062**	−2.2611***	4.4472***	1.684***	−0.4195	1.1113	−0.0516
	(1.2975)	(1.015)	(0.3175)	(0.2559)	(0.8482)	(1.4534)	(0.4881)	(0.8251)	(0.9818)	(0.371)
Number of covering ESG rating agencies				0.3624**	1.921**	5.6502***	2.8823***	2.8014***	0.1207	0.5297**
				(0.1754)	(0.9426)	(0.6083)	(0.2908)	(0.4449)	(0.3516)	(0.244)
ESG score				0.2539***	0.7022***	0.383	0.2075	0.0684	−0.0748	0.8172***
				(0.0423)	(0.1693)	(0.3631)	(0.1489)	(0.2469)	(0.1528)	(0.1207)
Ownership % of institutions with high-ESG preference		0.8478	3.7154***	0.0602	1.1826**	0.5757	2.5277***	1.1817**	1.3852***	4.6955***
		(0.6355)	(0.545)	(0.2583)	(0.5571)	(0.5462)	(0.3798)	(0.4677)	(0.4636)	(0.544)
Industry fixed effects (# of significant)	0	0	2	0	2	0	0	0	4	0
Observations	2550	2721	2240	2405	2995	1975	1347	2441	2037	1453

The table reports coefficient estimates and standard errors from logit regressions for the probability of receiving a coverage by an ESG-rating agency in a given year. All models include industry fixed effects (17 Fama-French industries). All explanatory variables are sampled one year before the coverage initiation and are detailed in Appendix A. Missing ESG scores are coded with 0 for the matching procedure. The last row reports the total number of observations in each regression. (***), (**), and (*) indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively

provider, MSCI KLD tends to initiate coverage before all other agencies.

Data Sources

We compile our data from multiple sources. As noted earlier, we focus on the ESG coverage of four leading ESG rating providers. We obtain the actual ESG data from WRDS and Bloomberg and firm coverage criteria directly from the providers.

Our initial sample includes all publicly traded firms in CRSP and Compustat with fiscal years between 1986 and 2020. We exclude highly regulated financial firms and utilities. CRSP provides historical information on prices, returns, and shares outstanding for all stocks traded on the U.S. major exchanges: NYSE, AMEX, and Nasdaq. Compustat is supplied by Standard & Poor's and provides comprehensive accounting data for all publicly traded U.S. companies. We obtain institutional ownership level data from the Thomson-Reuters Global Ownership Data over the 1997–2020 period. We focus on the ownership of primary share classes and select the variables as of the last quarter available for each year to complement the Compustat dataset.

To examine the effect of ESG coverage on firm environmental performance, we employ data from the EPA's TRI and P2. The EPA provides facility-level disclosures of toxic chemical emissions and quantities processed through abatement activities for U.S. manufacturers, while P2 reports the source reduction activities implemented by these firms. To match the sample firms with parent firms reporting their facility releases to the EPA, we use the matching table provided by Xiong and Png (2019).

The data on government enforcement actions comes from the Violation Tracker database provided by the non-profit organization Good Jobs First. They document law violations written by over 50 US federal agencies. The data classify all violations into several primary offense groups. Based on this classification, we identify government enforcement actions related to environmental, social, employment, consumer, and financial irregularities.[16] We then count the number of violations within each category for a firm each year.

In Table 3, we report the means and standard deviations of all variables in the sample as well as averages of all variables across the treatment and control groups measured at the end of the matching year.[17] We observe that the sample and control firms are similar with respect to their ESG scores and total assets. Treated firms disclose more ESG information and have lower valuation ratios and higher institutional ownership than control firms. Approximately 20% of the sample belongs to the three largest industries—computer programming, data processing, and other computer-related services; drugs; and electronic components. More than 30% of the sample consists of firms located in the three most represented states—California, Texas, and New York. The geographic and industry composition of treated and control firms appears similar across the five most represented industries and states in the sample.

ESG Coverage and ESG Performance

Real ESG Performance

We start our analysis by examining the implications of ESG coverage for real ESG performance. Table 4 focuses on firm environmental impact, where the main variables of interest, in Panel A, are total toxic releases and total toxic releases scaled by toxicity and, in Panel B, measures of environmental pollution abatement activities. Following Russo and Harrison (2005), we proxy toxicity by the required threshold for reporting accidental spills—the "reportable quantities" (RQ) in the EPA's Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The reportable quantity varies from one to 5000 pounds for relatively benign chemicals. To construct the measure, first, we divide each toxic chemical release (in pounds) by its corresponding RQ and then aggregate all scaled quantities across firms. We also include the number of firm facilities and the total toxic releases by facility as additional dependent variables.

The sample of firms with toxic release information (TRI sample) consists of around 10% of the main sample. This is because it is focused only on manufacturers. Examining the variables from Table 3, we note that, when compared to the main sample, the TRI sample is similar. The TRI sample is slightly biased toward larger firms (log of total assets 7.19 against 6.4) and firms with higher ROA (0.04 against 0.01). The market-to-book ratio is virtually identical across the two samples (log market-to-book of 0.75 against 0.77), and so is institutional ownership (log of institutional ownership of 0.59 against 0.56). Moreover, TRI firms exhibit similar ESG scores and ESG disclosure measures. The most represented industries in the TRI sample are electronic components; computer programming, data processing, other computer-related services; drugs; motor vehicles and motor vehicle equipment; construction, mining, and materials handling machinery and equipment. The most represented states in the TRI sample are California, Texas, Illinois, New York, and Ohio.

[16] Environmental and financial violations are already labeled by the data provider. We classify as social violations all employment and consumer-related cases.

[17] Appendix A presents the definitions of all variables we use. We scale most of the variables by total assets (lagged total assets for flow variables). To ensure outliers do not skew the results, we winsorize all variables at the 1% and 99% level.

Table 3 Summary statistics

	Matched sample across all years		Matched sample (one year prior to the event)			
			Treated	Control	Treated minus Control	
	mean	STD	mean	mean	difference	t-stat
	(1)	(2)	(3)	(4)	(5)	(6)
Coverage	0.338	0.473	1	0	1***	
Post	0.3901	0.4878	0.0013	0.0006	0.0008	(1.2211)
Coverage*post	0.1586	0.3653	0.0013	0	0.0013**	(2.2374)
ESG score	3.4317	0.4072	3.4731	3.5156	−0.0425***	(−4.5014)
E score	3.8965	0.3447	3.8699	3.9481	−0.0781***	(−9.9169)
S score	3.3805	0.3979	3.4911	3.4413	0.0498***	(5.9616)
G score	3.9942	0.3139	4.0528	4.0884	−0.0356***	(−4.6065)
Total assets	6.4738	1.7072	6.6345	6.448	0.1865***	(5.9418)
Market to book value	0.7711	0.8429	0.7136	0.7046	0.009	(0.5421)
Return on assets	0.0133	0.1582	0.0025	−0.0084	0.0109***	(3.2906)
Leverage	0.1933	0.1622	0.1707	0.2156	−0.0448***	(−14.8348)
File size of 10-Ks	14.7874	1.4098	14.6983	14.5779	0.1205***	(4.2911)
Number of words in 10-Ks	10.484	0.4837	10.5283	10.5695	−0.0412***	(−3.9482)
Number of complex words In 10-Ks	9.1199	0.4836	9.1604	9.2015	−0.0411***	(−3.9549)
Number of ESG words in 10-Ks	6.3098	0.983	6.2693	6.1831	0.0862***	(4.2558)
Percent of ESG words in 10-Ks	0.999	0.5082	0.9468	0.8657	0.0811***	(7.8922)
Share of institutional ownership	0.5601	0.1636	0.5777	0.5506	0.0272***	(8.0067)
Number of institutional owners	4.9433	0.9902	5.1778	4.843	0.3348***	(17.1567)
ownership of institutions with High-ESG Preference	0.4169	0.1952	0.4367	0.407	0.0297***	(7.7107)
ownership of institutions with Low-ESG Preference	0.1518	0.1248	0.1689	0.1569	0.012***	(4.9167)
Matched sample across all years		Matched sample (one year prior to the shock)				
		Treated	Control	Treated minus Control		
Mean	STD	Mean	Mean	Difference	t-stat	
(1)	(2)	(3)	(4)	(5)	(6)	
9.4267	4.5488	9.9161	9.0056	0.9104***	(5.0694)	
4.0041	3.3165	4.1594	3.8379	0.3215**	(2.3659)	
8.1322	3.8862	8.4824	7.8341	0.6483***	(4.2148)	
2.8545	2.5384	2.9141	2.785	0.1291	(1.2316)	
1.6665	0.9213	1.7573	1.588	0.1693***	(4.4967)	
1.0602	0.9509	1.0976	1.005	0.0926**	(2.3886)	
1.1092	0.8921	1.2045	1.0474	0.1571***	(4.2631)	
0.0198	0.1395	0.0268	0.0134	0.0134***	(4.6084)	
7.5997	5.8923	7.0126	7.1573	−0.1447	(−0.5987)	
3.5417	4.8948	3.1725	2.8592	0.3133	(1.6319)	
0.0369	0.2047	0.0603	0.0221	0.0382***	(8.2871)	
0.0318	0.1808	0.0439	0.0262	0.0178***	(4.7567)	
0.0263	0.1598	0.0403	0.0209	0.0195***	(5.5762)	
0.0073	0.0824	0.0043	0.008	−0.0036***	(−2.8007)	
0.0018	0.0373	0.0029	0.0015	0.0014	(1.4535)	
9.26%	28.98%	8.27%	11.10%	−2.84%***	(−5.0805)	
6.41%	24.49%	7.70%	6.65%	1.06%**	(2.0725)	
4.64%	21.03%	5.39%	4.24%	1.16%***	(2.7152)	
4.00%	19.59%	2.52%	4.69%	−2.17%***	(−6.3808)	
3.70%	18.89%	4.08%	3.41%	0.67%*	(1.7759)	

