Does Socially Responsible Investing Change Firm Behavior?

Davidson Heath[a], Daniele Macciocchi[b], Roni Michaely[c], and Matthew C. Ringgenberg[a*]

August 2022[†]

ABSTRACT

Using micro-level data, we examine the impact of socially responsible investment (SRI) funds on corporate behavior. SRI funds *select* firms with lower pollution, more board diversity, higher employee satisfaction, and better workplace safety. Yet, both in the cross-section and using an exogenous shock to SRI capital, we find SRI funds do not significantly *change* firm behavior. Moreover, there is little evidence they try to impact firm behavior using shareholder proposals. Our results suggest SRI funds are not greenwashing, but they are impact washing. They invest in a portfolio consistent with their objective, but do not try to impact corporate conduct.

Keywords: Corporate Social Responsibility (CSR), Environmental, Social, and Governance (ESG), Institutional Investors, Socially Responsible Investing (SRI)
JEL Classification Numbers: G12, G14

[*]Corresponding author: E-mail address: matthew.ringgenberg@eccles.utah.edu; Tel.: 801-213-6916

[†][a]University of Utah, [b]University of Miami, [c]Hong Kong University. We thank Rui Albuquerque, John Barrios, Asaf Bernstein, Matthias Breuer, Marco Ceccarelli (discussant), Minxia Chen, Lauren Cohen, Mike Cooper, Shaun Davies, Alex Edmans, Yonca Ertimur (discussant), Kornelia Fabisik (discussant), Fabrizio Ferri, Henry Friedman, Simon Gloßner, Umit Gurun, Michael Halling, Mirko Heinle, Jessica Jeffers (discussant), Dirk Jenter, Oğuzhan Karakas (discussant), Sehoon Kim, Karl Lins, John Matsusaka, Dhananjay Nanda, Yihui Pan, Melissa Prado (discussant), Ellen Quigley (discussant), Enrichetta Ravina (discussant), Zacharias Sautner, Holger Spamann, Mitch Towner, Ed Van Wesep, Cara Vansteenkiste (discussant), and Tracy Wang for helpful comments. We also thank virtual conference and seminar participants at the American Finance Association 2022 Annual Meeting, Annual Conference on Financial Market Regulation, the 2nd Boca Corporate Finance and Governance Conference, Chapman University, Columbia University (Accounting), the COP26 Climate Finance conference, the Corporate Governance and Executive Compensation Research Series, ESSEC - Amundi Chair Webinar, the European Winter Finance Summit, the Financial Accounting and Reporting Section (FARS), 1st Conference in Sustainable Finance at the University of Luxembourg, Georgetown University, the 2022 Global Corporate Governance Colloquium, The Hong Kong University of Science and Technology, Paris December Finance Meeting, Singapore Management University, UCLA (Accounting), the University of Illinois Chicago, University of Georgia, the University of Miami, the University of Miami Winter Warm-up Conference, Virginia Tech, and the 2021 UMass Boston–EM Normandie Conference on Corporate Social Responsibility. We thank Glassdoor, Inc. (www.Glassdoor.com) and the Environmental Protection Agency for providing data and for helpful conversations. All errors are our own.

I. Introduction

Over the last decade, there has been a significant increase in the popularity of socially responsible investment (SRI) funds. These funds have a stated objective about the environmental or social behavior of their portfolio firms; in our sample, 81% of SRI funds claim that they work to improve firm behavior. Yet, despite the increasing popularity of these SRI funds and their stated objective, it is unclear whether these funds do actually improve firms' environmental and social behavior. In this paper, we examine the impact of SRI funds. Using 18 environmental and social (E&S) attributes, we provide some of the first evidence on the extent to which SRI funds: (1) select firms with better E&S behavior and (2) improve firm E&S behavior.

The 18 firm-level variables we examine measure a wide variety of environmental and social attributes.[1] On the environmental dimension, we examine seven measures of pollution using data from the Environmental Protection Agency (EPA); on the social dimension, we examine seven measures of employee satisfaction using data from Glassdoor, Inc., two measures of workplace safety using data from the Occupational Safety and Health Administration (OSHA), and two measures of diversity on the board of directors using data from BoardEx and ISS. Using these measures, we find that SRI funds do *select* companies with better environmental and social conduct, but SRI funds do not *improve* the environmental or social behavior of their portfolio firms. Importantly, we manually read the prospectus of each SRI fund and find that the majority of them (81%) explicitly state a goal of engaging

[1]Berg, Koelbel, and Rigobon (2019) document that third-party environmental and social (E&S) ratings often differ significantly for the same firm across different rating agencies. Moreover, Berg, Fabisik, and Sautner (2020) show that firms seem to modify their data ex post. We avoid these issues by focusing on outcome variables, instead of E&S ratings. Yet, our conclusions are unchanged if we instead use E&S ratings (see Appendix A8).

with firms to improve corporate E&S behavior.[2] Thus, the actual impact of many SRI funds is inconsistent with their claimed impact.

While there is a large literature examining the impact of socially responsible behavior on stock and bond prices,[3] there is little evidence on the relation between SRI funds and the behavior of their portfolio firms. There are three main possibilities. First, SRI funds might behave similarly to non-SRI funds in their portfolio choices or the way in which they interact with firms ("greenwashing"). Second, SRI funds might select firms that focus on E&S issues, but make no effort to impact firms' behavior ("impact washing"). Finally, SRI funds might successfully work to improve the E&S conduct of their portfolio firms.

Theoretically, Broccardo, Hart, and Zingales (2022) note that funds can impact firm behavior through voice (voting and engagement) or exit (divestment and boycott). In fact, the recent growth in capital allocated to SRI funds could make them more effective at influencing firm behavior through engagement and coordination with activists (Dimson, Karakaş, & Li, 2015), or the threat of exit (Edmans, 2009; Edmans & Manso, 2010). Moreover, survey evidence suggests that SRI funds do view engagement as a tool for addressing climate risks (Krueger, Sautner, & Starks, 2020).[4]

On the other hand, engagement is costly, and the cost of engaging with portfolio firms and changing their behavior is likely higher than the cost of pure portfolio selection based on observable E&S performance. Thus, SRI funds may lack the incentive to engage (Davies & Van Wesep, 2018; Friedman & Heinle, 2021), as well as the expertise, resources, or steward-

[2]For example, BlackRock's Investment Stewardship team claims to regularly engage with companies to understand how material environmental factors are considered from the perspective of risk and opportunity (BlackRock, 2020). Similarly, Domini Social Equity Fund (2021) claims to influence corporations through shareholder activism: "*In pursuing our clients' sustainability objectives, we seek to influence the actions of corporations on a wide range of social, environmental and governance issues.*"

[3]See, for example, Edmans (2011) and Pástor, Stambaugh, and Taylor (2021).

[4]Moreover, Chowdhry, Davies, and Waters (2019) show that investors can, theoretically, change corporate behavior depending on the structure of stakeholders' financial claims.

ship personnel (Bebchuk & Tallarita, 2020). Further, for the threat of exit to have an impact it should be capable of significantly changing the cost of capital of affected firms (Pástor et al., 2021). Recent evidence suggests the impact of SRI funds on firm's cost of capital is too small to meaningfully affect firm investment decisions (Berk & van Binsbergen, 2021). In sum, there are several mechanisms through which SRI funds could affect firms; whether they do or not is an open empirical question.

To examine the impact of SRI funds, we use two different regression designs. The first uses ordinary least squares (OLS) regressions to test for a relation between SRI fund ownership and firms' E&S behavior. However, if we find a relation, it could be due to selection effects or treatment effects. Put differently, studying the impact of SRI funds on firm behavior is challenging because holdings by SRI funds may be endogenously related to firm behavior. For example, different firm policies might attract different types of investors. Moreover, firm characteristics, such as managerial quality, may jointly affect ownership and firm behavior. Hence, there are concerns of both reverse causality and omitted variable bias in this setting. To disentangle selection effects from treatment effects, we develop a second empirical design that exploits plausibly exogenous variation in the amount of capital allocated to SRI funds. This second analysis allows us to examine whether SRI funds *change* firm behavior.

In our first set of analyses, we use cross-sectional OLS regressions to test for selection effects by examining the characteristics of companies held by SRI funds. We start by examining firm-level pollution using data from the EPA. Survey evidence in Krueger et al. (2020) indicates that institutional investors believe climate risks have financial implications for their portfolio firms. As a result, many investors state that they consider firm-level emissions when making holding decisions. Consistent with this, we find that more SRI fund ownership is associated with lower air and water pollution by firms, and more investment

in pollution abatement technologies. The results are economically large: a one-standard deviation increase in SRI fund ownership is associated with 24.5 percent lower annual total emissions.

We next examine whether SRI fund ownership is related to employee well-being, which has been shown to be related to shareholders' returns (Edmans, 2011). We use data on self-reported employee reviews about their firms from Glassdoor, Inc. and workplace safety data from OSHA. We find that SRI fund ownership is associated with better firm-level outcomes for stakeholders: employees at firms with more ownership by SRI funds rate their firm better and experience fewer workplace injuries. We also examine broader social dimensions such as gender and racial diversity on the board of directors. Many institutional investors actively support board diversity and many companies have publicly committed to increase it (Krouse, 2018). We find that firms with more SRI fund ownership have more women on their board of directors.

Together, our first set of analyses shows that SRI funds are not *greenwashing* – they do hold portfolio companies that behave consistent with their stated objectives. However, it is unclear whether these results are treatment effects, or only selection effects. In other words, it remains unknown whether SRI funds improve the behavior of their portfolio companies or simply select firms with better E&S practices. To examine this, we use our second research design. Specifically, we develop a new research design that exploits Morningstar "star ratings" as an exogenous shock to SRI fund capital.

Morningstar is an investment research company that provides independent ratings of investment funds. In particular, Morningstar ranks the universe of investment funds using a proprietary algorithm that evaluates funds based on their risk-adjusted returns within an investment category. The best performing funds receive five stars, while the worst performing

funds receive one star. These star ratings are widely used by investors, and they have been shown to strongly affect the amount of investor capital allocated to a given fund (Guercio & Tkac, 2008; Reuter & Zitzewitz, 2021). Importantly, it is nearly impossible for funds to manipulate their rating each period, and discontinuities in the "star rating" lead to sharp discontinuities in capital allocation.[5]

We construct a set of matched treated and control funds that have different star ratings but are indistinguishable on their observable characteristics—including, crucially, the inputs into their Morningstar star ratings. Treated funds are SRI funds that received a high star rating; control funds are non-SRI funds that received a lower star rating in the same fund category and with near-identical lagged returns. While treated and control funds have similar assets and flows in the years prior to treatment, we find that higher star ratings lead to large fund flows; the assets of treated funds increase by 22.9% relative to control funds. We use these relative changes in SRI assets under management, multiplied by the funds' *pre-treatment* portfolio weights, to construct plausibly exogenous flows of SRI investment into portfolio firms. In sum, our analysis exploits discontinuities in the Morningstar star rating to generate economically large changes in each firm's ownership by SRI funds, as in a Bartik (1991) instrumental variables design.

Using our Morningstar setting, we next test for treatment effects. Again, we start by examining pollution. While we find that SRI funds hold companies that pollute less, we find no evidence that SRI funds *change* the environmental behavior of firms. Specifically, an exogenous increase in SRI capital by 22.9% leads to zero change in total pollution or investment in pollution abatement technologies. Next, we examine measures of employee

[5]Duong and Meschke (2020); S. H. Kim (2021) examine whether funds can manipulate their star ratings and find that year-end manipulation disappeared after 2002 because of SEC scrutiny. Our sample focuses exclusively on year-end ratings in the period after 2002 when manipulation is not a concern.

well-being and board diversity. We find that an exogenous increase in SRI capital by 22.9% leads to zero change in employee well-being or board diversity. Taken together, the results show that SRI funds do select companies that behave in a relatively more environmentally and socially responsible manner, but they do not significantly improve the environmental or social conduct of their portfolio firms. Put differently, we find strong evidence of a selection effect, but not a treatment effect, consistent with impact washing.

One of the unique contributions of our study is that we examine 18 different E&S outcomes and: (i) we report results for all of them and (ii) we find consistent results across them. However, given the large number of outcome variables we examine, we would expect some outcomes to be statistically significant by chance (a Type I error).[6] Thus, we apply the Romano and Wolf (2005) adjustment for multiple hypothesis testing to all of the outcomes examined in our analyses. Our main conclusions are unchanged.

We also conduct a number of additional tests to support our finding of no treatment effect. As noted in Abadie (2020), "...rejection of a point null often carries very little information, while failure to reject may be highly informative." However, while our non-results on the impact of SRI may be highly informative, there are four main concerns that need to be addressed. Specifically, our non-results could be due to: (1) the limited size of investment by SRI funds, (2) weak statistical power, (3) a short time horizon in our estimates, (4) limited scope for improvement at SRI portfolio firms.