Table 3 (continued)

Matched sample across all years		Matched sample (one year prior to the shock)			
		Treated	Control	Treated minus Control	
Mean	STD	Mean	Mean	Difference	t-stat
(1)	(2)	(3)	(4)	(5)	(6)
15.01%	35.72%	14.41%	16.13%	−1.72%**	(−2.486)
11.20%	31.54%	10.57%	11.60%	−1.03%*	(−1.6942)
5.88%	23.53%	6.52%	6.01%	0.51%	(1.0785)
4.66%	21.07%	5.72%	4.20%	1.51%***	(3.4786)
4.50%	20.73%	5.37%	4.06%	1.31%***	(3.086)

This table reports summary statistics for all variables used in the study. The definitions of all variables are provided in Appendix A. Columns 1 and 2 report the means and standard deviations for the matched sample across all years. Columns 3 and 4 report the means for the treated and control groups in the matched sample measured in the matching year only (one year prior to the coverage event). Columns 5 and 6 report the difference between the means in the treated and control groups and the associated t-statistics. (***), (**), and (*) indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively

We observe that the firms that receive additional coverage by an ESG rating agency have higher toxic emissions (Coverage). After receiving additional coverage, however, firms reduce both their total emissions and their toxicity-scaled emissions. The last two models of Panel A of Table 4 show that newly covered firms reduce significantly both their total toxic releases per facility and their toxicity-adjusted total toxic releases per facility. The control variables indicate that larger firms have more toxic emissions. As expected, larger firms also operate with more facilities. Growth firms (with high market-to-book ratios) tend to have lower emissions than value firms (with low market-to-book ratios). Firm profitability and leverage are insignificantly associated with toxic pollution. We also find that polluters tend to have fewer institutional investors. This is consistent with the idea that institutional investors prefer cleaner firms.

Beyond closing their most polluting facilities, companies could use various methods to decrease the emissions of their remaining facilities. The EPA recognizes a series of pollution abatements.[18] The most preferable practice is *prevent* pollution (source reduction), followed by *recycling*; *(combusting for) energy recovery*; and then *treatment or capture*.[19] To assess the implications of ESG coverage for firms' abatements, we use TRI variables on pollution mitigation, detailing the amount of chemical waste that went through recycling, energy recovery, and disposal. Additionally, we follow Akey and Appel (2019) and use the TRI P2 Database to develop an indicator variable for firm source reduction activities, such as implementing cleaner technologies or materials to prevent chemical waste during production.

The first model in Panel B of Table 4 shows that, after receiving the coverage, firms reduce their total number of facilities. The next two models reveal that it is exactly the high-polluting facilities that drive the disposal result. Model (4) of Panel B shows that firms that receive coverage are more likely to prevent pollution (reduce sources). We also find that the recycling and energy recovery of firms with additional ESG coverage differ insignificantly from the recycling and energy recovery of control firms. This result aligns with the decline in overall pollution generation reported in Model (4)—firms reduce waste, leading to less pollution to process.

Table 5 examines the implications of ESG coverage for violations of regulations imposed by 50 US federal agencies. As noted earlier, most of the violations could be classified into environmental, social, and governance categories. The dependent variables in Table 5 count the number of violations of each type by a firm in a given year. Consistent with the toxic emission results, we observe that treated firms are less compliant than control firms (Coverage). After receiving the additional coverage, however, treated firms are associated with fewer environmental and consumer violations. For example, the first model in the table indicates that, after receiving coverage, firms reduce their environmental violations by an additional 5.2 percent compared to the control group. The number of employment and financial violations is insignificantly affected by the additional coverage.[20]

The control variables in Table 5 indicate that larger firms are subject to more government enforcement actions across all types of violations. Firm valuation ratios and profitability relate insignificantly to enforcement actions,

[18] See https://www.epa.gov/environmental-economics/pollution-abatement-costs-and-expenditures-2005-survey

[19] See https://www.epa.gov/sites/default/files/2020-02/documents/10588_tri_p2_factsheet_13feb2020_0.pdf

[20] These findings are consistent with those of Tsang et al (2024), who find a negative correlation between ESG violations and the commencement and extent of coverage by four ESG rating agencies.

Table 4 Firm ESG coverage and environmental pollution

Panel A: Toxic releases	Total toxic releases	Total toxic releases scaled by toxicity	Toxic releases per facility	Toxic releases scaled by toxicity by facility
	(1)	(2)	(4)	(5)
Coverage*post	**−1.262*****	**−0.948*****	**−0.955*****	**−0.596*****
	(−3.254)	**(−3.342)**	**(−2.818)**	**(−2.694)**
Coverage	1.557***	0.799**	1.178***	0.469*
	(3.222)	(2.223)	(2.876)	(1.708)
Post	0.654	0.321	0.342	−0.011
	(1.408)	(1.080)	(0.858)	(−0.044)
Total assets	1.325***	1.282***	0.898***	0.810***
	(7.514)	(10.195)	(5.656)	(8.619)
Market-to-book ratio	−0.661***	−0.293*	−0.526***	−0.172
	(−3.165)	(−1.698)	(−2.904)	(−1.346)
Return on assets	0.609	0.785	0.410	0.634
	(0.382)	(0.612)	(0.286)	(0.590)
Leverage	0.484	−1.476	−0.183	−1.825**
	(0.281)	(−1.494)	(−0.118)	(−2.334)
Number of institutional owners	0.093	−0.376	0.058	−0.367**
	(0.297)	(−1.510)	(0.218)	(−2.189)
Observations	4758	4758	4758	4758
Adjusted R-squared	0.368	0.403	0.316	0.350
Year-cohort and industry-cohort FEs	Yes	Yes	Yes	Yes

Panel B: Environmental pollution abatement	Number of facilities	Number of high-polluting facilities	Number of low-polluting facilities	Source Reduction	Recycling	Energy recovery
	(1)	(2)	(3)	(4)	(5)	(6)
Coverage*post	**−0.213****	**−0.283*****	**−0.125**	**0.053***	**0.356**	**−0.448**
	(−2.424)	**(−3.694)**	**(−1.340)**	**(1.668)**	**(0.684)**	**(−0.770)**
Coverage	0.242**	0.220**	0.131	−0.005	−0.309	0.615
	(2.117)	(2.096)	(1.138)	(−0.150)	(−0.517)	(1.258)
Post	0.224**	0.221**	0.183**	−0.022	−0.330	−0.009
	(2.338)	(2.442)	(2.020)	(−0.741)	(−0.626)	(−0.012)
Total assets	0.338***	0.420***	0.133**	−0.023**	−0.161	0.374
	(6.742)	(8.689)	(2.438)	(−2.338)	(−0.737)	(1.262)
Market-to-book ratio	−0.113*	−0.061	−0.112*	0.011	−0.279	0.128
	(−1.848)	(−1.046)	(−1.701)	(1.140)	(−1.061)	(0.467)
Return on assets	0.157	−0.126	0.461	0.029	2.493	−3.082
	(0.447)	(−0.368)	(1.252)	(0.271)	(1.224)	(−1.639)
Leverage	0.549	−0.158	1.126***	−0.041	1.587	−2.480
	(1.529)	(−0.479)	(2.976)	(−0.471)	(0.762)	(−1.481)
Number of institutional owners	0.000	−0.062	0.157	0.028*	0.990**	0.381
	(0.003)	(−0.638)	(1.536)	(1.950)	(2.590)	(0.800)
Number of facilities				0.115***	3.077***	1.878***
				(8.538)	(8.725)	(5.569)
Observations	4758	4758	4758	4758	4758	4758
Adjusted R-squared	0.365	0.420	0.212	0.117	0.427	0.304

Table 4 (continued)

Panel B: Environmental pollution abatement						
	Number of facilities	Number of high-polluting facilities	Number of low-polluting facilities	Source Reduction	Recycling	Energy recovery
	(1)	(2)	(3)	(4)	(5)	(6)
Year-cohort and Industry-cohort FEs	Yes	Yes	Yes	Yes	Yes	Yes

We identify firms that receive coverage by an ESG rating agency and could be matched with (up to five) firms that exhibit similar propensity scores (estimated in Table 2), are covered by the same or a smaller number of rating agencies, and did not receive the coverage. The first group of firms constitutes our treatment group and their five closest-matched counterparts – our control group. Afterward, we construct a stacked sample where, for each treatment cohort (coverage event), we keep only control firm-years that were not treated by the agency over the next five years following the event. We repeat this procedure for each coverage expansion cohort and stack all cohorts together to construct the stacked sample. The table reports coefficient estimates and t-statistics from OLS regressions of firm toxic releases on *Coverage*, an indicator variable equal to 1 for treated firms; Post, an indicator variable equal to 1 for the inclusion year and all subsequent years; and *Coverage* * Post. The dependent variables in Panel A are the natural log of one plus firm total toxic releases, total toxic releases scaled by toxicity, toxic releases per facility, and total toxic releases scaled by toxicity per facility. The dependent variables in Panel B are the natural log of one plus number of reporting facilities in a firm, number of high-(low-) polluting facilities in a firm, an indicator variable for source reduction activities, firms' chemical waste that went through recycling, and energy recovery. All firms are followed from 5 years before until 5 years after coverage expansion. The sample includes 278 treatments and covers the 1997–2020 period. All models include year-cohort (biannual) and industry-cohort (defined by the first SIC code digit) fixed effects. Standard errors are clustered at the firm level. All variables are detailed in Appendix A. The last two rows report the total number of observations and adjusted R-squared of each regression. (***), (**), and (*) indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively

while more leveraged firms tend to be more compliant. Finally, institutional investors are less likely to hold the stocks of companies with more environmental and consumer violations.