On the first concern, it is possible that our findings of zero treatment effects are because SRI funds do not yet own large enough stakes in their portfolio firms to influence firm policies. SRI fund capital has been rising rapidly through our sample period. Yet the total

[6]In our setting, the probability of making at least one Type I error using a critical value of 5% is $1-(1-5\%)^{18} = 60\%$, where 18 is the number of outcomes (assuming independence of tests and all of the null hypotheses are true).

ownership represented by SRI funds is still relatively small, representing less than 1% of most firms' market capitalization, which might not be sufficient to drive change (Heinkel, Kraus, & Zechner, 2001). On the other hand, SRI funds could still affect firms even with small ownership positions. For example, they could coordinate engagement actions with other blockholders (Dimson et al., 2015), and/or they could submit shareholder proposals. Those actions do not require holding large positions. In fact, there are a few examples of investors successfully impacting firms despite holding a minimal stake.[7] To investigate this, we split our sample firms on the ex-ante level of SRI fund investment. In the highest tercile of firm-years, average SRI fund holdings are on the order of 1% of market capitalization. In this subsample, we again find zero treatment effects on environmental policies and employee well-being, and small effects on board gender diversity.

It also is possible that SRI funds try to impact portfolio firms' E&S behavior but are not successful. In light of this possibility, we directly examine the actions of SRI funds. We find no evidence that SRI funds attempt to impact firm behavior using shareholder proposals on either the extensive or intensive margins. An exogenous increase in ownership by SRI funds does not lead to more E&S shareholder proposals, nor does it increase the likelihood of such proposals passing. Even if SRI funds are not large shareholders, they could still submit shareholder proposals if they intended to change firm behavior.[8] Yet, we find no evidence that they do. This finding complements the voting results in Michaely, Ordonez-Calafi, and Rubio (2021) who find that SRI funds behave strategically: they vote in favor of E&S proposals when they are unlikely to pass, but they vote against them when their vote

[7]For example, a small activist fund named Engine No.1 was able to win three board seats at Exxon, Inc. even though they had less than a 0.1% stake in the company (Stevens, 2021).

[8]Exchange Act Rule 14a-8 states that a shareholder may submit a proposal if they own at least $2,000 of a stock for three years or $15,000 for two years or $25,000 for one year (Securities and Exchange Commission, 2020).

is more likely to be pivotal.

To address the second concern, we compute the minimum detectable effect size (MDES) as in Bloom (1995) for each of our treatment-effect estimates. The MDES measures the magnitude of treatment effect that a given estimator could reliably detect. Throughout our analyses, the MDES indicates that we have enough power to reliably detect a meaningful change in real outcomes. SRI funds simply do not cause a meaningful change.

On the third concern, we examine longer-run effects on firm outcomes using data two and three years post-treatment. Even at longer horizons, we find no evidence of a treatment effect. Finally, on the fourth concern of no scope for improvement, we find that SRI funds exclude mostly the worst-performing firms on various E&S criteria, but that there is still room for improvement in their portfolio firms.[9]

Overall, all of our results point to the same conclusion – SRI funds do not have real effects on their portfolio firms. They operate primarily as stock selectors; they invest in firms that behave better, but even though the majority of SRI funds have a stated goal of improving firm conduct, most do not exert costly effort to improve the behavior of their portfolio firms. Put differently, we find that SRI funds are not greenwashing, but they are impact washing. Our finding complements studies such as Berk and van Binsbergen (2021) and Davies and Van Wesep (2018), by documenting that SRI funds behave in a manner consistent with their incentives.[10] While investors do care about environmental and social issues (Riedl & Smeets, 2017), fund flows respond to third-party rating agencies and these ratings reward

[9]It is also possible that heterogeneous treatment effects lead to biased estimates (see Borusyak, Jaravel, and Spiess (2017); Goodman-Bacon (2021); Sun and Abraham (2021)). We use the approach of Sun and Abraham (2021) to address this issue. The implicit weighting function in our setting does not suggest cause for concern, and Sun and Abraham (2021)'s proposed robust estimator produces similar results to our baseline estimates suggesting heterogeneous treatment effects are not an issue in our setting.

[10]Recent work by S. Kim, Kumar, Lee, and Oh (2021) documents similar results for ESG bonds. They show that issuers of ESG bonds tend to have better ESG scores, but these scores do not improve after the bonds are issued.

stock selection more than engagement (Hartzmark & Sussman, 2019; Gantchev, Giannetti, & Li, 2020).[11] As a consequence, SRI fund managers have weak incentives to exert costly effort to improve firm behavior. Our results also confirm the theoretical predictions in Broccardo et al. (2022) that the exit mechanism is not very effective in promoting socially responsible behavior.

II. Data

To examine the relation between socially responsible investing and E&S corporate behavior, we combine micro-level data from a wide variety of public and private sources, as discussed below. Detailed definitions of all our variables and their construction are presented in Sections A1 and A2 of the Internet Appendix.

We construct a firm-year panel of firms held by U.S. open-end mutual funds for the period from 2010 to 2019.[12] From the Morningstar database we collect all mutual funds with available star ratings. To identify an SRI fund, we use data from three sources: Bloomberg, Morningstar, and the US Sustainable Investment Forum (US SIF) membership list. First, using the Bloomberg terminal, we hand-collect mutual funds that identify themselves as "social responsible" or "SRI" funds. Second, we obtain data from Morningstar Socially Conscious data set, which indicates if a fund identifies itself as selectively investing based on certain non-economic principles. These funds may make investments to improve corporate behavior on such issues as environmental responsibility, human rights, or religious views. An SRI fund identified in this list can take a proactive stance by selectively investing in,

[11] In Appendix Table A7, we show that third-party E&S rating agencies assign the best ratings to firms with the best level of E&S behavior, but they do not appear to reward firms for *improving* their behavior.

[12] The beginning and ending of our sample period varies for some tests based on the availability of data. We provide more details about each source of data below.

for example, environmentally friendly companies or firms with good employee relations. This list also includes funds that may avoid investing in companies in the defense industry or companies involved in promoting alcohol, tobacco, or gambling. Third, the Forum for Sustainable and Responsible Investment (US SIF) is a U.S.-based membership association that advances impact investing across all asset classes. We take the union of the three lists and manually match funds with those in the Center for Research in Security Prices (CRSP) Survivor-Bias-Free US Mutual Fund Database, from which we retrieve information about each fund's asset under management (AUM), turnover ratio, management fees, expense ratio, and portfolio holdings, which allow us to measure the percentage of a firm's ownership held by SRI funds (*SRI Investment*).

Figure 1 shows the substantial growth in SRI funds' number and AUM over time. While the trend is strongly upward and shows a growing interest in socially responsible investing – in 2019 our sample comprises 602 SRI funds – the total assets under management in SRI funds remains modest, approximately $240 billion as of December 2019. The average firm-year in our sample has 0.27 percent of its market capitalization owned by SRI funds (Table I).

Because our main research question is about the impact of SRI funds on their portfolio firms, it is important to establish whether these funds claim to impact their portfolio firms. Accordingly, for each of the SRI funds in our sample we examine their most recent prospectus, as well as their annual report, stewardship report, and other fund and fund-family documents. We record whether each fund claims they *select* firms with good ESG performance and/or claims they *engage* with their portfolio firms. Out of 134 SRI funds in our sample, we find that 134 funds (100%) claim that they select firms with good ESG performance, and 108 funds (81%) claim that they engage with their portfolio firms.

We aim to examine corporate behavior on environmental and social issues. Hence, we collect firm-year level data from several different data sources. Our paper is among the first to use novel micro-level data to examine firm behavior. To examine firm environmental behavior, we obtain detailed plant-chemical level pollution data from the Environmental Protection Agency (EPA)'s Toxic Release Inventory database. Also, from the EPA Pollution Prevention database, we collect information about a facility's yearly investments in pollution reducing activities.

In Table I we report descriptive statistics for the EPA data. On average, firms in our sample release 1.5 million pounds of chemicals per year: 470 thousand pounds into the air, 130 thousand pounds into the water, 680 thousand pounds into the land. Furthermore, firms in our sample invest in 3.6 abatement activities every year, on average, and 43 percent of firm-years show a nonzero investment in pollution reducing activities. Finally, we examine a holistic measure of firms' exposure to climate risk using data from Sautner, van Lent, Vilkov, and Zhang (2020) (*CCExposure*). This measure is based on machine learning algorithm that identifies a firm's annual climate change exposure from earnings conference calls. Our sample mean (1.00) is consistent with Sautner et al. (2020).

We also aim to examine each firm's social behavior. To do so, we use four different data sources. To measure employee satisfaction, we obtain data on employee reviews from Glassdoor, Inc., which is a worldwide leader in providing insights about jobs and companies. From the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA), we obtain data on workplace safety. In Table I, we find that firms report an average of 1.86 employees' injuries that require hospitalization, and 0.52 employees' injuries that require amputations. We use BoardEx data to measure gender diversity on the board of directors (*Gender Div*), and from Institutional Shareholder Services (ISS) database we retrieve data

on racial diversity on the board (*Racial Div*). In our sample, firms have on average 16 percent of their board represented by women and 11 percent of their board represented by non-caucasian directors (Table I).

All in all, we use 18 micro-level variables (7 environmental and 11 social), that measure a wide spectrum of firms' E&S behavior, ranging from carbon emissions, to water pollution, to workplace safety and diversity. Finally, to corroborate that our 18 variables do measure environmental and social behavior, we also examine aggregate E&S scores of the firms in each fund's portfolio (*ES_index*) using the MSCI KLD database. We also examine data on shareholder proposals and voting outcomes using the ISS Voting Analytics database.

III. Research Design

A. Selection vs. Treatment

Disentangling a *selection* effect from a *treatment* effect is difficult because of the possibility of an omitted variable or reverse causality. To address this, we make use of funds' Morningstar star ratings. Each month Morningstar assigns each fund an integer number of stars, from 1 to 5. The star rankings are a complex nonlinear function of each fund's percentile ranking, within its category, on the basis of their returns over a three, five, and ten year lagged basis, adjusted for the fund's return volatility over the same period.[13] Crucially, these are the *only* inputs that determine funds' star ratings.

The mapping from lagged returns to Morningstar stars allows us to construct a matched set of funds that are indistinguishable on all observable characteristics—including their investment category and lagged returns in the Morningstar database—but had different Morn-

[13]For a detailed primer on the assignment of Morningstar stars, see Reuter and Zitzewitz (2021).

ingstar star ratings. We select all U.S. equity funds in the Morningstar database with at least $50 million in AUM, in December of each year from 2012 to 2018.[14] Our matched sets of treated and control funds satisfy the following requirements: The treated fund is an SRI fund, as defined in Section II. The treated fund is matched with a control fund that: (1) is in the same Morningstar category as the treated fund; (2) has assets under management within +/- 50% of the treated fund; (3) has lagged three, five, and ten year adjusted returns that are within +/-50 basis points of the treated fund; (4) is a non-SRI fund; and (5) is assigned *one fewer* star than the treated fund in January of the following year. When a treated fund has multiple candidate control funds that satisfy the requirements above, as happens in the majority of cases, we pick up to three control funds with the closest three, five, and ten year adjusted returns to the treated fund, weighted equally.

Figure 2 compares treated versus control funds. We see that the two groups of funds are very closely matched in terms of the 3-year, 5-year, and 10-year Morningstar returns—the inputs that determine the Morningstar star ratings. The differences in means between the two groups are 8, 10 and 9 basis points respectively, and the differences are not statistically significant. Appendix Section A3.1 presents formal tests of the match quality between the matched samples on a variety of fund characteristics, as well as tests of conditional independence of treatment status. We find that treated and control funds are indistinguishable on all characteristics we examine, including AUM, turnover, expense ratio, and 3-year, 5-year, and 10-year returns.

[14]Our data runs from 2010 to 2019. We select cohorts from 2012 to 2018 so that each cohort has three years of pre-treatment observations and at least one year of post-treatment observations.

B. Exogenous Changes in Fund Assets

Having established that treated and control funds are indistinguishable, ex ante, on observable characteristics, we next examine how Morningstar ratings affect investment in treated and control funds. Figure 3 shows the AUM for treated and control funds in event time relative to the cohort-year. We find that the two groups of funds have similar pre-treatment trends in their AUM, while post-treatment their AUMs diverge sharply. In particular, the AUM of treated funds (which receive a higher star rating) increases on average, while the AUM of control funds (which receive a lower star rating) decreases on average post-treatment. The results show investors differentially allocate capital based on Morningstar star ratings *despite* the funds' similar underlying fundamentals.