ESG Ratings

We continue our analysis by exploring the implications of ESG coverage by a rating agency for the outstanding ESG ratings of firms. Hypothesis 1 implies that, if ratings are informative and coverage pressures firms to improve their ESG performance, then increased coverage will improve firm ESG ratings.

While Sustainalytics and Bloomberg provide aggregate ESG scores, MSCI KLD ratings consist of binary indicators for strengths and concerns along the E, S, and G dimensions as well as miscellaneous indicators that do not fit in these categories. Since the number of indicators varies from year to year, we follow the literature to make the ratings comparable across time (e.g., Kempf and Osthoff 2007; Halbritter and Dorfleitner 2015). To this end, we first compute the total ESG score as the sum of all E, S, and G strengths minus the sum of all E, S, and G concerns. We then normalize the scores each year between 0 and 100.[21] At the end, we compute the average ESG ratings based on the MSCI KLD and Sustainalytics normalized scores.[22]

Column (1) of Table 6 presents the results for the aggregate ESG score. The dependent variables in columns (2) to (4) are the E, S, and G components of the index, respectively. We observe that covered firms have experienced a decrease in their ratings over the sample period (Post). Our primary variable of interest, the interaction term *Coverage * Post,* is positive and statistically significant in models (1) through (4). The magnitude of the effect is also not trivial. For example, model (1) implies that initiation of additional ESG coverage by an agency increases a firm's ESG score by an additional 8.8 percent relative to the control group.

To examine the effect of rating disagreement on the coverage effect, we divide the sample into four groups based on the average ESG ratings of the treated firms one year before the treatment and the ESG rating of the new agency. We consider a rating high if it is above the median of all covered firms in a given year and low if it is below the median. Table 7 estimates the implications of coverage for existing ESG ratings, pollution, government enforcement actions, and ESG disclosures within four subsamples in which a high rating was followed by a high rating (model 1), a high rating was followed by a low rating (model 2), a low rating was followed by a high rating (model 3), and a low

[21] The normalization formula is (ESG – min(ESG))/(max(ESG) – min(ESG))*100.

[22] We do not have Refinitiv ratings data and exclude the Bloomberg scores from this analysis because Bloomberg focuses predominantly on disclosure quality.

Table 5 Firm ESG coverage and government enforcement actions

	Environmental violations	Social violations	Employment violations	Consumer violations	Financial violations
	(1)	(2)	(3)	(4)	(5)
Coverage*post	**−0.052***	**−0.051*****	**−0.029**	**−0.024***	**−0.004**
	(−1.879)	**(−2.906)**	**(−1.489)**	**(−1.899)**	**(−0.865)**
Coverage	0.081***	0.021	0.028	−0.015**	0.004
	(3.754)	(0.896)	(1.249)	(−2.211)	(1.547)
Post	0.023	0.073***	0.021	0.047	0.005
	(0.723)	(3.086)	(0.716)	(1.473)	(1.225)
Total assets	0.096***	0.076***	0.055***	0.031***	0.007***
	(3.979)	(5.411)	(4.899)	(4.284)	(2.622)
Market-to-book ratio	−0.009	0.011	0.004	0.012*	0.002
	(−0.797)	(1.023)	(0.467)	(1.956)	(1.036)
Return on assets	−0.177**	−0.054	−0.051	−0.011	−0.019*
	(−2.311)	(−1.490)	(−1.637)	(−0.746)	(−1.853)
Leverage	−0.187***	−0.140***	−0.098**	−0.060**	−0.017**
	(−2.760)	(−2.659)	(−2.221)	(−2.437)	(−2.478)
Number of institutional owners	−0.053*	−0.033	−0.016	−0.023*	−0.003
	(−1.649)	(−1.136)	(−0.775)	(−1.695)	(−0.941)
Observations	15366	15366	15366	15366	15366
Adjusted R-squared	0.195	0.297	0.204	0.292	0.022
Year-cohort and industry-cohort FEs	Yes	Yes	Yes	Yes	Yes

We identify firms that receive coverage by an ESG rating agency and could be matched with (up to five) firms that exhibit similar propensity scores (estimated in Table 2), are covered by the same or a smaller number of rating agencies, and did not receive the coverage. The first group of firms constitutes our treatment group and their five closest-matched counterparts – our control group. Afterward, we construct a stacked sample where, for each treatment cohort (coverage event), we keep only control firm-years that were not treated by the agency over the next five years following the event. We repeat this procedure for each coverage expansion cohort and stack all cohorts together to construct the stacked sample. The table reports coefficient estimates and t-statistics from OLS regressions of firm government enforcement actions on *Coverage*, an indicator variable equal to 1 for treated firms; *Post*, an indicator variable equal to 1 for the inclusion year and all subsequent years; and *Coverage * Post*. The dependent variables are natural log of one plus the number of government enforcement actions related to firm environmental, social, employment, consumer, and financial violations. All firms are followed from 5 years before until 5 years after coverage expansion. The sample includes 651 treatments and covers the 1997–2020 period. All models include year-cohort (biannual) and industry-cohort (defined by the first SIC code digit) fixed effects. Standard errors are clustered at the firm level. All variables are detailed in Appendix A. The last two rows report the total number of observations and adjusted R-squared of each regression. (***), (**), and (*) indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively

rating was followed by a low rating (model 4). The appendix provides the definitions of all variables.

We observe that coverage by ESG rating agencies tends to improve firm ESG performance, independent of the relative magnitude of the old and the new ratings. Both real ESG performance and existing ratings increase across all four subsamples. The only exception is model (2) in Panel A, indicating that firms with high outstanding ratings experience a decline in these ratings when their rating from the new agency is relatively low. We note, however, that this "downgrade" is not supported by real ESG performance, as real ESG performance of companies in this group does not worsen. This is more consistent with rating agencies adjusting their scores downward. One plausible explanation for the downgrade by legacy agencies is that, because assigning a low rating to a highly rated firm could be controversial, the new rating agency performs more due diligence in these cases. As a result, the new ratings tend to be more informative and lead other ratings.

ESG Disclosures

Next, we examine the implications of ESG coverage for corporate disclosure policies. The dependent variable in model (1) of Panel A of Table 8 is the number of ESG-related words in a firm's 10-K filing. To calculate this number, we construct a dictionary of ESG words based on the language used by MSCI KLD and Refinitiv to describe the scope of ESG coverage in their handbooks.[23] Appendix B presents the complete ESG dictionary. Figure 2 presents a word cloud with the most frequently used words form the

[23] Out of the four agencies, MSCI and Refinitiv are the only ones that describe their ranking criteria in detail.

Table 6 Firm ESG coverage and average ESG ratings

	ESG score (1)	E score (2)	S score (3)	G score (4)
Coverage*post	**0.088*** **	**0.035** **	**0.062*** **	**0.087*** **
	(4.625)	**(2.118)**	**(3.761)**	**(5.320)**
Coverage	−0.033***	−0.033***	−0.011	−0.017
	(−2.678)	(−4.235)	(−0.832)	(−1.454)
Post	−0.128	−0.120	−0.099	−0.068
	(−0.964)	(−1.261)	(−0.890)	(−0.838)
Total assets	0.067***	0.021***	0.090***	−0.019***
	(8.417)	(4.225)	(9.395)	(−2.593)
Market-to-book ratio	0.033***	0.006	0.040***	0.008
	(3.458)	(0.975)	(4.015)	(1.098)
Return on assets	0.012	0.037*	−0.057	0.107***
	(0.320)	(1.692)	(−1.351)	(3.243)
Leverage	−0.187***	−0.018	−0.264***	0.066
	(−4.506)	(−0.720)	(−5.829)	(1.476)
Number of institutional owners	−0.043**	−0.002	−0.016	−0.085***
	(−2.561)	(−0.275)	(−0.685)	(−5.399)
Observations	43578	43578	43481	43481
Adjusted R-squared	0.521	0.667	0.504	0.429
Year-cohort and industry-cohort FEs	Yes	Yes	Yes	Yes

We identify firms that receive coverage by an ESG rating agency and could be matched with (up to five) firms that exhibit similar propensity scores (estimated in Table 2), are covered by the same or a smaller number of rating agencies, and did not receive the coverage. The first group of firms constitutes our treatment group and their five closest-matched counterparts – our control group. Afterward, we construct a stacked sample where, for each treatment cohort (coverage event), we keep only control firm-years that were not treated by the agency over the next five years following the event. We repeat this procedure for each coverage expansion cohort and stack all cohorts together to construct the stacked sample. The table reports coefficient estimates and t-statistics from OLS regressions of firm ESG scores on *Coverage*, an indicator variable equal to 1 for treated firms; *Post*, an indicator variable equal to 1 for the inclusion year and all subsequent years; and *Coverage * Post*. The dependent variables are the natural log of one plus the normalized average ESG, E, S, and G scores based on MSCI KLD and Sustainalytics. All firms are followed from 5 years before until 5 years after coverage expansion. The sample includes 1966 treatments and covers the 1998–2020 period. All models include year-cohort and industry-cohort (defined by the first two SIC code digits) fixed effects. Standard errors are clustered at the firm level. All variables are detailed in Appendix A. The last two rows report the total number of observations and adjusted R-squared of each regression. (***), (**), and (*) indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively

dictionary. The figure suggests that our dictionary captures verbiage linked to ESG issues. The dependent variables in model (2) of Panel A of Table 8 are the percentage of ESG-related words in a firm's 10-K filing (relative to the total number of words). In models (3), (4), and (5) of Panel A of Table 8, we evaluate the implications of ESG coverage for the size of the disclosure, measured with the size of the firm's 10-K in megabytes and number of words, and for the complexity of the report, respectively. In models (1) and (2), we also add these three variables as additional controls.