Table II, Column 1 shows the corresponding regression estimate of the treatment effect on funds' AUM. We estimate cohort difference-in-differences regressions that compare fund AUM for treated versus control funds, three years pre-treatment to three years post-treatment. Formally, we examine regressions of the form:

$$logAUM_{i,t} = \beta_(Treated \times Post) + FE_i + FE_t + \epsilon_{i,t}, \tag{1}$$

The estimates include both fund-by-cohort fixed effects, which sweep out any non-time-varying differences across funds, and year fixed effects which sweep out common trends in fund assets.[15] The results show that treated funds have AUM that is 22.9% higher (t=3.2) than control funds because of the difference in their star ratings. These additional investment dollars, driven by the discontinuous cutoffs in the Morningstar ratings, are plausibly

[15]Note that this specification also sweeps out any differences in the Morningstar assignment variables—that is, controls for funds' lagged returns or category-by-year fixed effects would be collinear with the fund-by-cohort fixed effects.

unrelated to the treated funds' performance or objectives.[16]

B.1. Placebo Specification

To further ensure that our research design is capturing investments into treated funds driven only by the Morningstar ratings and not by some omitted variable, we repeat the exact matching exercise described in Section III.A above, but we require treated and control funds to have the *same* Morningstar star rating. This serves as a placebo (or falsification) test since we compare funds that had similar underlying fundamentals, as in our main specification, but that had the *same* Morningstar star rating. Table II, Column 2 shows the resulting difference-in-differences estimate. In contrast to our first specification, shown in Column 1, we find there is no significant difference in AUM between treated and control funds post-treatment, either economically or statistically (0.8%, t=0.1).

B.2. Removing Aggregate Trends in Fund Assets

One possible concern for our research design is that our results may reflect aggregate trends in fund assets over time, rather than the pure effect of the Morningstar star ratings on fund assets. For example, because SRI funds are increasing their assets throughout the sample (both in absolute terms and relative to non-SRI funds), perhaps they were more likely to have higher AUM in later (post-treatment) years independent of their Morningstar rating.

To examine this possibility, we orthogonalize each funds' log(AUM) to yearly trends within each Morningstar category, separately for SRI and non-SRI funds. To do this, we de-

[16]For every fund that gets one more star, there will be a fund that gets one fewer star. If holdings are substantially the same across funds then this could conceivably result in flows that cancel out at the stock-level; if so, then Morningstar rating changes would not change ownership by SRI funds. In Appendix Section A3.2, we show that this is not an issue.

mean each fund's log(AUM) by its Morningstar category, interacted with the year, interacted with SRI fund status. Thus, the "Residualized" log(AUM) removes year-by-year trends in assets under management, within each Morningstar investment category each year, for SRI and non-SRI funds separately. Table II, Column 3 shows the main difference-in-differences estimate, where the outcome variable is the residualized fund AUM. The results are nearly identical to our first specification, shown in Column 1. Namely, we observe a large difference in AUM between treated and control funds (21.3%, t=3.3) post-treatment. The results show that aggregate trends are not an issue in our setting.

B.3. Heterogeneous Treatment Effects in a Staggered Setting

Finally, a recent set of papers point out potential issues with staggered difference-in-differences regressions in the presence of heterogeneous treatment effects over time (Borusyak et al., 2017; Goodman-Bacon, 2021; Sun & Abraham, 2021). Since the treatment effects of Morningstar ratings on investments into SRI funds could plausibly vary over time, we investigate this possibility using the approach of Sun and Abraham (2021). The results are shown in Appendix A4. The implicit weighting function does not suggest cause for concern, and Sun and Abraham (2021)'s proposed robust estimator produces similar results to our baseline estimates. We conclude that there is little cause for concern that heterogeneous treatment effects may be biasing our estimates.

C. Exogenous Changes in SRI Investment

Our results show that the discontinuous assignment of Morningstar ratings leads to a relative increase in assets under management for our treated funds. However, one concern is that after an exogenous increase in AUM, fund managers may *choose* which stocks to invest

the additional capital in, and this choice could lead to an omitted variable bias. Accordingly, we project the treatment effect of 22.9% of fund AUM (Table II Column 1) onto treated funds' holdings as of the December just prior to treatment. That is, for each fund in the matched set, we compute the fitted value of the difference-in-differences estimate for fund assets, and multiply that change by that fund's pretreatment holdings of each U.S. firm in the merged CRSP/Compustat data.[17] Our approach is similar to the instrumental variables analysis in Bartik (1991) (now commonly refereed to as a Bartik instrument). The resulting value, fund-by-firm-by-year, is the projected change in investment by that fund in that firm, holding the fund's portfolio composition fixed after treatment (i.e., with no look-ahead bias). For a control fund, this value is zero for all firms and years. For a treated fund, this value is zero in pre-treatment years, and a positive fraction of firm value in post-treatment years.

Summing the fitted values by firm-year, we obtain a *single* fitted value for each firm-year. The value is zero for firms that were never held by a treated fund, and for firms that were held by any treated fund in pretreatment years. The value is a positive fraction of firm value for firms that were held by at least one treated fund in post-treatment years. Thus, the fitted value, which we denote by $\Delta SRI\widehat{Investment}$, represents the predicted change in SRI investment for each firm in the sample, that flows from our matched funds difference-in-differences setting. Put differently, it is a difference-in-differences estimator at the firm-year level, with a continuous treatment intensity for each firm-year. We then use this to examine regressions of the form:

$$y_{j,t} = \beta * \Delta SRI\,\widehat{Investment}_{jt} + FE_j + FE_t + \epsilon_{j,t}, \tag{2}$$

[17]This approach assumes that inflows into treated funds were, on average, allocated *pro rata* to the fund's existing portfolio. We examine this assumption in Appendix Section A5, and find that SRI funds, on average, do allocate inflows pro rata to their existing portfolio.

where $y_{j,t}$ is a measure of environmental or social behavior. All estimates include firm fixed effects, which sweep out any non-time-varying differences across firms, and year fixed effects which sweep out time trends. In Sections A3.1 and A3.2 of the Appendix we further examine the exogeneity and relevance assumptions, respectively, of our research design; we find that the Morningstar ratings appear to be conditionally independent between our matched funds, and that the fitted values do significantly predict SRI fund investment at the firm-year level. These findings support our identifying assumptions.

IV. Results

We conduct three sets of analyses. First, we examine the portfolio selection choices of SRI funds using OLS regressions that examine the relation between SRI fund holdings and E&S outcomes (Section IV.A). Second, we test for treatment effects to see if SRI funds change firm behavior using our Morningstar research design that generates exogenous variation in SRI capital (Section IV.B). Third, we examine the stewardship behavior of SRI funds by looking at their engagement with portfolio firms (Section IV.C).

A. SRI Fund Selection

A.1. SRI Funds and Corporate Environmental Behavior

We start by running OLS regressions with year fixed effects to examine the association between SRI investment and firm-level emissions. Based on their stated objective, SRI funds should select firms with lower emissions. Accordingly, we examine micro data on firm emissions from the EPA Toxic Release Inventory, which allows us to understand whether a firm's actual pollution is related to SRI portfolio selection strategies. The EPA data provides

granular information about firm-level emissions at the production facility (on site), about the emissions transferred on a different location (off site), as well as disaggregated information broken out into air, ground, and water pollution. Importantly, the "air" measures include carbon dioxide, which is the primary greenhouse gas related to global warming. The results from our OLS analyses are reported in Table III.

We find strong evidence that SRI funds select firms that pollute less. A one standard deviation increase in SRI ownership is associated with 24.5 percent lower total emissions (scaled by total sales, Column 1). To put this number in perspective, this relation implies that firms owned by SRI funds have an average of 334 thousand pounds fewer toxic chemical releases per year. This result indicates that SRI funds provide investors with a portfolio of firms that pollute significantly less than the average firm.

The granularity of the EPA data allows us to go a step further and examine different pollution mechanisms—namely air, water and ground. Most industrial pollution involves air emissions, although in terms of pounds produced, ground emissions represent the largest share given the different chemicals emitted (see Table I for more details). We examine the relation between SRI funds and different types of emissions in Columns 2 to 4 of Table III. We find that SRI funds invest in firms that produce lower air and water emissions.

In addition to on-site releases into the air, land, and water, we also examine firm investments in pollution reducing activities (i.e., abatement). This analysis allows us to shed light on the channels that drive portfolio selection by SRI funds. Firms document their investments to reduce emissions in their annual fillings to the EPA. The EPA does not require firms to report the dollar amounts spent on these investments, but firms must disclose what types of actions they take according to seven categories of pollution reduction. We combine these disclosures into two variables: *Abatement*, which takes the value of one if the firm

reports an abatement activity across any category and is zero otherwise, and *logAbatements* which is the log of abatement actions that a firm discloses in a given year. Columns 5 and 6 of Table III show the association between SRI ownership and firms' investment in pollution abatement activities. At the extensive margins, we observe that SRI funds tend to hold firms that are 2.2% more likely to invest in pollution abatements.

Finally, we examine a holistic measure of firms' exposure to climate risk. Sautner et al. (2020) use machine learning algorithms to measure exposure to climate change risk at the firm-year level. We examine the relation between SRI ownership and their measure of climate change exposure, *CCExposure*; the results are shown in Table III Column 7. We find that SRI ownership is strongly negatively associated with a firm's exposure to climate risk. Consistent with Sautner et al. (2020) who show that firms with higher carbon intensity are more exposed to climate risk, we observe that SRI funds select firms that pollute less and those firms have 6.1 percent lower climate risk exposure.

One concern related to statistical inference is that we examine the association between SRI ownership and firm behavior across a large number of outcome variables. If uncorrected, this multiple-testing can lead to a large number of false positive findings (Heath, Ringgenberg, Samadi, & Werner, 2021). To account for this, we present both naive (i.e. unadjusted) p-values for each estimate as well as p-values adjusted for multiple testing using the Romano-Wolf procedure (Romano & Wolf, 2005). We find that after adjustment for multiple testing, the main associations of SRI with the key measures of total pollution (Column 1), airborne and water pollution (Columns 2 and 3) and climate risk exposure (Column7) remain significant at conventional levels. Taken together, our results show robust evidence that SRI funds select firms that pollute less.

A.2. SRI Funds, Employee Well-being, and Board Diversity

Next, we examine whether SRI funds select firms with better employee well-being. We begin by looking at workplace safety and employee satisfaction, which has been shown to be positively correlated with shareholder returns (Edmans, 2011). In our analysis, we use private data on several dimensions of employee satisfaction provided by Glassdoor, Inc. and public data on workplace accidents available through the Department of Labor–Occupational Safety and Health Administration (OSHA). The results are shown in Table IV Panel A.

Across the board, we find positive relations, both overall and in regard to career opportunities, confidence in senior leadership, work/life balance, corporate culture, confidence in the CEO, and future outlook. These positive associations are statistically significant at conventional levels for 3 of the 7 measures individually, while after adjustment for multiple testing only the association with employees' future outlook remains statistically significant. Thus, while the evidence is weaker statistically than for environmental behavior, the evidence is still suggestive that SRI funds do tend to invest in firms with higher employee satisfaction.

Furthermore, we examine the relation between SRI fund ownership and workplace safety. For accidents that resulted in either hospitalizations (Column 8) or amputations (Column 9) we observe negative associations. The association with fewer hospitalizations is statistically significant both individually and after adjustment for multiple testing. Thus, we conclude that SRI funds invest in firms with significantly better workplace safety.

Finally, we examine gender and racial diversity in the workplace. Many institutional investors have publicly committed to increase board diversity (Krouse, 2018). Similarly, NASDAQ is considering a proposal to advance diversity through a new listing requirements[18],

[18]https://www.nasdaq.com/press-release/nasdaq-to-advance-diversity-through-new-proposed-listing-requirements-2020-12-01

and some states have enacted legislation requiring gender or racial diversity for companies headquartered or operating in their states (Greene, Intintoli, & Kahle, 2020).

In Panel B of Table IV, we find that SRI funds select firms with more women on the board of directors. A one standard deviation increase in SRI ownership is associated with 0.6 percentage points more women on the board, but is not associated with more non-Caucasian board members. The association of SRI investing with gender diversity is statistically significant both individually and after adjustment for multiple testing. The findings are consistent with Gow, Larcker, and Watts (2020), who show that shareholders are more likely to support gender diverse candidates than racially diverse candidates. While the economic magnitudes of these findings may seem small, the effects are meaningful relative to the unconditional mean values (in our sample, 16% of board members are women).

These findings show that SRI funds do invest in firms with greater employee well-being and better gender diversity on the board of directors. Overall, the results show strong evidence that SRI funds offer their investors a portfolio of firms with better environmental and social conduct.