We find that, following a coverage expansion, firms disclose more ESG-related information both in absolute terms and relative to the size of the filing. Like Drempetic, Klein, and Zwergel (2020), we also find that larger firms (total assets) disclose more ESG information. ESG disclosure correlates negatively with accounting performance (return on assets) and positively with the number of institutional investors. As expected, larger filings contain more ESG information.

If ESG rating agencies pressure firms to improve their ESG performance, one would expect firms to comment on the coverage in their annual reports. A review of the 10-K filings of firms that have received additional coverage by ESG rating agencies shows that this is indeed the case. For example, CMS Energy Corp. states in its 2017 annual report: "In a 2016 report published by Sustainalytics, a global leader in sustainability research and analysis, CMS Energy scored the highest among 54 U.S. utilities in environmental, social, and governance performance." Xylem Inc. comments in its 2020 annual report that its 2019 credit facility included a

Table 7 The effect of ESG coverage conditional on ratings disagreement

Panel A- Average ESG ratings				
	High-high	High-low	Low-high	Low-low
	(1)	(2)	(3)	(4)
Coverage*post	0.132***	−0.045*	0.206***	0.074***
	(3.700)	(−1.649)	(6.307)	(2.808)
Observations	7594	8822	11453	9726
Adjusted R-squared	0.502	0.619	0.429	0.529
Panel B- Environmental pollution				
Coverage*post	−1.236**	−0.271	−1.346*	−0.504
	(−2.138)	(−0.575)	(−1.879)	(−1.146)
Observations	1006	470	1163	727
Adjusted R-squared	0.395	0.582	0.268	0.416
Panel C- Government enforcement actions				
Coverage*post	−0.100*	−0.092	−0.075	−0.041
	(−1.885)	(−1.468)	(−1.571)	(−0.793)
Observations	3323	2611	2909	2524
Adjusted R-squared	0.490	0.338	0.278	0.177
Panel D- ESG disclosure				
Coverage*post	0.064*	0.052*	0.083***	0.112***
	(1.923)	(1.868)	(3.460)	(4.644)
Observations	8209	10216	12415	11330
Adjusted R-squared	0.713	0.682	0.660	0.664

We identify firms that receive coverage by an ESG rating agency and could be matched with (up to five) firms that exhibit similar propensity scores (estimated in Table 2), are covered by the same or a smaller number of rating agencies, and did not receive the coverage. The first group of firms constitutes our treatment group and their five closest-matched counterparts – our control group. Afterward, we construct a stacked sample where, for each treatment cohort (coverage event), we keep only control firm-years that were not treated by the agency over the next five years following the event. We repeat this procedure for each coverage expansion cohort and stack all cohorts together to construct the stacked sample. Afterwards, we divide the sample into four groups based on the average ESG ratings of the treated firms one year before the treatment and the ESG rating of the new agency. We consider a rating *High* if it is above the median and *Low* if it is below the median of all covered firms in a given year. For example, the column *High-High* includes all treated firms (and their control firms) who had above-median average ratings pre-treatment and received a new rating which was also above the median of all newly-covered firms. The table reports coefficient estimates and t-statistics from OLS regressions on *Coverage*, an indicator variable equal to 1 for treated firms; *Post*, an indicator variable equal to 1 for the inclusion year and all subsequent years; and *Coverage * Post*. The dependent variable in *Panel A* is the average ESG score (not including the score from the coverage); the dependent variable in *Panel B* is the natural log of one plus firm total toxic releases, the dependent variable in *Panel C* is the number of government enforcement actions for environmental and social violations; and the dependent variable in *Panel D* is the number of ESG-related words in firm 10-K filing. All firms are followed from 5 years before until 5 years after the coverage expansion. All models include all baseline control variables, year-cohort and industry-cohort fixed effects. Standard errors are clustered at the firm level. All variables are detailed in Appendix A. (***), (**), and (*) indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively

pricing grid that "determines the applicable margin based on Xylem's credit rating, with a further adjustment depending on Xylem's annual Sustainalytics Environmental, Social and Governance score."

Our results are consistent with the idea that ESG rating agencies pressure firms to disclose more ESG information. As noted by Drempetic, Klein, and Zwergel (2020) and others, ESG rating agencies award higher ratings to companies disclosing more ESG-related information. This raises the question of whether the positive impact of coverage on ESG ratings documented in Table 6 reflects increased disclosure. To delve into this possibility, in Panel B of Table 8, we estimate all models from Table 6 by adding the disclosure variable as an additional control. Consistent with the existing evidence, we confirm that firms disclosing more ESG information in their annual reports receive higher ratings. The magnitude of the coverage effect on firm ESG ratings, however, is insignificantly affected by the inclusion of the disclosure variable. This suggests that improved disclosures do not mainly drive the higher ESG ratings of more covered firms.

Table 8 Firm ESG coverage and ESG disclosure

Panel A – ESG disclosure

	ESG words in 10-Ks	Percent of ESG words in 10-Ks	File size of 10-Ks	Number of words in 10-Ks	Number of complex words in 10-Ks
	(1)	(2)	(3)	(4)	(5)
Coverage*post	**0.063*****	**0.039*****	**0.077*****	**0.014**	**0.014**
	(3.237)	**(2.786)**	**(2.935)**	**(1.051)**	**(1.121)**
Coverage	−0.050***	−0.025***	−0.061***	−0.053***	−0.054***
	(−3.385)	(−2.677)	(−3.136)	(−3.685)	(−3.871)
Post	−0.084	−0.045	−0.062	−0.051	−0.054
	(−0.524)	(−0.518)	(−0.355)	(−0.348)	(−0.354)
Total assets	0.016	0.009	0.172***	0.095***	0.097***
	(1.478)	(1.405)	(13.282)	(10.247)	(10.849)
Market-to-book ratio	−0.004	−0.003	0.024*	0.014	0.014
	(−0.435)	(−0.485)	(1.808)	(1.606)	(1.644)
Return on assets	−0.283***	−0.172***	−0.339***	−0.538***	−0.543***
	(−5.991)	(−5.866)	(−6.007)	(−12.835)	(−13.578)
Leverage	−0.043	−0.008	0.217***	0.136***	0.121***
	(−0.655)	(−0.200)	(3.043)	(3.009)	(2.740)
Number of institutional	0.063***	0.037***	0.022	0.044***	0.049***
owners	(4.204)	(4.250)	(1.070)	(3.228)	(3.698)
File size of 10-Ks	0.327***	0.216***			
	(24.237)	(25.527)			
Number of words in 10-Ks	−0.803***	−1.099***			
	(−4.727)	(−9.852)			
Number of complex words	1.273***	0.764***			
in 10-Ks	(7.221)	(6.641)			
Observations	62944	62944	62944	62944	62944
Adjusted R-squared	0.792	0.674	0.847	0.501	0.525
Year-cohort and industry-cohort FEs	Yes	Yes	Yes	Yes	Yes

Panel B – Firm ESG coverage and average ESG ratings: controlling for ESG disclosure

	ESG score	E score	S score	G score
	(1)	(2)	(3)	(4)
Coverage*post	**0.094*****	**0.036****	**0.061*****	**0.085*****
	(4.903)	**(2.119)**	**(3.689)**	**(5.204)**
Percent of ESG words in 10-Ks	**0.047*****	**0.018**	**0.037*****	**0.050*****
	(3.156)	**(1.472)**	**(2.670)**	**(4.632)**
Coverage	−0.038***	−0.029***	−0.016	−0.019
	(−2.985)	(−3.704)	(−1.175)	(−1.554)
Post	−0.132	−0.121	−0.102	−0.070
	(−0.988)	(−1.275)	(−0.904)	(−0.884)
Total assets	0.065***	0.020***	0.090***	−0.019**
	(7.708)	(4.019)	(8.723)	(−2.379)
Market-to-book ratio	0.034***	0.004	0.042***	0.009
	(3.374)	(0.702)	(4.078)	(1.270)
Return on assets	0.004	0.038	−0.074*	0.115***
	(0.110)	(1.628)	(−1.696)	(3.231)
Leverage	−0.173***	−0.012	−0.258***	0.073

Table 8 (continued)

Panel B – Firm ESG coverage and average ESG ratings: controlling for ESG disclosure	ESG score	E score	S score	G score
	(1)	(2)	(3)	(4)
	(−4.065)	(−0.491)	(−5.470)	(1.515)
Number of institutional owners	−0.044**	−0.005	−0.018	−0.088***
	(−2.317)	(−0.629)	(−0.669)	(−4.961)
Observations	40524	40524	40439	40439
Adjusted R-squared	0.518	0.669	0.507	0.437
Year-cohort and industry-cohort FEs	Yes	Yes	Yes	Yes