B. SRI Fund Impact

Our results so far show that SRI fund ownership is strongly associated with better firm behavior on environmental and social dimensions. However, it remains unclear whether SRI funds actually affect the behavior of their portfolio firms. In other words, the positive association could be due to selection or treatment effects. Disentangling the two effects is critical, since 81% of the SRI funds in our sample state in their filings that they actively engage with portfolio firms and seek to make an impact. In this section, we examine whether SRI funds cause real effects using our Morningstar research design.

B.1. SRI Funds and Corporate Environmental Behavior

In Table III we found that SRI fund ownership is associated with lower emissions. Now, we examine whether SRI fund ownership *causes* changes in pollution. Table V implements our difference-in-differences design that uses exogenous variation in SRI fund ownership to examine EPA pollution data. For all four measures of toxic releases, the point estimate on the effect of SRI investment is positive, which is inconsistent with emissions reduction. Moreover, none of the estimates is statistically significantly different from zero.

It is possible that significant reductions in pollution take time to occur. Accordingly, we also examine whether SRI ownership leads to investments in pollution abatement activities, which might happen more quickly. If SRI funds aim to reduce pollution in their portfolio firms, then we should observe greater investments in abatement technologies of SRI funds' portfolio firms. The results show no effect of SRI funds ownership on abatements at the extensive margin (Column 5) or at the intensive margin (Column 6). We also find no significant effect on climate risk exposure (Column 7) consistent with firms not changing their environmental policies following an increase in SRI ownership.[19]

In general, we observe that the point estimates in Table V are all small in magnitude. One important question for our difference-in-difference estimates is whether our research design is adequately powered to detect a significant treatment effect. If not, then our finding that SRI fund investment has no effect on emissions could be due to our estimates being underpowered. To examine this possibility, for each of our estimates we compute the minimum detectable effect size (MDES) following Bloom (1995). The MDES is a simple measure of the magnitude of treatment effect that a given estimator can reliably detect. The MDES of our estimates

[19] All of the results remain statistically insignificant after we adjust for multiple testing using the Romano-Wolf procedure (Romano & Wolf, 2005).

suggests that our research design is adequately powered to detect meaningful effects on the average firm's total emissions. For example, in the case of the log number of pollution abatements (Column 6), our research design could reliably detect a treatment effect on the order of 11.4% or larger. The number of abatements in our sample has a mean of 3.6 and a standard deviation of 15.4—in logs, it has a mean of 0.70 and a standard deviation of 1.01. Thus, our research design could reliably detect a treatment effect of a magnitude less than 1/10 of one sample standard deviation. We conclude that our research design is well-powered for all seven outcomes examined in the table.

Importantly, the MDES is also much smaller in magnitude than the selection effects documented in the previous section. For example, a one standard deviation increase in SRI investment is associated with 24.5% lower total firm emissions on average (Table III Column 1), compared to the MDES for the treatment effect of 11.4% (Table V Column 1). Thus, both economically and statistically, we can rule out that the associations found in Table III are driven by treatment effects of SRI fund ownership on pollution, abatements, or climate risk.

Our results so far suggest that SRI funds select firms that pollute less. Yet, SRI funds do not improve firm-level pollution. In other words, we do not observe any changes in the environmental behavior of firms due to ownership by SRI funds.[20]

[20]Our results are consistent with Bartram, Hou, and Kim (2019), who show that instead of reducing emissions, some firms shift emissions and plant ownership from California to other states to avoid stringent regulation on plant emission. In our setting, the fact that firms do not reduce pollution nor do they change their in investment in pollution abatements suggest that the marginal cost of further pollution reduction is higher than the marginal benefit from attracting investment by SRI funds.

B.2. SRI Funds, Employee Well-being, and Board Diversity

Next, in Table VI we examine whether SRI fund investment leads to improved employee well-being. First, we examine employee satisfaction and workplace safety in Panel A. Then we examine diversity on the board of directors in Panel B.

In Panel A, we find that an exogenous increase in SRI fund ownership is followed by insignificant or small positive changes in employee satisfaction. All seven measures of employee satisfaction increase on average following treatment. Once again, the MDES calculations suggest that our research design is adequately powered. Before adjusting for multiple testing, the treatment effect is statistically significant for three measures, reflecting an improvement in career opportunities, confidence in the CEO, and overall firm outlook. However, the magnitudes of all of these effects are small, and after adjusting for multiple testing none of them is statistically significant at conventional levels as shown by the Romano-Wolf p-values. Overall, we cannot reject the null that SRI fund ownership has no causal effect on employee satisfaction and safety. Put differently, while SRI funds invest in firms with higher employee satisfaction and safety, SRI funds do not cause improvements in these outcomes.

As in our selection analyses, we also examine the board of directors' gender and racial diversity. In Table VI, Panel B, we find that an exogenous increase in SRI fund ownership is followed by an increase in women on the board of directors, but no significant changes in racial diversity. Again, the MDES calculations suggest that our research design is adequately powered. For example, the MDES for gender diversity is 0.4 percent, so our research design can – and does – reliably detect a change in board diversity of 0.5 percent. Yet after adjusting for multiple testing, the Romano-Wolf p-value is not significant at conventional levels. Hence, while SRI funds select firms with more diverse boards in order to fulfill their social goals, they do not increase the proportion of women directors at their portfolio firms.

Finally, while our main analyses examine dependent variables measured over the year that immediately follows treatment, it is possible that SRI funds change firm behavior at longer horizons. To account for this possibility, we examine changes in firm behavior at longer (two- and three-year) horizons. The results are shown in Appendix A6. The MDES again suggests that our estimates are well powered, and we again find zero significant effects of SRI ownership on total pollution, overall employee ratings, and board gender diversity. In other words, even at the two- and three-year horizon, we find no evidence that SRI funds change firm-level behavior.

B.3. Heterogeneous Treatment Effects of SRI funds Ownership

To corroborate our results on SRI impact, we now examine whether our findings of zero treatment effects of SRI funds can be due to heterogeneity between different funds or firms. First, the majority of SRI funds in our sample claim that they engage with their portfolio firms in order to impact real-world outcomes. One question is whether funds that explicitly claim to pursue impact at their portfolio firms behave differently from funds that do not. In Table VII Panel A, we split the *predicted* level of SRI fund holdings using our Morningstar shocks into holdings by funds that do claim impact and holdings by funds that do not. For brevity, we present estimates for a subset of the main outcomes examined in our prior analyses, however the findings are similar across all of our outcome variables. We find that the estimated treatment effects for both types of funds are virtually identical and again near zero for total pollution, overall employee ratings, and gender diversity on the board. Our findings indicate that SRI funds that claim to engage with their portfolio firms do not have more impact than funds that do not claim to engage.

Second, while the AUM of SRI funds has substantially increased over the last ten years

(see Figure 1), the average level of SRI fund ownership in each stock is still relatively small (0.27% of shares outstanding in our sample). It is possible that our non-results indicate that SRI funds are not large enough to influence company-level policies. However, there is variation in the position sizes of SRI funds in our sample—SRI funds in the top decile of our sample hold approximately 1% of shares outstanding in a company, which is large enough to submit shareholder proposals and win board seats.[21] To examine whether our non-results are due to the small average position size of many funds, we test for heterogeneity in the treatment effect by splitting firms into terciles of SRI ownership prior to the shock. In other words, we examine whether the effect of SRI ownership is different for firms with higher versus lower preexisting levels of SRI fund ownership.

The results are reported in Table VII, Panel B. We continue to find no significant effect of SRI funds ownership on the EPA total releases. In contrast, we do find an effect on overall employee satisfaction and the fraction of women on boards for firms in the top terciles of SRI funds ownership. Yet, the F-test for heterogeneity in the treatment effect show no significant differences between funds with large versus small position sizes for overall employee satisfaction, but a marginally significant difference for women on boards. Taken together, these results suggest that our non-results in Tables V and VI are unlikely to be caused by the small size of SRI funds, and that SRI funds perhaps focus on firm policies that are easier to change and have greater visibility, like having more women on boards. Of course, an SRI fund with a *much* larger ownership stake is more likely to change corporate policies, but in modern capital markets with diffuse ownership, our results suggest that SRI

[21] Engine No.1 was able to win three board seats at Exxon, Inc. with less than a 0.1% stake in the company (Stevens, 2021).

funds typically do not own enough shares to affect change.[22]

Third, we examine the scope for improvement at SRI funds' portfolio firms. If SRI funds select only the best behaving firms *ex ante*, then this could explain why they take no action at their portfolio firms, since there is no room for improvement. We examine this with two analyses. In Figure 4 we show the relation between a firm's SRI funds ownership and the quintiles of real outcome variables of interest. In Panel A, the sorting variable is total pollution releases, in Panel B the sorting variable is investment in pollution abatement technology, in Panel C the sorting variable is gender diversity on the board of directors, and in Panel D the sorting variable is overall employee ratings. In all panels, we find that SRI funds significantly omit holdings in the worst behaving companies. However, they do invest in firms in the second, third, and fourth quintiles, which is inconsistent with the story that their portfolio firms have no room for improvement. Put differently, SRI funds avoid holding the worst firms, but they do hold plenty of firms that have room for improvement.

Hence, in Table VII Panel C we examine heterogeneity in the treatment effect by conditioning on a firm's E&S performance in the year prior to the shock to SRI ownership. In other words, we examine whether the effect of SRI ownership is different for firms that already have high versus low E&S performance. We continue to find no effect of SRI funds ownership on the EPA total emissions, or overall employee satisfaction. We do find an effect on the fraction of women on boards. However, the F-tests for heterogeneity in the treatment effect show no significant differences between funds with high versus low pre-existing levels of women on board.

[22]These findings are broadly consistent with Teoh, Welch, and Wazzan (1999) who show that shareholder divestitures protesting apartheid in South Africa had little effect despite the widespread attention they received.

C. SRI Fund Engagement

Finally, in light of our results showing that SRI funds do not impact firm behavior, we examine whether SRI funds use shareholder proposals to impact the E&S conduct of their portfolio firms. Specifically, we examine whether SRI investment impacts shareholder proposals at the extensive and intensive margins by examining whether SRI investment leads to more shareholder proposals and/or increases the likelihood they pass. Even though most SRI funds are small, Exchange Act Rule 14a-8 states that a shareholder may submit a proposal if they own at least $2,000 of a stock for three years or $15,000 for two years or $25,000 for one year (Securities and Exchange Commission, 2020). As such, even smaller SRI funds should be able to submit shareholder proposals to influence firm policies.

Table VIII presents the results from regressing our shareholder-proposal measures on the fitted value of SRI ownership from our Morningstar difference-in-differences research design. The table examines whether an exogenous increase in ownership by SRI funds leads to more E&S shareholder proposals or increases the likelihood of E&S proposals passing or being withdrawn. We find that a one standard deviation increase in level of investment by SRI funds leads to zero change in the number of E or S items that are proposed by any shareholders (Columns 1-3) or the number of E&S items proposed by SRI funds (Column 4). Moreover, the E&S items that are proposed are slightly *less* likely to pass (Columns 5-6) consistent with voting results in Michaely et al. (2021), and there is no change in the items that are withdrawn (Columns 7-8).

Accordingly, the results confirm that SRI funds are not acting to improve firm behavior using shareholder proposals on either the extensive or intensive margin. While one could argue that SRI funds affect their portfolio firms in other ways, perhaps via (unobservable) behind-the-scenes engagement with their portfolio firms, our results suggest this is not the

case. If behind-the-scenes engagement were effective, we would expect to see changes in either E&S proposals or real-world firm behavior.[23] Yet we do not. Furthermore, behind-the-scenes engagement often results in the withdrawal of shareholder proposals (after a negotiated change in behavior). Yet, the insignificant effect of SRI fund ownership on E&S shareholder proposals withdrawn indicates that behind-the-scene engagement with management is not effective in this setting.

As a final possibility, we explore whether some of the SRI funds in our sample are passive index funds and therefore lack the incentives and resources to engage with their portfolio firms (Heath, Macciocchi, Michaely, & Ringgenberg, 2022). Rows 2 and 3 of Table I show that virtually all SRI ownership at the firm level is by *actively* managed SRI funds. As of 2019, the last year in our sample, passively managed SRI funds were a small minority both by number (80 of 602 total SRI funds) and by assets under management ($25 billion of $240 billion total AUM in SRI funds).[24] Thus, the two recent booms in passive investing and socially responsible investing (SRI) are largely separate. We also find that within passive and active funds, SRI funds charge higher fees on average than non-SRI funds. Within actively managed funds, SRI funds have an average expense ratio of 1.09% compared to 0.99% for non-SRI funds; within passive index funds, SRI funds have an average expense ratio of 0.50% compared to 0.42% for non-SRI funds (results untabulated). We conclude that SRI funds have the resources to engage with their portfolio firms, and yet do not behave differently than non-SRI funds. These findings are consistent with a recent study conducted by Morningstar, which argued that SRI funds charge a "greenium" compared to similar non-SRI funds; as a result, "the sale of esg products helps asset managers to mitigate the two-decade-old curse

[23]For example, if shareholder engagement led to improved firm behavior, we would expect to see a drop in subsequent shareholder proposals.