We identify firms that receive coverage by an ESG rating agency and could be matched with (up to five) firms that exhibit similar propensity scores (estimated in Table 2), are covered by the same or a smaller number of rating agencies, and did not receive the coverage. The first group of firms constitutes our treatment group and their five closest-matched counterparts – our control group. Afterward, we construct a stacked sample where, for each treatment cohort (coverage event), we keep only control firm-years that were not treated by the agency over the next 5 years following the event. We repeat this procedure for each coverage expansion cohort and stack all cohorts together to construct the stacked sample. The table reports coefficient estimates and t-statistics from OLS regressions of firm ESG disclosure variables on *Coverage*, an indicator variable equal to 1 for treated firms; *Post*, an indicator variable equal to 1 for the inclusion year and all subsequent years; and *Coverage* * *Post*. The dependent variables in Panel A are the natural log of one plus the number of ESG-related words, the percentage of ESG-related words in firm 10-K filing, the size of the firm 10-K filing in Megabytes, the number of words, and the number of complex words in firm 10-K filings. The dependent variables in Panel B are the natural log of one plus the normalized average ESG, E, S, G scores based on MSCI KLD and Sustainalytics. All firms are followed from 5 years before until 5 years after the coverage expansion. The sample includes 2849 treatments and covers the 1997–2020 period. All models include year-cohort and industry-cohort (defined by the first two SIC code digits) fixed effects. Standard errors are clustered at the firm level. All variables are detailed in Appendix A. The last two rows report the total number of observations and adjusted R-squared of each regression. (***), (**), and (*) indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively

Institutional Ownership

Table 9 evaluates changes in institutional ownership in response to ESG coverage. The dependent variable in model (1) is the percentage of institutional ownership, while the dependent variable in model (2) is the number of institutional owners in a given stock. We find that an increase in ESG coverage increases the level of institutional ownership in terms of both percentage share ownership and the number of institutional investors. The effect here is also economically meaningful. For example, one additional coverage increases firm institutional ownership by 2.1 percent.

The last two models of Table 9 evaluate the implications of ESG coverage for institutions with a revealed preference for high- or low-ESG stocks. We classify institutions as ESG-friendly or ESG-unfriendly as follows. Each year, we sort stocks into two groups, depending on whether they rank above (HESG) or below (LESG) the median ESG score in the market that year based on MSCI KLD scores. We then calculate the percentage allocation of each institutional investor across the two types of stocks, HESG and LESG, net of the relative weight of these groups of stocks in the market portfolio. We refer to these adjusted weights as HESG bias and LESG bias, respectively. We measure the overall bias of an institution toward high-ESG stocks as the difference of its HESG bias minus its LESG bias. In other words, investors exhibit revealed preferences for ESG stocks if they tend to overweight high-ESG stocks and underweight low-ESG stocks. We then classify institutions in the top (bottom) 20% of their overall bias as having a revealed preference for high- (low-) ESG stocks.

We find that increased ESG coverage by rating agencies increases the ownership of institutional investors with revealed preference for high-ESG firms. Specifically, additional coverage by a rating agency increases firm ownership by ESG-conscious institutions by 2.1 percentage points. Institutions with a revealed preference for low-ESG firms do not respond to the additional coverage. These results are consistent with Hypothesis 2a.

Our institutional ownership results also comport with evidence from other studies that institutional investors incorporate ESG information into their investment decisions (Dyck et al. 2019; Hong and Kacperczyk 2009). Chen, Dong, and Lin (2020) find that institutional ownership improves firm ESG performance through ESG-related proposals. Dimson, Karakas, and Li (2015) further show that institutional investors are more likely to engage with companies with inferior ESG performance. Furthermore, after successful engagements, companies experience improved accounting performance.

Examining the Effect of Industry Competition

As noted earlier, we contend that ESG rating agencies could generate additional information about the firms they cover by lowering information costs or promoting standardization.

Fig. 2 Word cloud of ESG dictionary words in 10-K filings

To better understand how ESG rating agencies engage in information production, we assess the coverage effect conditional on the competitiveness of the firm industry. Hypothesis 2b states that, if rating standardization facilitates the comparisons of ESG performance across firms, then the coverage effect would strengthen in more competitive markets. Thus, a different coverage effect across more competitive and less competitive industries would allow us to evaluate the relative importance of standardization.

In Table 10, we divide the sample into two groups based on the industry competitiveness of treated firms one year before the treatment. To this end, we define industries based on three-digit SIC codes. We consider an industry to be highly competitive if it ranks in the top 25 percent based on the total number of firms during that year. Table 10 estimates the coverage effect on the firm total toxic releases; environmental, social, and governance violations; ESG score; the number of ESG-related words in the firm's annual report (a measure of ESG disclosure); and institutional ownership of investors with revealed preference for high-ESG stocks, within the two subsamples. We observe that the coverage effect is equally strong among firms in both highly and less competitive industries. This suggests that the effect of ESG rating agencies goes beyond facilitating comparisons across firms.

Robustness Tests

Our empirical design controls for many confounding effects that could affect both ESG coverage and ESG performance.

Table 9 Firm ESG coverage and institutional ownership

	Share of institutional ownership	Number of institutional owners	Ownership % of institutions with high-ESG preference	Ownership % of institutions with low-ESG preference
	(1)	(2)	(3)	(4)
Coverage*post	**0.021*****	**0.072*****	**0.021*****	**0.004**
	(4.643)	**(4.454)**	**(4.284)**	**(0.877)**
Coverage	0.002	0.101***	0.012**	−0.003
	(0.372)	(5.765)	(2.551)	(−0.804)
Post	−0.092***	−0.310***	−0.076***	−0.063***
	(−4.147)	(−4.148)	(−3.298)	(−4.993)
Total assets	0.048***	0.466***	0.068***	−0.004***
	(16.932)	(47.158)	(26.008)	(−3.084)
Market-to-book ratio	0.017***	0.264***	0.029***	−0.005**
	(5.344)	(21.023)	(9.366)	(−2.307)
Return on assets	0.077***	0.303***	0.053***	0.026***
	(4.802)	(4.826)	(3.347)	(2.909)
Leverage	−0.077***	−0.995***	−0.139***	0.017
	(−4.117)	(−15.305)	(−7.478)	(1.302)
Observations	63173	63619	61871	61894
Adjusted R-squared	0.392	0.804	0.623	0.416
Year-cohort and industry-cohort FEs	Yes	Yes	Yes	Yes

We identify firms that receive coverage by an ESG rating agency and could be matched with (up to five) firms that exhibit similar propensity scores (estimated in Table 2), are covered by the same or a smaller number of rating agencies, and did not receive the coverage. The first group of firms constitutes our treatment group and their five closest-matched counterparts – our control group. Afterward, we construct a stacked sample where, for each treatment cohort (coverage event), we keep only control firm-years that were not treated by the agency over the next five years following the event. We repeat this procedure for each coverage expansion cohort and stack all cohorts together to construct the stacked sample. The table reports coefficient estimates and t-statistics from OLS regressions of firm institutional ownership variables on *Coverage*, an indicator variable equal to 1 for treated firms; *Post*, an indicator variable equal to 1 for the inclusion year and all subsequent years; and *Coverage* * *Post*. The dependent variables are the natural log of one plus the percentage of institutional ownership, the number of institutional investors, and the ownership share for institutions with a revealed preference for high-/low-ESG stocks. All firms are followed from 5 years before until 5 years after coverage expansion. The sample includes 2442 treatments and covers the 1997–2020 period. All models include year-cohort and industry-cohort (defined by the first two SIC code digits) fixed effects. Standard errors are clustered at the firm level. All variables are detailed in Appendix A. The last two rows report the total number of observations and adjusted R-squared of each regression. (***), (**), and (*) indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively

In this section, we perform additional tests aimed at ruling out a spurious association between ESG coverage and performance.

One commonly used diagnostic for confounding effects is parallel trends in the values of the dependent variable across the treatment and control groups pre treatment. This requires that, absent treatment, the difference between the treatment and control groups is constant over time. In Panel A of Table 11, we decompose the post-period variable and its interactions with *Coverage* into indicator variables for each year relative to the event. We do not identify any significant positive effect of the additional coverage pre treatment. However, the pre-event interaction terms suggest that, 5 years prior to the event, newly covered firms tend to disclose less ESG-related information, with the difference dissipating after year four.[24]

In Panel B of Table 11, we estimate all baseline models with firm and year fixed effects. The interaction term between *Coverage* and *Post* variable remains statistically significant in most models. The exception is the total toxic releases regression, where the interaction term preserves its positive sign but loses statistical significance. This is likely due to the relatively small sample size of this model.

While the propensity-score matching can match treated and control firms based on observables, it cannot address selection on account of unobserved factors. With this in mind, we design a placebo test, where, for each expansion

[24] To mitigate concerns regarding a potential violation of the parallel trends assumption in the disclosure model, we conduct a sensitivity analysis of the ESG coverage effect on firm ESG disclosure, following Rambachan and Roth (2023) (see also He and Maire (2023) and Li and Li (2025)). We find that the coverage effect on firm ESG disclosure is robust with respect to this test.