[24]In addition to accounting for only one-tenth of SRI fund assets, passive funds invest in a more diversified portfolio on average, so they account for even *less* of the average SRI ownership by firm.

of declining fees" (The Economist, 2022). In other words, the concern is that fund managers may declare a socially responsible objective because they want to charge higher fees to their investors.

V. Conclusion

While there is an active debate about the social role of institutional investors in society (Hart & Zingales, 2017), to date there is little evidence on whether socially responsible investing actually affects corporate behavior. We provide novel evidence on the impact and actions of SRI funds. We find that SRI funds are significantly more likely than non-SRI funds to hold firms with good environmental and social conduct. SRI funds tend to hold companies that pollute less, have better workplace safety, have greater board diversity, and have better employee satisfaction. However, we find little evidence that SRI funds have any impact on corporate behavior.

Our results suggest that, for fund managers, the benefit from improving firm behavior may not compensate for the cost of engaging with portfolio firms. To examine this, in Section A7 of the Internet Appendix we examine the incentives of SRI fund managers. Fund flows respond to third-party E&S ratings (Hartzmark & Sussman, 2019), which are a function of the ratings of the firms in each fund's portfolio. We show that while firm-level E&S ratings reflect the firm's current *level* of E&S performance, they are uncorrelated with *changes* in E&S performance. It follows that SRI funds seeking to maximize investor flows are primarily stock selectors: They invest in a portfolio of firms with good E&S performance, but do not work to improve corporate conduct.

Our main conclusions come from a carefully-identified novel research design using dis-

continuities in the Morningstar star ratings. Yet, we show that the same conclusions hold over treatment periods longer than one year, for firms with relatively large and small SRI fund holdings, and for funds that explicitly claim to engage with their portfolio firms as well as those that do not. Moreover, our conclusions are also the same when we relax the assumptions of our research design, and simply examine correlations in the broad cross-section of data. Figure 5 plots the distribution of firms' yearly changes in total emissions, overall employee ratings, and gender diversity as a function of investment by SRI funds. Once again, in all three cases, there is no significant relation between SRI investment and improvements in firm behavior. These results support the external validity of our main findings.

Overall, our results suggest that while SRI funds are successful in providing their investors with a portfolio of environmentally and socially responsible firms, they do not significantly improve corporate conduct. Put differently, our results suggest that while SRI funds may not be "greenwashing," the majority (81% of funds in our sample) are "impact washing." These funds claim to impact firm behavior, but they do not. Future research should explore alternate methods of socially responsible investing, and perhaps regulatory responses, to ensure that investors' good intentions and the fees charged by SRI funds are repaid with real results.

References

Abadie, A. (2020). Statistical non-significance in empirical economics. *American Economic Review: Insights*, *2*, 193–208.

Bartik, T. J. (1991). *Who benefits from state and local economic development policies?* WE Upjohn Institute for Employment Research Kalamazoo, MI.

Bartram, S. M., Hou, K., & Kim, S. (2019). Real effects of climate policy: Financial constraints and spillovers. *Fisher College of Business Working Paper*(2019-03), 004.

Bebchuk, L. A., & Tallarita, R. (2020). The illusory promise of stakeholder governance. *Working Paper*.

Berg, F., Fabisik, K., & Sautner, Z. (2020). Rewriting history ii: The (un) predictable past of esg ratings. *European Corporate Governance Institute–Finance Working Paper*, *708*.

Berg, F., Koelbel, J. F., & Rigobon, R. (2019). Aggregate confusion: The divergence of ESG ratings. *Working Paper*.

Berk, J., & van Binsbergen, J. H. (2021). The impact of impact investing. *Working Paper*.

BlackRock. (2020). *Emissions, engagement, and transition to a low low-carbon economy.* Retrieved March 2020, from `https://www.blackrock.com/corporate/literature/publication/blk-commentary-engaging-on-emissions.pdf`

Bloom, H. S. (1995). Minimum detectable effects: A simple way to report the statistical power of experimental designs. *Evaluation Review*, *19*(5), 547-556.

Borusyak, K., Jaravel, X., & Spiess, J. (2017). Revisiting event study designs: Robust and efficient estimation. *Working Paper*.

Broccardo, E., Hart, O. D., & Zingales, L. (2022). Exit vs. voice. *Journal of Political Economy*, *forthcoming*.

Chowdhry, B., Davies, S. W., & Waters, B. (2019). Investing for impact. *Review of Financial*

Studies, *32*, 864—904.

Cohen, L., Gurun, U. G., & Nguyen, Q. (2020). The ESG - Innovation Disconnect: Evidence from Green Patenting. *Working Paper*.

Davies, S. W., & Van Wesep, E. D. (2018). The unintended consequences of divestment. *Journal of Financial Economics*, *128*, 558–575.

Dimson, E., Karakaş, O., & Li, X. (2015). Active ownership. *The Review of Financial Studies*, *28*(12), 3225–3268.

Domini Social Equity Fund. (2021). *Sustainable, responsible and impact mutual fund and etf chart – fund profile: Domini social equity fund.* Retrieved June 2021, from `https://charts.ussif.org/mfpc/fund_profile_display.php?FundID=94`

Duong, T. X., & Meschke, F. (2020). The rise and fall of portfolio pumping among us mutual funds. *Journal of Corporate Finance*, *60*, 101530.

Edmans, A. (2009). Blockholder trading, market efficiency, and managerial myopia. *The Journal of Finance*, *64*(6), 2481–2513.

Edmans, A. (2011). Does the stock market fully value intangibles? Employee satisfaction and equity prices. *Journal of Financial Economics*, *101*(3), 621–640.

Edmans, A., Levit, D., & Schneemeier, J. (2022). Socially responsible divestment. *European Corporate Governance Institute–Finance Working Paper*(823).

Edmans, A., & Manso, G. (2010). Governance through trading and intervention: A theory of multiple blockholders. *The Review of Financial Studies*, *24*(7), 2395–2428.

Friedman, & Heinle, M. S. (2021). Interested Investors and Intermediaries: When do ESG Concerns Lead to ESG Performance? *Jacobs Levy Equity Management Center for Quantitative Financial Research Paper*.

Gantchev, N., Giannetti, M., & Li, R. (2020). Sustainability or Performance? Ratings and Fund Managers' Incentives. *Working Paper*.

Goodman-Bacon, A. (2021). Difference-in-differences with variation in treatment timing. *Journal of Econometrics*, *225*, 254–277.

Gow, I. D., Larcker, D. F., & Watts, E. M. (2020). Board diversity and shareholder voting. *Working Paper*.

Greene, D., Intintoli, V. J., & Kahle, K. M. (2020). Do board gender quotas affect firm value? Evidence from California Senate Bill No. 826. *Journal of Corporate Finance*, *60*, 101526.

Guercio, D. D., & Tkac, P. A. (2008). Star power: The effect of morningstar ratings on mutual fund flow. *Journal of Financial and Quantitative Analysis*, 907–936.

Harstad, B. (2012). Buy Coal! A Case for Supply-Side Environmental Policy. *Journal of Political Economy*, *120*, 77–115.

Hart, O., & Zingales, L. (2017). Companies should maximize shareholder welfare not market value. *Journal of Law, Finance, and Accounting*, *2*, 247–274.

Hartzmark, S. M., & Sussman, A. B. (2019). Do Investors Value Sustainability? A Natural Experiment Examining Ranking and Fund Flows. *Journal of Finance*, *74*, 2789–2837.

Heath, D., Macciocchi, D., Michaely, R., & Ringgenberg, M. C. (2022). Do index funds monitor? *The Review of Financial Studies*, *35*, 91–131.

Heath, D., Ringgenberg, M. C., Samadi, M., & Werner, I. M. (2021). Reusing natural experiments. *Journal of Finance*, *forthcoming*.

Heinkel, R., Kraus, A., & Zechner, J. (2001). The effect of green investment on corporate behavior. *Journal of Financial and Quantitative Analysis*, *36*(4), 431–449.

Kim, S., Kumar, N., Lee, J., & Oh, J. (2021). ESG Lending. *Working Paper*.

Kim, S. H. (2021). Do Mutual Fund Managers Care About Star Ratings? Evidence from Portfolio Pumping. *Working Paper*.

Krouse, S. (2018). Blackrock: Companies should have at least two female directors. *Wall*

Street Journal, 81–104.

Krueger, P., Sautner, Z., & Starks, L. T. (2020). The importance of climate risks for institutional investors. *The Review of Financial Studies*, *33*(3), 1067–1111.

Michaely, R., Ordonez-Calafi, G., & Rubio, S. (2021). ES votes that matter. *Working Paper*.

Pástor, L., Stambaugh, R. F., & Taylor, L. A. (2021). Sustainable investing in equilibrium. *Journal of Financial Economics*, *142*(2), 550–571.

Reuter, J., & Zitzewitz, E. (2021). How much does size erode mutual fund performance? A regression discontinuity approach. *Review of Finance*, *forthcoming*.

Riedl, A., & Smeets, P. (2017). Why do investors hold socially responsible mutual funds? *Journal of Finance*, *72*, 2505–2550.

Romano, J. P., & Wolf, M. (2005). Stepwise multiple testing as formalized data snooping. *Econometrica*, *73*(4), 1237–1282.

Sautner, Z., van Lent, L., Vilkov, G., & Zhang, R. (2020). Firm-level climate change exposure. *Working Paper*.

Securities and Exchange Commission. (2020, September 23). *Sec adopts amendments to modernize shareholder proposal rule.* Retrieved 2022-08-09, from `https://www.sec.gov/news/press-release/2020-220`

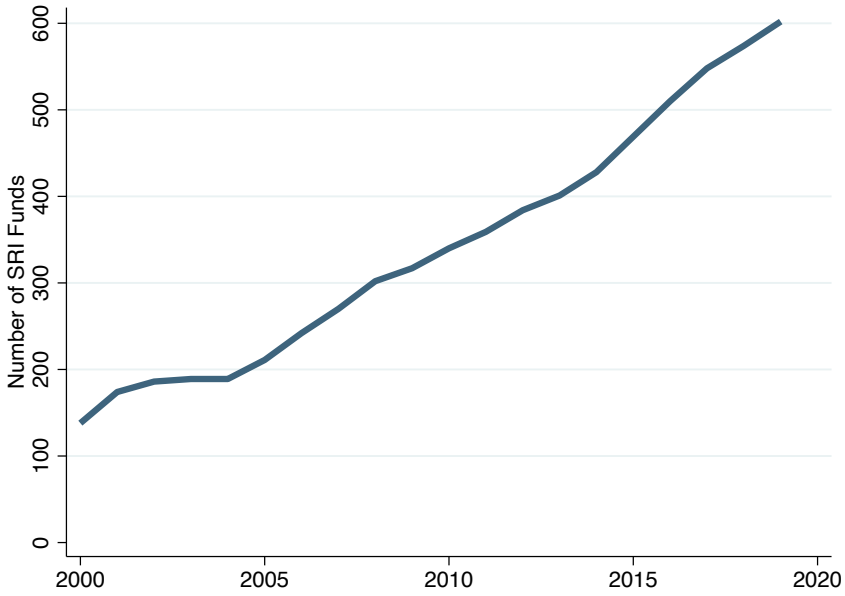
Stevens, P. (2021, June 2). Activist firm Engine No. 1 claims third Exxon board seat. *CNBC*. Retrieved 2022-08-09, from `https://www.cnbc.com/2021/06/02/activist-firm-engine-no-1-claims-third-exxon-board-seat-.html`

Sun, L., & Abraham, S. (2021). Estimating dynamic treatment effects in event studies with heterogeneous treatment effects. *Journal of Econometrics*, *225*, 175–199.

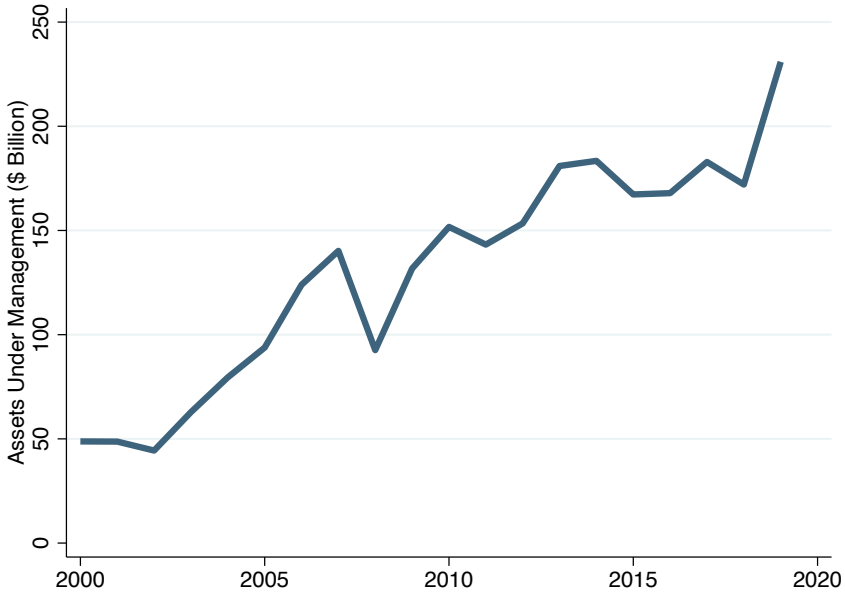
Teoh, S. H., Welch, I., & Wazzan, C. P. (1999). The effect of socially activist investment policies on the financial markets: Evidence from the south african boycott. *Journal of*

Business, *72*, 35–89.