Table 10 Competitive vs. less competitive industries

Panel A – High competition					
	Total toxic releases scaled by toxicity	Total violations	ESG score	Percent of ESG words in 10-Ks	Ownership % of institutions with high-ESG preference
	(1)	(2)	(3)	(4)	(5)
Coverage*post	**−1.018*****	**−0.099*****	**0.092*****	**0.035****	**0.019*****
	(−3.062)	**(−3.235)**	**(4.696)**	**(2.465)**	**(3.722)**
Coverage	0.721*	0.064*	−0.024*	−0.018*	0.009*
	(1.653)	(1.657)	(−1.852)	(−1.813)	(1.754)
Post	0.211	0.127***	0.097***	0.020	−0.024***
	(0.610)	(3.037)	(6.026)	(1.254)	(−4.498)
Observations	2874	9279	30451	45861	43977
Adjusted R-squared	0.389	0.332	0.499	0.663	0.616
Panel B - Low competition					
	Total toxic releases scaled by toxicity	Total violations	ESG score	Percent of ESG words in 10-Ks	Ownership % of institutions with high-ESG preference
	(1)	(2)	(3)	(4)	(5)
Coverage*post	**−0.889*****	**−0.085****	**0.089*****	**0.063*****	**0.025*****
	(−2.712)	**(−2.303)**	**(3.539)**	**(3.093)**	**(4.084)**
Coverage	0.945**	0.162***	−0.081***	−0.033*	0.018**
	(1.981)	(3.598)	(−3.212)	(−1.855)	(2.161)
Post	0.480	0.053	0.084***	−0.013	−0.038***
	(1.263)	(1.273)	(3.981)	(−0.589)	(−6.106)
Observations	1882	6087	13120	17072	17887
Adjusted R-squared	0.512	0.313	0.495	0.688	0.603

We identify firms that receive coverage by an ESG rating agency and could be matched with (up to five) firms that exhibit similar propensity scores (estimated in Table 2), are covered by the same or a smaller number of rating agencies, and did not receive the coverage. The first group of firms constitutes our treatment group and their five closest-matched counterparts – our control group. Afterward, we construct a stacked sample where, for each treatment cohort (coverage event), we keep only control firm-years that were not treated by the agency over the next five years following the event. We repeat this procedure for each coverage expansion cohort and stack all cohorts together to construct the stacked sample. We divide the sample into two groups based on the industry competitiveness of treated firms one year before the treatment, where industries are defined based on three-digit SIC codes. We consider an industry to be highly competitive if it ranks within the top 25 percent based on total number of firms. The table reports coefficient estimates and t-statistics from OLS regressions on *Coverage*, an indicator variable equal to 1 for treated firms; *Post*, an indicator variable equal to 1 for the inclusion year and all subsequent years; and *Coverage * Post*. The dependent variables are the natural log of one plus firm total toxic releases, the number of government enforcement actions for environmental, social, and governance violations, the average ESG score, the number of ESG-related words in firm 10-K filing, and the percentage ownership of institutions with a revealed preference for high-ESG stocks. All firms are followed from 5 years before until 5 years after coverage expansion. Only the coefficient for the interaction term *Coverage * Post* is reported. All models include baseline control variables, year-cohort and industry-cohort fixed effects. Standard errors are clustered at the firm level. All variables are detailed in Appendix A. (***), (**), and (*) indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively

event, we randomly select similar firms for treatment. To construct the placebo treatment, first we identify firms that receive coverage from an ESG rating agency and match them with up to six firms that 1) have similar propensity scores (as estimated in Table 2), 2) are covered by the same or fewer number of rating agencies, and 3) did not receive the coverage. We then randomly select one of these six firms as the placebo firm. The remaining five firms constitute our control group. We repeat this procedure for each coverage expansion event and stack all cohorts to construct the stacked placebo sample. Panel C of Table 11 presents estimated coefficients from the placebo tests corresponding to our baseline models. We find no significant coverage effect in all models with the placebo treatment.

Table 11 Firm ESG coverage effects: robustness tests

Panel A – Lead-and-lags regressions					
	Total toxic releases scaled by toxicity	Total violations	ESG score	Percent of ESG words in 10-Ks	Ownership % of institutions with high-ESG preference
	(1)	(2)	(3)	(4)	(5)
Coverage * t-5	0.593*	0.032	−0.013	−0.041**	0.006
	(1.733)	(0.783)	(−0.614)	(−2.114)	(0.912)
Coverage * t-4	0.498	0.058	0.008	−0.029*	0.002
	(1.557)	(1.355)	(0.546)	(−1.853)	(0.302)
Coverage * t-3	0.366	−0.038	0.001	−0.004	−0.005
	(1.285)	(−0.735)	(0.093)	(−0.278)	(−1.034)
Coverage * t-2	0.238	−0.012	0.011	−0.014	−0.003
	(1.101)	(−0.268)	(1.232)	(−1.126)	(−0.694)
Coverage * t	−0.225	−0.039	**0.114*** **	0.011	**0.019*** **
	(−0.813)	(−0.921)	**(3.509)**	(0.759)	**(4.052)**
Coverage * t+1	**−0.540***	−0.046	**0.142*** **	**0.055*** **	**0.016*** **
	(−1.721)	(−0.994)	**(5.252)**	**(2.693)**	**(2.770)**
Coverage * t+2	−0.673	−0.068	0.022	**0.043****	**0.017****
	(−1.507)	(−1.437)	(1.093)	**(2.001)**	**(2.399)**
Coverage * t+3	**−1.003*** **	**−0.169*** **	**0.065****	0.011	**0.033*** **
	(−2.969)	**(−2.918)**	**(2.393)**	(0.446)	**(3.950)**
Coverage * t+4	**−1.004****	**−0.136****	0.037	−0.024	**0.024****
	(−2.439)	**(−2.369)**	(1.490)	(−0.719)	**(2.199)**
Observations	4758	15366	43578	62944	61871
Adjusted R-squared	0.403	0.316	0.522	0.674	0.623
Control Variables	Yes	Yes	Yes	Yes	Yes
Year-cohort and industry-cohort FEs	Yes	Yes	Yes	Yes	Yes
Panel B – Firm fixed effects					
	Total toxic releases scaled by toxicity	Total violations	ESG score	Percent of ESG words in 10-Ks	Ownership % of institutions with high-ESG preference
	(1)	(2)	(3)	(4)	(5)
Coverage*post	**0.043**	**−0.050***	**0.098*** **	**0.034****	**0.014*** **
	(0.253)	**(−1.862)**	**(4.775)**	**(2.321)**	**(3.161)**
Post	−0.296**	0.085**	−0.036	−0.002	−0.016
	(−2.057)	(2.304)	(−0.558)	(−0.026)	(−1.480)
Total assets	0.501**	0.074*	−0.011	−0.007	0.064***
	(2.305)	(1.765)	(−0.479)	(−0.469)	(12.271)
Market-to-book ratio	0.049	−0.010	−0.000	−0.002	0.019***
	(0.650)	(−0.700)	(−0.018)	(−0.343)	(6.538)
Return on assets	−0.564	−0.204*	0.058	−0.049	0.038***
	(−0.968)	(−1.830)	(1.294)	(−1.635)	(3.266)
Leverage	−0.571	−0.121	−0.066	−0.019	−0.075***
	(−1.527)	(−1.395)	(−0.967)	(−0.413)	(−4.834)
Number of institutional owners	−0.189	−0.036	−0.020	0.021*	
	(−1.414)	(−1.468)	(−0.695)	(1.712)	
File size of 10-Ks				0.257***	
				(28.478)	
Number of words in 10-Ks				−1.070***	
				(−8.041)	
Number of complex words				0.659***	
in 10-Ks				(4.633)	
Observations	4753	15352	43541	62868	61858
Adjusted R-squared	0.924	0.612	0.726	0.800	0.879
Year-cohort and Firm-cohort FEs	Yes	Yes	Yes	Yes	Yes

Table 11 (continued)

Panel C – Placebo test					
	Total toxic releases scaled by toxicity	Total violations	ESG score	Percent of ESG words in 10-Ks	Ownership % of institutions with high-ESG preference
	(1)	(2)	(3)	(4)	(5)
Coverage *post	**0.442**	**0.012**	**0.021**	**−0.006**	**0.001**
	(1.226)	**(0.368)**	**(1.472)**	**(−0.616)**	**(0.334)**
Coverage	−0.324	0.002	−0.006	−0.001	−0.007**
	(−0.540)	(0.065)	(−0.880)	(−0.172)	(−2.477)
Post	−0.119	−0.051	0.086***	0.037**	−0.033***
	(−0.419)	(−0.846)	(3.891)	(2.180)	(−6.434)
Total assets	1.143***	0.251***	0.041***	0.012	0.085***
	(4.563)	(4.102)	(2.744)	(1.161)	(27.863)
Market-to-book ratio	0.159	-0.007	0.017	0.003	0.034***
	(0.566)	(−0.172)	(1.303)	(0.360)	(8.304)
Return on assets	3.668*	0.106	0.016	−0.123***	0.031
	(1.881)	(0.569)	(0.290)	(−3.211)	(1.431)
Leverage	0.447	−0.392**	−0.133**	−0.037	−0.223***
	(0.230)	(−2.470)	(−2.066)	(−0.696)	(−9.171)
Number of institutional owners	−0.626**	−0.211***	−0.035	0.025*	
	(−2.069)	(−3.202)	(−1.138)	(1.854)	
File size of 10-Ks				0.206***	
				(18.609)	
Number of words in 10-Ks				−0.802***	
				(−5.828)	
Number of complex words				0.487***	
in 10-Ks				(3.452)	
Observations	1045	3847	17969	26349	27316
Adjusted R-squared	0.366	0.370	0.519	0.657	0.671
Year-cohort and industry-cohort FEs	Yes	Yes	Yes	Yes	Yes

In Panels A and B, we identify firms that receive coverage by an ESG rating agency and could be matched with (up to five) firms that exhibit similar propensity scores (estimated in Table 2), are covered by the same or a smaller number of rating agencies and did not receive the coverage. The first group of firms constitutes our treatment group and their five closest-matched counterparts – our control group. Afterward, we construct a stacked sample where, for each treatment cohort (coverage event), we keep only control firm-years that were not treated by the agency over the next five years following the event. We repeat this procedure for each coverage expansion cohort and stack all cohorts together to construct the stacked sample. Panel A reports coefficient estimates and t-statistics from OLS regressions of firm outcome variables on *Coverage*, an indicator variable equal to 1 for treated firms; a series of indicators for each year *t* in the sample relative to the coverage expansion year (t0); and a series of interactions of treated and years relative to the coverage expansion *Coverage* * *t*, excluding the indicator of year t-1 and Coverage * t-1, which is taken as the baseline. The dependent variables are the natural log of one plus firm total toxic releases, the number of government enforcement actions for environmental, social, and governance violations, the average ESG score, the number of ESG-related words in firm 10-K filing, and the percentage ownership of institutions with a revealed preference for high-ESG stocks. Panel B reports coefficient estimates and t-statistics from OLS regressions of firm outcome variables on *Coverage*, an indicator variable equal to 1 for treated firms; *Post*, an indicator variable equal to 1 for the inclusion year and all subsequent years; and *Coverage* * *Post*. The dependent variables are the natural log of one plus firm total toxic releases, the number of government enforcement actions for environmental, social, and governance violations, the average ESG score, the number of ESG-related words in firm 10-K filing, and the percentage ownership of institutions with a revealed preference for high-ESG stocks. In Panel C, we identify firms that receive coverage by an ESG rating agency and could be matched with (up to six) firms that exhibit similar propensity scores (estimated in Table 2); are covered by the same or a smaller number of rating agencies; and did not receive the coverage. We randomly assign one of the matched firms as a placebo-firm. The remaining five firms constitute our control group. We repeat this procedure for each coverage expansion cohort and stack all cohorts together to construct the stacked sample. The table reports coefficient estimates and t-statistics from OLS regressions of firm outcome variables on *Coverage*, an indicator variable equal to 1 for treated firms; *Post*, an indicator variable equal to 1 for the inclusion year and all subsequent years; and *Coverage* * *Post*. The dependent variables are the natural log of one plus firm total toxic releases, the number of government enforcement actions for environmental, social, and governance violations, the average ESG score, the number of ESG-related words in firm 10-K filing, and the percentage ownership of institutions with a revealed preference for high-ESG stocks. All firms are followed from 5 years before until 5 years after coverage expansion. Only the coefficient for the interaction term *Coverage* * *Post* is reported. All models include baseline control variables, year-cohort and industry-cohort fixed effects. Standard errors are clustered at the firm level. All variables are detailed in Appendix A. (***), (**), and (*) indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively

Conclusion

A large literature has examined the link between firm ESG ratings and organizational performance. We focus on the effect of coverage by ESG rating agencies. We find that, when coverage by ESG rating agencies increases, both a firm's real ESG performance and its existing ESG ratings improve. We also find that more covered firms disclose more ESG-related information, and, as ESG coverage expands, ownership of ESG stocks shifts from individual investors toward financial institutions, particularly those with a revealed preference for ESG stocks. Our overall conclusion is that ESG rating agencies improve the ESG performance of firms.

Our results are consistent with the idea that ESG rating agencies increase the amount of ESG information in the market. We consider two possible ways rating agencies could generate more ESG information: 1) they could facilitate the processing of the information, or 2) they could increase the usefulness of the information by facilitating comparisons across firms. We find support only for the first explanation.

Our findings are relevant for firms trying to communicate their ESG commitment to stakeholders. ESG has become an important consideration for a growing number of institutional investors (Berry and Junkus 2013; Gibson et al. 2020), customers (Darendeli et al. 2022), suppliers (Dai, Liang, and Ng 2021; Tao, Wu, and Zhao 2023), and other stakeholders. By providing information to these stakeholders, ESG rating agencies could pressure firms to engage more actively in ESG. This pressure could create economic value, given that stronger ESG performance is associated with a lower cost of capital (e.g., Chava 2014; Gupta 2018; Dyck et al. 2019; Krueger, Sautner, and Starks 2020) and better risk management (Jo and Na 2012; Cai, Cui, and Jo 2016; Harjoto and Laksmana 2018).

Finally, our results have implications for policymakers seeking to regulate market levels of ESG commitment. We show that ESG rating agencies improve the ESG performance of firms. Other mechanisms, such as mandatory ESG disclosures, could achieve similar effects (Jackson et al. 2020; Krueger et al. 2024). We do not know whether the ESG rating industry is complementing or crowding out the information from these alternative disclosure means. We also do not know how the competitive structure of the ESG rating industry could affect ESG information production. Future research could explore these questions.

Appendix A

Variable definitions		
Variable	Description and data source	
	Coverage	An indicator variable equal to 1 for a firm that receives coverage by an ESG rating agency and 0 for a matched firm that does not receive the additional coverage. Control firms are identified using propensity score matching with replacement (five nearest neighbors with propensity score not exceeding 0.002) one year before the coverage expansion event. Control firms are covered by the same or a smaller number of rating agencies compared to treated firms.
	Post	An indicator variable equal to 1 for both treated and control firms after a treated firm receives new ESG coverage, and 0, otherwise.
	Coverage* post	An interaction term equal to 1 for a treated firm after it receives new ESG coverage and 0 otherwise.
ESG scores		

Variable	Variable definitions Description and data source	
	MSCI KLD ESG score	The natural logarithm of one plus the total ESG score. The total ESG score is calculated as the sum of all "E", "S", and "G" binary strengths and concerns indicators (with concerns subtracted from one to invert them into strengths) and normalized each year between 0 and 100 as follows: (ESG–min(ESG))/(max(ESG)–min(ESG)). *Source*: MSCI KLD
	Mean ESG score	The natural logarithm of one plus the average ESG score, calculated as the average of ESG scores available from the MSCI KLD and Sustainalytics rating agencies normalized each year between 0 and 100. For treated firms, scores from the agency initiating the additional coverage are not included in the calculation. *Source*: MSCI KLD, Sustainalytics
Performance		
	Total assets	The natural logarithm of one plus total assets (*at*). *Source*: Compustat
	Market-to-book ratio	The natural logarithm of one plus market value of equity scaled by book value of equity. Book value of equity equals stockholders' equity (*seq*, if missing *pstk+ceq*, if missing *at-lt*) plus deferred taxes (*txditc*, if missing *txdb+itcb*) minus preferred stock (*pref*). Market value of equity equals common shares outstanding (*CSHO*) multiplied by share price (*PRCC_F*, if missing *PRCC_C*) *Source*: Compustat, CRSP
	Return on assets	Net income (*ni*) divided by total assets (average *at* as of the beginning and the end of the year). *Source:* Compustat
Reporting		
	File Size of 10-Ks	The natural logarithm of one plus the size of a 10-K filing in Megabytes in a given year. *Source: WRDS SEC Analytics Suite*
	Number of words in 10-Ks	The natural logarithm of one plus the total number of words in a 10-K filing in a given year. *Source: WRDS SEC Analytics Suite*
	Number of complex words in 10-Ks	The natural logarithm of one plus the complex word count. *Source: WRDS SEC Analytics Suite*

Variable	Variable definitions Description and data source	
	ESG Words in 10-Ks	The natural logarithm of one plus the number of ESG-related words in a 10-K filing in a given year. To calculate the number of words, we construct an ESG vocabulary based on the words used in MSCI KLD and Refinitiv handbooks (presented in Appendix B). Then, we access each 10-K text document using the link from the WRDS SEC Analytics Suite dataset. We scan each 10-K text and count the number of a given ESG-related word/phrase mentioned in each line of the document. We then sum these words up to get the final ESG words to count. *Source:* www.sec.gov, *WRDS SEC Analytics Suite*
	Percent of ESG words in 10-Ks	The natural logarithm of one plus the percentage of ESG-related words relative to the total number of words in a 10-K filing in a given year. *Source:* www.sec.gov, *WRDS SEC Analytics Suite*
Institutional ownership		
	Share of institutional ownership	Total Institutional Ownership scaled by the firm market cap. *Source:* Thomson Reuters/Refinitiv Ownership (Consolidated Holdings) dataset, CRSP
	Number of institutional owners	The natural logarithm of one plus number of institutional owners. *Source*: Thomson Reuters/Refinitiv Ownership (Consolidated Holdings) dataset, CRSP
	Ownership of institutions with preference for high-/low-ESG stocks	Each year, we sort stocks into HESG and LESG groups (above and below the median ESG score). For each group, we calculate their weight in the market portfolio and in the portfolio of each institutional investor. The difference between the market and institutional weights for the two groups of stocks measure the institutional bias towards holding high- and low-ESG stocks, respectively. Based on this, we calculate total institutional bias as the difference between the biases towards high- and low-ESG stocks. We then classify institutions in the top/bottom 20% as having a revealed preference for high-/low-ESG stocks. *Source*: Thomson Reuters/Refinitiv Ownership (Consolidated Holdings) dataset, CRSP
Environmental pollution		
	Total toxic releases	The natural logarithm of one plus the sum of toxic releases (*'TOTAL RELEASES'*) by all company facilities. *Source*: EPA's The Toxics Release Inventory (TRI)