The Economist. (2022, July 21). The saviour complex. it's time to get real about what esg can–and cannot–achieve. *The Economist*.



Panel A: Number of SRI funds



Panel B: SRI Assets Under Management

Figure 1. Growth in SRI Funds and Assets over Time

The figure plots the number of SRI funds (Panel A) and the total assets under management in those funds (Panel B) in the CRSP Mutual Fund Database, as of December of each year.

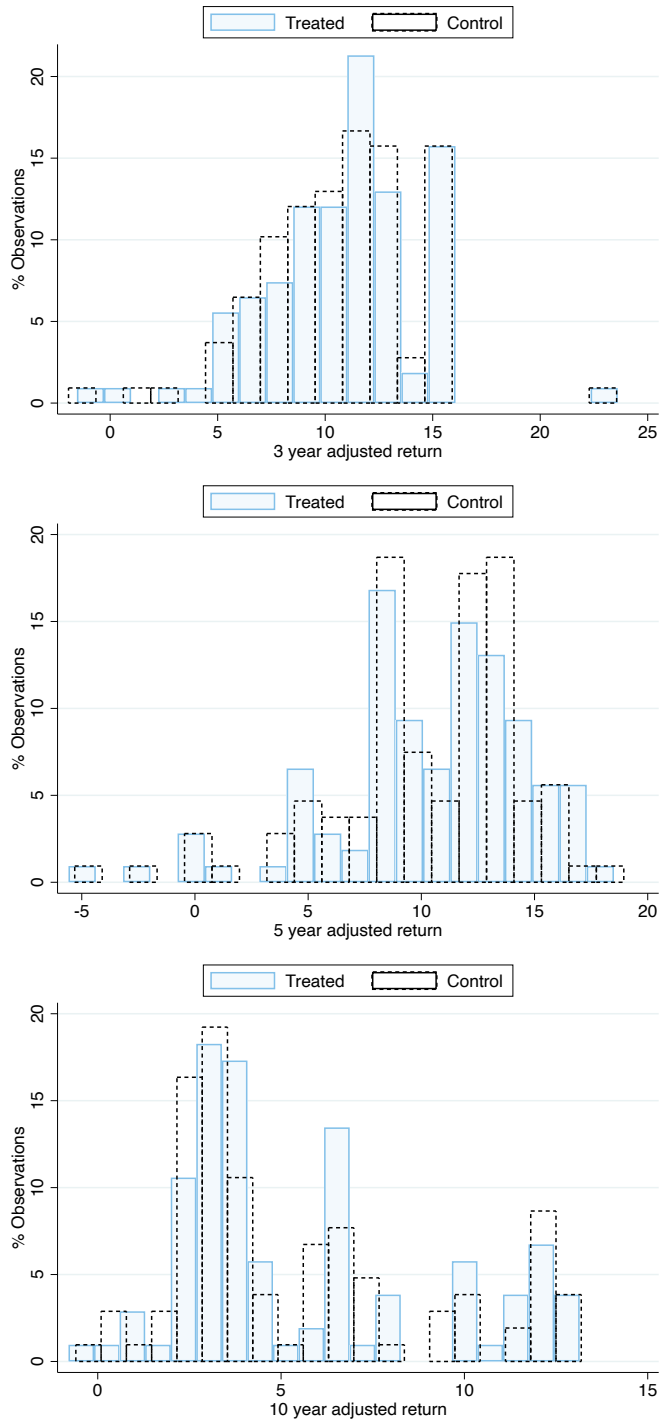


Figure 2. Treated vs. control fund lagged returns

The figure plots the distribution of the variables that determine Morningstar star ratings (3 year, 5 year and 10 year adjusted returns) for the treated and control funds, measured as of the December prior to the treatment year.

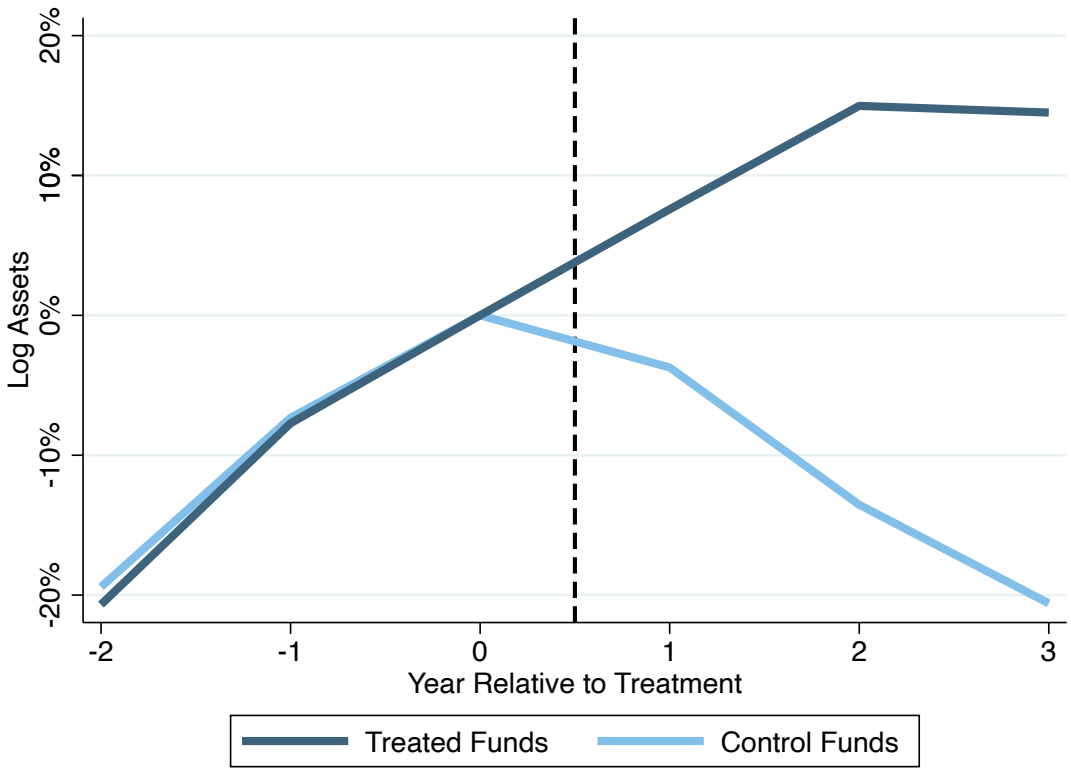
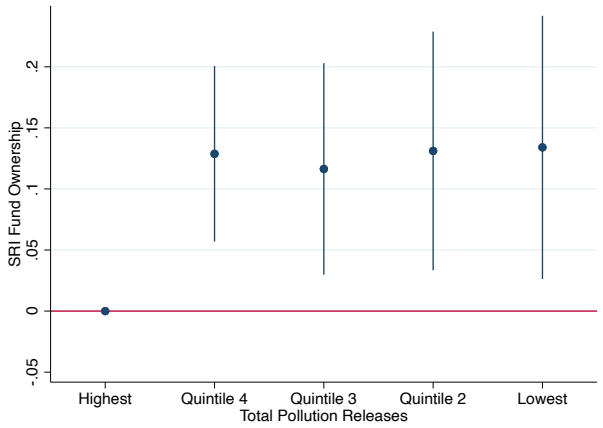
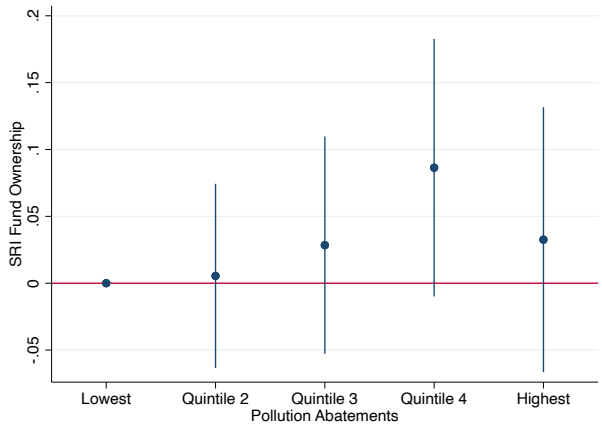


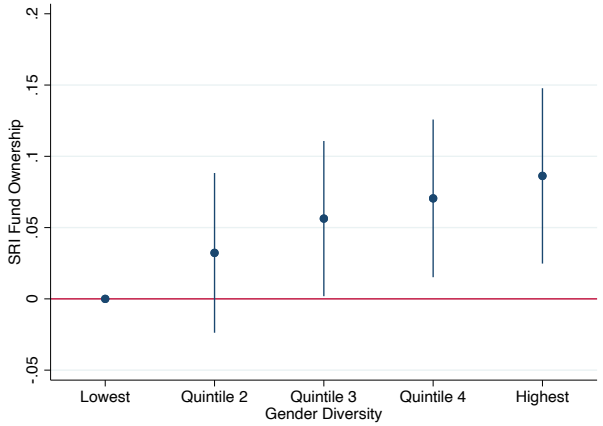
Figure 3. Treated vs. control fund assets, pre- versus post-treatment
The figure plots average log fund assets, for treated and control funds separately, in event-time for three years before and after the cohort year. Both series have been aligned at zero as of the cohort year (year 0, the last pretreatment year) for ease of comparison.



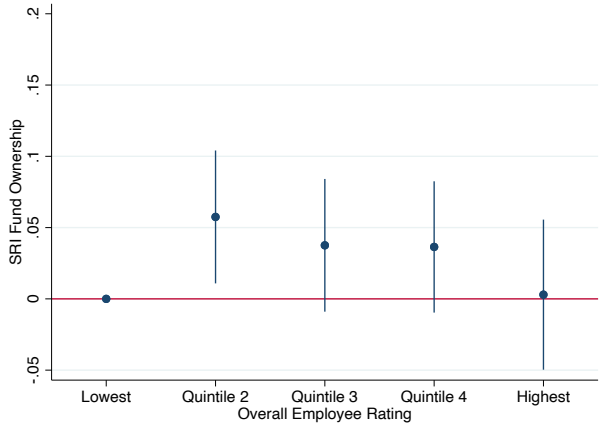
(a) Sorting variable: Total Pollution Releases



(b) Sorting variable: Pollution Abatement

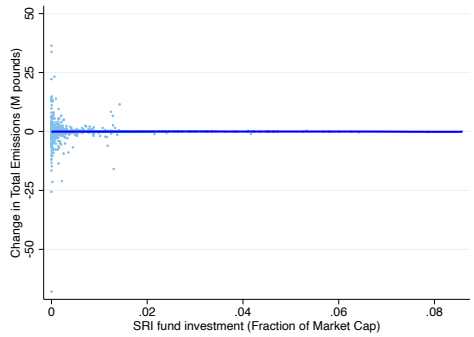


(c) Sorting variable: Gender Diversity

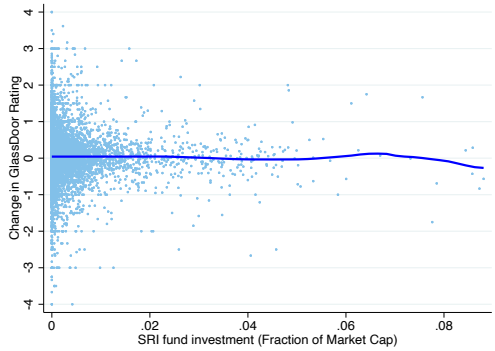


(d) Sorting variable: Overall Rating

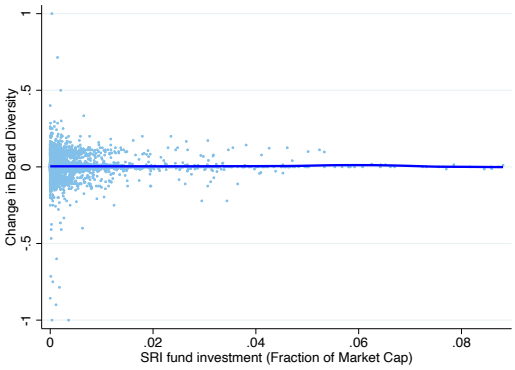
Figure 4. The figure plots the relation between SRI fund ownership and the quintile in which firm i resides when sorted on the level of the real outcome variable of interest. In panel A, the sorting variable is total pollution releases, in panel B the sorting variable is investment in pollution abatement technology, in panel C the sorting variable is gender diversity on the board of directors, and in panel D the sorting variable is overall employee rating from Glassdoor, Inc.