Variable	Variable definitions Description and data source	
	Total toxic releases scaled by toxicity	The natural logarithm of one plus the sum of toxic releases (*'TOTAL RELEASES'*) scaled by their toxicity by all company facilities. We scale for toxicity by dividing each chemical release by its corresponding reportable quantity that sets forth the disclosure requirements with regulators. Note that lower reportable quantity signals about higher toxicity. *Source*: EPA's The Toxics Release Inventory (TRI), the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
	Toxic releases per facility	The natural logarithm of one plus total toxic releases divided by the number of facilities in a firm. *Source*: EPA's The Toxics Release Inventory (TRI)
	Toxic releases scaled by toxicity per facility	The natural logarithm of one plus total toxic release scaled by their toxicity divided by the number of facilities in a firm. *Source*: EPA's The Toxics Release Inventory (TRI), the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
	Number of facilities	The natural logarithm of one plus the number of a company's facilities reporting to the EPA. *Source*: EPA's The Toxics Release Inventory (TRI)
	Number of high-(low-) polluting facilities	The natural logarithm of one plus the number of facilities with toxic releases scaled by toxicity, that fall within the top quartile (the bottom three quartiles) for a given firm. *Source*: EPA's The Toxics Release Inventory (TRI)
	Source reduction	An indicator variable takes the value of one if the company implements a source reduction activity that eliminates at least 95% of a given chemical's emissions, and zero otherwise. *Source*: EPA's The Toxics Release Inventory (TRI) P2 Dataset
	Recycling	The natural logarithm of one plus the sum of chemical waste that went through recycling (sum of *'8.4 – RECYCLING ON SITE', '8.5 – RECYCLING OFF SITE'*) by all company facilities. *Source*: EPA's The Toxics Release Inventory (TRI)
	Energy recovery	The natural logarithm of one plus the sum of chemical waste that went through energy recovery (sum of *'8.2 – ENERGY RECOVERY ON SITE', '8.3 – ENERGY RECOVERY OFF SITE')* by all company facilities. *Source*: EPA's The Toxics Release Inventory (TRI)

Variable	Variable definitions Description and data source	
	Treatment	The natural logarithm of one plus the sum of chemical waste that went through treatment (sum of *'8.6 – TREATMENT ON SITE', '8.7 – TREATMENT OFF SITE'*) by all company facilities. *Source*: EPA's The Toxics Release Inventory (TRI)
Government enforcement actions		
	Environmental violations	The natural logarithm of one plus the sum of all violations labeled as *environment-related offenses*. *Source*: Violation Tracker
	Employment violations	The natural logarithm of one plus the sum of all violations labeled as *employment-related offenses,* and the following safety-related offenses: *mining violations*, and *workplace safety or health violation.* *Source*: Violation Tracker
	Consumer violations	The natural logarithm of one plus the sum of all violations labeled as *consumer-related offenses,* and the following safety-related offenses: *food safety violation*s, and *product safety violations*. *Source*: Violation Tracker
	Social violations	The natural logarithm of one plus the sum of employment and consumer violations. *Source*: Violation Tracker
	Financial violations	The natural logarithm of one plus the sum of all violations labeled as *financial offenses*. *Source*: Violation Tracker

Appendix B

ESG Dictionary

CSR, ESG, GHG, ABUSE, ACCEPTABLE STANDARDS, ACCESS TO COMMUNICATION, ACCESS TO FINANCE, ACCESS TO HEALTHCARE, ACCOUNTING IRREGULARIT, ACRIMONIOUS CONTRACT NEGOTIATION, ADVANCED MATERIAL, AD-WARE, ALTERNATIVE ENERGY, ANTICOMPETITIVE, ANTICOMPETITIVE, ANTI-UNION, BATTERY, BID RIGGING, BIODIESEL, BIODIVERS, BIOGAS, BIOMASS, BLENDED CEMENT, BOARD-LEVEL OBJECTION, BREACH, BRIBE, CARBON, CARCINOGEN, CAREER DEVELOPMENT, CASH PROFIT SHARING, CELLULOSIC ETHANOL, CENSORSHIP, CERTIFICATION, CHEMICAL SAFETY, CHILD LABOR, CIVIL LIBERT, CLEAN AIR, CLEAN ENERGY, CLEAN TECH, CLEAN WATER, CLEANER ENERGY, CLIMATE CHANGE, COLLECTIVE BARGAIN, COLLUSION, COMMUNITY, COMPACT FLUORESCENT LIGHTING, COMPLICITY IN KILLING, CONFLICT OF INTEREST, CONFLICTS OF INTEREST, CONTAMINATION, CORRUPTION, CUSTOMER RELATION, CUSTOMER TRUST, DATA PROTECTION, DATA SECURITY, DECEPTIVE, DEMOGRAPH, DEPLETION, DESALINATION, DEVELOPMENT PROGRAMS, DISCRIMINAT, DISPLACEMENT, DISPOSAL, DISTURBANCE, DIVERS, DROUGHT-RESISTANT SEED, ECOLOGICALLY SENSITIVE, ECONOMIC OPPORTUNITIES, ECOSYSTEM, EFFLUENTS, ELDERLY, ELECTRICAL NETWORK EXPANSION, ELECTRONIC WASTE, ELIMINATE CHEMICAL, EMISSION, EMPLOYEE, EMS, END-OF-LIFE ELECTRONIC, ENERGY EFFICIENCY, ENERGY USE, ENGAGEMENT, ENVIRONMEN, EQUIPMENT COMMERCIALIZATION, ETHIC, EXCESSIVE FEES, EXCESSIVE WORKING HOURS, FACILITY CLOSURES, FATALIT, FIREARMS, FOOD SAFETY, FORCED LABOR, FREEDOM, FRONT-RUN,

FSC-CERTIFIED LUMBER, FUEL CELLS/HYDROGEN SYST, HYDROGEN, GENDER, GEOTHERMAL, GOVERNAN, GOVERNMENT SURVEILLANCE, GREEN, H&S, HABITAT DAMAGE, HARM, HEALTHIER PRODUCT, HIDDEN FEE, HUMAN CAPITAL, HUMAN RIGHT, ELECTRIC VEHICLES, HYBRID VEHICLES, HYDRAULIC FRACTURING, IMPROPER BILLING, IMPROVED NUTRITIONAL PROFILE, IMPROVEMENT TARGET, INADEQUATE PAY, INCENTIVE, INCLUSION, INDEPENDEN, INDIGENOUS PEOPLES, INDUSTRIAL AUTOMATION, INFRASTRUCTURE DEVELOPMENT, INITIATIVES, INJUR, INSULATION, INSURING HEALTH, INTERNATIONAL NORMS, JOB ACCIDENT, JOB SATISFACTION, KIDNAP, LABOR, LAND USE, LEADERSHIP, LED LIGHTING, LEGAL LIABILITY, LOCAL COMMUNIT, LOCAL ECONOMIC, LOCK-OUTS, LONG-TERM PERFORMANCE, LOSS OF ECONOMIC VALUE, LOW-TEMP ASPHALT, MARINE, MENTAL HEALTH, MILITARY, MINORIT, MISTREAT, NATURAL, NUCLEAR POWER, NUTRITION AND HEALTH, OFF-LABEL USE, OPPORTUNITIES IN CLEAN TECH, OPPORTUNITIES IN HEALTH, OPPORTUNITIES IN NUTRITION, OPPOSITION TO SHAREHOLDER, OPTIMIZATION TECH & SYST, OTHER ENERGY STORAGE, OVERTIME, PACKAGING MATERIAL, PERFORMANCE AUDITING, PERFORMANCE INCENTIVES, PERSONAL DATA, PHILANTHROP, POLLUTION, PREDATORY FINANCIAL, PREDATORY PRICING, PRICE FIXING, PRISON LABOR, PRIVACY, PRODUCT QUALITY, PRODUCT RECALL, PRODUCT RECOVERY, PRODUCT SAFETY, PRODUCT TESTING, PROFESSIONAL DEVELOPMENT, PUBLIC HEALTH, QUALITY CONCERN, RAINWATER HARVESTING, RAW MATERIAL SOURCING, RECLAMATION COST, RECYCL, REDUCTIONS IN BENEFITS, RENEWABLE ENERGY, RENEWABLE POWER, REPLACEMENT WORKERS, REPRESENTATION, REPRESS, REPUTABLE, REPUTATION, RESOURCE INTENSIVE, RESPONSIBLE INVESTMENT, RESPONSIBLE MARKETING, REUSE, RIGHTS VIOLATION, SABOTAGE, SAFETY, SCRUTINY, SECURITY, SHAREHOLDER OBJECTION, SHAREHOLDER RIGHT, SHARING PROGRAM, SLAVE LABOR, SMALL HYDRO, SMART GRID, SMART METER, SOCIAL, SOLAR, SOVEREIGN, SPAM, SPECIALTY CEMENT, SPILL, STAKEHOLDER, STRIKE, SUB-STANDARD TREATMENT, SUPERCONDUCTOR, SURVEILLANCE, SUSTAIN, TAKEOVER DEFENS, TAX EVASION, TENANT ENGAGEMENT, TOXIC, TRAINING, TRANSPAREN, UNDERAGE LABOR, UNDERAGE WORK, UNDER-BANKED, UNDERQUALIFICATION, UNDERREPRESENT, UNDERSERVED POPULATION, UNION DENSITY, UNION RELATION, UNIONIZ, UNIONS, UNSAFE WORK, VIOLENCE, VULNERABLE POPULATION, WASTE, WATER, WAVE TIDAL, WEAPON, WORKFLOW DISRUPTION, WORKFORCE, WORKING CONDITION, WRONGFUL TERMINATION.

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Data Availability The sample used in the main analysis is available in the data repository by the following link: https://osf.io/jc2hm/?view_only=f24448d799b64689a62dfa6628d94aff

The above project contains:

The final propensity-score matched sample ("base_sample.dta") used for the main analysis.

The sample for placebo tests in Panel C of Table 11 ("base_placebo.dta") The samples construction and variables calculation procedures are described in the paper.

The samples construction and variables calculation procedures are described in the paper.

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