Panel A: Change in EPA Total Emissions



Panel B: Change in Glassdoor Overall Ratings



Panel C: Change in Board Gender Diversity

Figure 5. Yearly Changes in Firm SRI Outcomes and SRI Fund Investment
The figure plots the yearly change (from t to $t+1$) for three major categories of firm E&S performance, against the total level of SRI fund investment in the firm at time t. Panel A plots changes in total EPA emissions in millions of pounds of pollutant. Panel B plots changes in the overall employee rating on Glassdoor. Panel C plots changes in board gender diversity. The blue lines present the local polynomial best-fit.

Table I
Summary statistics

The table presents summary statistics for key variables used in our analyses. For each variable, we present the mean, the standard deviation, the 1st decile, the median, and the 10th decile. Definitions and constructions for all variables are in Appendix A1 and A2.

Variable	Mean	St. Dev.	p10	Median	p90
	(1)	(2)	(3)	(4)	(5)
SRI Investment (%)	0.27	0.66	0.00	0.05	0.67
SRI Investment (Active) (%)	0.26	0.66	0.00	0.04	0.67
SRI Investment (Passive) (%)	0.00	0.01	0.00	0.00	0.01
Total releases (M pounds)	1.51	5.25	0.00	0.04	3.06
Air (M pounds)	0.47	1.68	0.00	0.01	0.90
Water (M pounds)	0.13	1.11	0.00	0.00	0.05
Land (M pounds)	0.68	4.04	0.00	0.00	0.39
Num_abatements	3.64	15.37	0.00	0.00	8.00
Abatement	0.43	0.49	0.00	0.00	1.00
CCExposure	1.00	2.67	0.00	0.27	1.93
Overall	3.27	0.68	2.49	3.28	4.00
Careeropps	3.02	0.66	2.25	3.00	3.79
Srleader	2.92	0.73	2.03	2.91	3.83
Worklife	3.30	0.68	2.50	3.32	4.04
Culture	3.22	0.75	2.33	3.24	4.07
CEO	0.29	0.41	-0.19	0.32	0.82
Outlook	0.24	0.41	-0.25	0.25	0.75
Hospitalization	1.86	2.63	0.00	1.00	4.00
Amputation	0.52	1.05	0.00	0.00	1.00
Gender Div.	0.16	0.11	0.00	0.14	0.30
Racial Div.	0.11	0.12	0.00	0.10	0.25
ES_Index	0.17	0.58	-0.50	0.00	0.90

Table II
Difference-in-differences regression of fund assets

The table presents results for the effects of the Morningstar star ratings on fund assets. Specifically, we estimate regressions of the form:

$$y_{i,t} = \beta(Treated \times Post) + FE_i + FE_t + \epsilon_{i,t},$$

Treated is an indicator that equals one for treated funds, and zero otherwise. Treated funds are SRI funds that have a Morningstar star rating that is one star higher than the matched control fund in January of the treatment year. *Post* is an indicator that equals one after treatment, and zero otherwise. FE_i is a fund-by-cohort fixed effect, and FE_t is a year fixed effect. *Placebo* is an indicator that equals one for treated funds in our placebo test, for which treatment funds are defined as SRI funds that have a Morningstar star rating equal to the matched control fund in January of the treatment year. Robust standard errors, clustered at the fund level, are shown in parenthesis. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	log(AUM)	Falsification log(AUM)	Residualized log(AUM)
	(1)	(2)	(3)
Treated × Post	0.229***		0.213***
	(0.072)		(0.064)
Placebo × Post		0.008	
		(0.059)	
Observations	1,161	1,778	1,088
Adjusted R-squared	0.909	0.918	0.923
Fund × Cohort FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Table III

Selection Effects: SRI funds and corporate environmental behavior

The table presents estimates of the relation between SRI fund investment and firm total pollution (*Total releases*), air pollution (*Air*), water pollution (*Water*), land pollution (*Land*), investments in pollution abatement (*Abatement* and *logAbatements*), and climate change exposure (*CCExposure*). *SRI Investment* is the percentage of a firm's ownership held by SRI funds (to facilitate the interpretation of the results, the measure is standardized). Definitions for all variables are in the Appendix Section A2. Robust standard errors, clustered at the firm level, are shown in parenthesis with raw and Romano and Wolf (2005) p-values shown below. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Total releases	Air	Water	Land	Abatement	logAbatements	CCExposure
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
SRI Investment	-0.245	-0.251	-0.684	-0.340	0.022	0.032	-0.061
	(0.094)	(0.092)	(0.162)	(0.286)	(0.012)	(0.040)	(0.023)
Unadjusted p	0.010***	0.007***	0.001***	0.233	0.067*	0.421	0.009***
Romano-Wolf p	0.081*	0.077*	0.004***	0.435	0.229	0.435	0.081*
Observations	3,759	3,584	1,885	1,222	3,579	1,526	15,004
Adjusted R-squared	0.005	0.006	0.038	-0.000	0.015	0.013	0.002
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table IV
Selection Effects: SRI funds, employee well-being, and board diversity

The table presents estimates of the relation between SRI fund investment and a firm's employee well-being using data provided by Glassdoor, Inc. and OSHA (Panel A), and board gender and racial diversity (Panel B). *SRI Investment* is the percentage of a firm's ownership held by SRI funds (to facilitate the interpretation of the results, the measure is standardized). Definitions for all variables are in the Appendix Section A2. Robust standard errors, clustered at the firm level, are shown in parenthesis with raw and Romano and Wolf (2005) p-values shown below. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Employee well-being

	Overall	Careeropps	Srleader	Worklife	Culture	CEO	Outlook	Hospitalization	Amputation
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
SRI Investment	0.004	0.008	0.006	0.006	0.013	0.007	0.012	-0.042	-0.009
	(0.006)	(0.006)	(0.007)	(0.006)	(0.007)	(0.004)	(0.004)	(0.014)	(0.007)
Unadjusted p	0.511	0.179	0.390	0.319	0.082*	0.058*	0.001***	0.002***	0.192
Romano-Wolf p	0.778	0.642	0.697	0.682	0.452	0.387	0.078*	0.091*	0.642
Observations	12,113	12,038	12,032	12,042	10,701	11,566	10,628	1,251	1,251
Adjusted R-squared	0.035	0.027	0.013	0.011	0.012	0.010	0.014	-0.001	-0.001
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Panel B: Board diversity

	Gender Div.	Racial Div.
	(1)	(2)
SRI Investment	0.006	0.000
	(0.001)	(0.002)
Unadjusted p	0.001***	0.997
Romano-Wolf p	0.025**	0.997
Observations	15,661	9,898
Adjusted R-squared	0.117	0.006
Year FE	Yes	Yes

Table V

Treatment effects: SRI funds and corporate environmental behavior

The table presents estimates of the effect of SRI fund investment on firm total pollution (*Total releases*), air pollution (*Air*), water pollution (*Water*), land pollution (*Land*), total off-site pollution (*Off-site*), one time pollution (*One-time*), investments in pollution abatement (*Abatement* and *logAbatements*), and climate change exposure (*CCExposure*). $\Delta SRI\,\widehat{Investment}$ is the predicted change in SRI investment for each firm in the sample from our paired fund-level difference-in-differences regression (to facilitate the interpretation of the results, the measure is standardized). MDES is the minimum detectable effect size (Bloom, 1995). Definitions for all variables are in the Appendix Section A2. Robust standard errors, clustered at the firm level, are shown in parenthesis with raw and Romano and Wolf (2005) p-values shown below. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Total releases	Air	Water	Land	Abatement	logAbatements	CCExposure
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$\Delta SRI\,\widehat{Investment}$	0.030	0.018	0.077	0.031	0.013	0.019	-0.000
	(0.042)	(0.041)	(0.064)	(0.098)	(0.016)	(0.040)	(0.023)
MDES	±0.119	±0.116	±0.181	±0.278	±0.046	±0.114	±0.065
Unadjusted p	0.481	0.658	0.230	0.729	0.420	0.628	0.998
Romano-Wolf p	0.959	0.985	0.811	0.985	0.959	0.985	0.996
Observations	3,728	3,555	1,869	1,183	3,551	1,456	14,973
Adjusted R-squared	0.887	0.892	0.888	0.906	0.508	0.718	0.857
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table VI

Treatment effects: SRI funds, employee well-being, and board diversity

The table presents estimates of the effect of SRI fund investment on a firm's employee well-being using data provided by Glassdoor, Inc. and OSHA (Panel A), and the effect of SRI fund investment on board diversity (Panel B). $\Delta SRI\widehat{Investment}$ is the predicted change in SRI investment for each firm from our paired fund-level difference-in-differences regression (to facilitate the interpretation of the results, the measure is standardized). MDES is the minimum detectable effect size (Bloom, 1995). Definitions for all variables are in the Appendix Section A2. Robust standard errors, clustered at the firm level, are shown in parenthesis with raw and Romano and Wolf (2005) p-values shown below. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Employee well-being

	Overall	Careeropps	Srleader	Worklife	Culture	CEO	Outlook	Hospitalization	Amputation
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$\Delta SRI\widehat{Investment}$	0.015	0.019	0.011	0.010	0.016	0.013	0.014	0.048	-0.028
	(0.011)	(0.011)	(0.011)	(0.010)	(0.013)	(0.006)	(0.008)	(0.034)	(0.029)
MDES	±0.030	±0.030	±0.032	±0.028	±0.035	±0.017	±0.024	±0.097	±0.081
Unadjusted p	0.150	0.071*	0.336	0.303	0.194	0.026**	0.088*	0.159	0.333
Romano-Wolf p	0.665	0.563	0.774	0.774	0.710	0.458	0.589	0.665	0.774
Observations	12,017	11,939	11,933	11,944	10,592	11,451	10,512	963	963
Adjusted R-squared	0.364	0.330	0.333	0.371	0.401	0.343	0.338	0.823	-0.097
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Panel B: Board Diversity

	Gender Div.	Racial Div.
	(1)	(2)
$\Delta SRI\widehat{Investment}$	0.004	0.002
	(0.001)	(0.002)
MDES	±0.004	±0.005
Unadjusted p	0.002***	0.295
Romano-Wolf p	0.368	0.774
Observations	15,649	9,807
Adjusted R-squared	0.774	0.787
Year FE	Yes	Yes
Firm FE	Yes	Yes

Table VII
Heterogeneous Treatment Effects of SRI funds Ownership

The table presents estimates of the heterogeneity of the effect of SRI funds investment on firm's environmental and social behavior. In Panel A, we interact the fitted values of SRI fund ownership ($\Delta SRI\widehat{Investment}$) with two indicators for whether SRI funds claim to make an impact on firm behavior ($FundClaimsImpact$ and $FundDoesNotClaimImpact$). In Panel B, we interact the fitted values of SRI fund ownership ($\Delta SRI\widehat{Investment}$) with terciles of lagged SRI fund ownership ($SRI\ Investment_{t-1}$). In Panel C, we interact the fitted values of SRI fund ownership ($\Delta SRI\widehat{Investment}$) with terciles of the given outcome variable as of the previous year. Robust standard errors, clustered at the firm level, are shown in parenthesis. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Heterogeneity by whether SRI funds claim to change behavior

	Total Releases (1)	Overall (2)	Gender Div. (3)
$FundClaimsImpact$	0.016	0.012	0.003*
$\times\ \Delta SRI\widehat{Investment}$	(0.040)	(0.010)	(0.002)
$FundDoesNotClaimImpact$	0.005	0.002	0.003*
$\times\ \Delta SRI\widehat{Investment}$	(0.043)	(0.013)	(0.002)
F-stat $[Coef1 = Coef2]$	0.03	0.24	0.01
Observations	3,728	12,017	15,649
Adjusted R-squared	0.887	0.364	0.774
Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes

Panel B: Heterogeneity by pretreatment SRI fund ownership

	Total Releases (1)	Overall (2)	Gender Div. (3)
Low $SRI\ Investment_{t-1}$	0.117	0.029*	0.000
$\times\ \Delta SRI\widehat{Investment}$	(0.123)	(0.017)	(0.002)
Mid $SRI\ Investment_{t-1}$	0.046	0.033**	0.003
$\times\ \Delta SRI\widehat{Investment}$	(0.066)	(0.014)	(0.002)
High $SRI\ Investment_{t-1}$	0.029	0.024*	0.004***
$\times\ \Delta SRI\widehat{Investment}$	(0.048)	(0.013)	(0.002)
F-stat [High = Low]	0.50	0.14	3.44*
Observations	3,231	10,588	13,299
Adjusted R-squared	0.888	0.380	0.783
Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes

Table VII:
Heterogeneous Treatment Effects of SRI funds Ownership (Cont'd)

Panel C: Heterogeneity by lagged E&S outcome

	Total Releases (1)	Overall (2)	Gender Div. (3)
Low OutcomeVar$_{t-1}$	0.062	0.015	0.004**
$\times \Delta\widehat{SRIInvestment}$	(0.075)	(0.016)	(0.002)
Mid OutcomeVar$_{t-1}$	0.056	0.016	0.001
$\times \Delta\widehat{SRIInvestment}$	(0.069)	(0.011)	(0.002)
High OutcomeVar$_{t-1}$	-0.028	0.020	0.005***
$\times \Delta\widehat{SRIInvestment}$	(0.053)	(0.014)	(0.002)
F-stat [High = Low]	0.99	0.11	0.04
Observations	3,153	9,785	13,220
Adjusted R-squared	0.888	0.427	0.783
Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes

Table VIII
The effects of SRI Investment on E&S Shareholder Proposals

The table presents estimates of the effects of SRI fund investment on the number and success of E&S shareholder proposals at portfolio firms. Definitions for all variables are in the Appendix Section A2. In all models, the independent variable, $\Delta\widehat{SRI\ Investment}$, is the predicted change in SRI investment for each firm in the sample from our paired fund-level difference-in-differences regression (to facilitate the interpretation of the results, the measure is standardized). In columns 1 to 3, the dependent variable is the number of shareholder proposals related to environmental and social issues (ES), environmental issues (E), and social issues (S), respectively. In column 4, the dependent variable is the number of ES items proposed by SRI funds. In columns 5 and 6, the dependent variable is the number and fraction of ES proposals that pass, respectively. In columns 7 and 8, the dependent variable is the number and fraction of ES proposals withdrawn, respectively. Robust standard errors, clustered at the firm level, are shown in parenthesis. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	(1) Number of ES Items	(2) Number of E Items	(3) Number of S Items	(4) ES Items by SRI Funds	(5) Number of ES Items Passed	(6) Fraction of ES Items Passed	(7) ES Items Withdrawn	(8) Fraction of ES Items Withdrawn
$\Delta\widehat{SRI\ Investment}$	0.001	0.003	-0.003	0.006	-0.002**	-0.000**	-0.001	-0.012
	(0.006)	(0.005)	(0.003)	(0.006)	(0.001)	(0.000)	(0.006)	(0.009)
Observations	16,192	16,192	16,192	9,119	16,192	15,761	9,119	3,022
Adjusted R-squared	0.461	0.432	0.278	0.256	0.008	0.043	0.113	0.199
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Internet Appendix for "Does Socially Responsible Investing Change Firm Behavior?"

Davidson Heath, Daniele Macciocchi, Roni Michaely, and Matthew C. Ringgenberg[1]

This Appendix provides additional information to supplement the analyses provided in the main paper.

- Section A1 provides a detailed overview of our sample construction.
- Section A2 provides definitions of the key variables used in our analyses.
- Section A3 provides additional evidence supporting our identification assumptions.
- Section A4 provides evidence on heterogeneous treatment effects.
- Section A5 examines the relation between our shock and treated fund's portfolio holdings.
- Section A6 tests for longer-run effects from SRI fund investment on firm behavior. Our main conclusions are unchanged.
- Section A7 examines the economic incentives of SRI funds and finds that third-party E&S rating agencies assign the best ratings to firms with the best level of environmental and social behavior, but they do not appear to reward firms for improving their behavior. Since fund flows strongly respond to these E&S ratings, this suggests fund managers have weak incentives to improve firm behavior.
- Section A8 repeats our main analyses using E&S ratings from KLD as the dependent variable. Our main conclusions are unchanged.

[1]Citation format: Heath, Davidson, Daniele Macciocchi, Roni Michaely, and Matthew C. Ringgenberg, Internet Appendix for "Does Socially Responsible Investing Change Firm Behavior?" 2022, Working Paper.

A1. Detailed Description of Data from the EPA, OSHA and Glassdoor, Inc.

We collect firm-year level data on environmental and social corporate practices from several databases. To examine environmental behavior, from the Environmental Protection Agency (EPA) we obtain data from (1) the Form R of the Toxic Release Inventory (TRI database) and (2) from the EPA Pollution Prevention (P2) database. The EPA TRI database contains facility-year level data on the chemical emissions of firms operating in regulated industries that meet a requirement on the minimum number of employees. Specifically, all facilities of private and public companies in the U.S. with more than 10 employees must disclose toxic release data for approximately 600 chemicals since 1987. Facilities in the U.S. are required to report to the EPA the pounds of chemical (grams for dioxin and dioxin-like compounds) released on-site, which are comprised by releases into the ground, air, water, and the total amount of releases transferred off-site.

We use the TRI database to create four measures of pollution at the parent company-year level. Our aggregated measure is *Total releases*, which is the total on-site and off-site releases. On site releases are the total quantity of the toxic chemicals released to air, water and land on-site at the facility. We measure *Air*, which is the total quantity of the chemical released as air emissions at the reporting facility; *Water*, which is the total quantity of the chemical released on-site as surface water discharges; an *Land*, which is the total quantity of the chemical injected on site at the facility to underground injection wells, on-site landfills, surface impoundments, or other.

From the EPA P2 database, we collect information about a facility's yearly investments in pollution reducing activities. Investment data is available from 2011 to 2018 and is divided into two categories: (1) the number of activities each facility undertakes in order to reduce pollution–for example operating process modifications, taking actions to prevent spills and leaks, and redesigning products to reduce pollution, etc.; and (2) the number of facilities that implemented pollution reducing activities. From the P2 database we create two measures of a firm's propensity and

frequency to invest in pollution reducing activities: *logAbatements*, which is the log of the number of abatement actions that a firm discloses in a given year, and *Abatement*, which is an indicator variable equal to 1 if the firm reports an abatement activity across any category, and 0 otherwise.

The EPA data is at the facility-chemical year level. For each facility, the EPA reports the name of the parent company, which is defined as highest-level corporation that owns at least 50 percent of voting shares. In order to merge the EPA data with our sample of funds and portfolio firms, we first combine all the EPA data at the parent-year level. Second, we combine data from the EPA P2 database with data from the EPA TRI database. Finally, we match the EPA parent name with Compustat firm name and retrieve the company gvkey by conducting a fuzzy match (we remove common suffixes like "Company", "Corp", "Incorporated", "LLC" etc.).

We also aim to examine each firm's social behavior. To do so, we use four different data sources with micro-level data about a company's employee well-being, workplace safety, and board demographics.[2]

To measure employee well-being, we obtain data on employee reviews from Glassdoor, Inc., which is a worldwide leader in providing insights about jobs and companies.[3] Glassdoor, Inc. collects employee feedback, company ratings and reviews, CEO approval ratings, salary reports, interview reviews and questions, and benefits reviews from a large spectrum of companies worldwide. From Glassdoor, we obtain nine measures of employees reviews of their companies. First, we obtain six different measures of employee satisfaction that each take on numerical values between 0 (bad) and 5 (good). These ratings are (1) the overall company rating (*Overall*); (2) the rating for the career opportunity within a corporation (*Careeropps*); (3) the rating for senior leadership (*Srleader*); (4) the rating for the corporation's work-life balance (*Worklife*); and (5) the rating for the corporate culture (*Culture*). Finally, we obtain two variables that range from -1 to 1: *CEO*, which is the review for the company's CEO (-1 if the employee disapproves, 0 if no opinion, and 1

[2]Similar to the process described above for the EPA data, we aggregate data at the parent company-year level (where necessary) and conduct a fuzzy name match with Compustat.

[3]See `www.glassdoor.com`.

if she approves); and *Outlook*, which measures the company outlook (-1 if worse, 0 if same, and 1 if better).

From the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA), we obtain data on the workplace safety. Starting in 2015, OSHA requires employers to report all severe work-related injuries, defined as an amputation or in-patient hospitalization. Accordingly, we create two variables. First, we measure *Hospitalization*, which is the annual number of work-related injuries that required hospitalization. Second, we measure *Amputation*, which is the annual number of work-related injuries that required amputation. In the regression models, to assure comparability across firms and consider scale issues, we scale *Hospitalization* and *Amputation* by the company's number of employees (in thousands).

A2. Variable Definitions

- *SRI investment* is the percentage of a firm's ownership held by SRI funds. The data is from Morningstar, Bloomberg, and the U.S. Sustainable Investment Forum.

- $\Delta SRI\widehat{Investment}$ is the predicted change in SRI investment for each firm in the sample from our paired fund-level difference-in-differences regression. Data is from Morningstar, Bloomberg and the U.S. Sustainable Investment Forum.

- *Total releases* is the total on-site and off-site releases. To assure comparability across firms and consider scale issues, in the regression models (Tables III and V) we scale emissions by the company's annual sales and compute the log of the ratio. Data is from the Form R of the EPA Toxic Release Inventory (TRI) database.

- *Air* is the total quantity of the chemical released as air emissions at the reporting facility. To assure comparability across firms and consider scale issues, in the regression models (Tables III and V) we scale emissions by the company's annual sales and compute the log of the ratio. Data is from the Form R of the EPA Toxic Release Inventory (TRI) database.

- *Water* is the total quantity of the chemical released on-site as surface water discharges. To assure comparability across firms and consider scale issues, in the regression models (Tables III and V) we scale emissions by the company's annual sales and compute the log of the ratio. Data is from the Form R of the EPA Toxic Release Inventory (TRI) database.

- *Land* is the total quantity of the chemical injected on site at the facility to underground injection wells, on-site landfills, surface impoundments, or other. To assure comparability across firms and consider scale issues, in the regression models (Tables III and V) we scale emissions by the company's annual sales and compute the log of the ratio. Data is from the Form R of the EPA Toxic Release Inventory (TRI) database.

- *logAbatements* is the log of the number of abatement actions (investments in pollution reducing activities) that a firm discloses in a given year. Data from the EPA P2 database.
- *Abatement* is an indicator variable equal to 1 if the firm reports an abatement activity across any category, and 0 otherwise. Data from the EPA P2 database.
- *CCExposure* is the relative frequency with which bigrams related to climate change occur in the transcripts of analyst conference calls. We count the number of such bigrams and divide by the total number of bigrams in the transcripts. We average values of the four analyst earnings conference calls during the year and multiply the ratio by 1,000. Data from Sautner et al. (2020).
- *Overall* is the overall employees' satisfaction score. Data from Glassdoor, Inc.
- *Careeropps* is the employees' score for career opportunities. Data from Glassdoor, Inc.
- *Srleader* is the employees' score for senior leadership. Data from Glassdoor, Inc.
- *Worklife* is the employees' score for work-life balance. Data from Glassdoor, Inc.
- *Culture* is the employees' score for corporate culture (i.e., cultural values). Data from Glassdoor, Inc.
- *CEO* measures the employees' CEO approval (-1 if disapprove, 0 if no opinion, and 1 if approve). Data from Glassdoor, Inc.
- *Outlook* measures the employees' company outlook (-1 if worse, 0 if same, and 1 if better). Data from Glassdoor, Inc.
- *Hospitalization* is the number of work-related injuries that required hospitalization scaled by the number of employees (in thousands). Data from the U.S. Department of Labor, OSHA.

- *Amputation* is the number of work-related injuries that required amputation scaled by the number of employees (in thousands). Data from the U.S. Department of Labor, OSHA.
- *Gender Div.* is the ratio of women directors on the board. Data from BoardEx.
- *Racial Div.* is the ratio of the number of non-caucasian directors on the board. Data from ISS.
- *ES_Index* is a firm's total environmental and social score. Data from KLD database.
- *Number of ES Items* is the number of shareholder proposals related to environmental and social issues. Data from ISS Voting Analytics.
- *Number of E Items* is the number of shareholder proposals related to environmental issues. Data from ISS Voting Analytics.
- *Number of S Items* is the number of shareholder proposals related to social issues. Data from ISS Voting Analytics.
- *ES Items by SRI Funds* is the number of ES items proposed by SRI funds. Data from ISS Voting Analytics.
- *Number of ES Items Passed* is the number of ES proposals that pass the shareholders vote. Data from ISS Voting Analytics.
- *Fraction of ES Items Passed* is the fraction of ES proposals that pass the shareholders vote. Data from ISS Voting Analytics.
- *ES Items Withdrawn* is the number of ES proposals that are withdrawn before the shareholders vote. Data from ISS Voting Analytics.
- *Fraction of ES Items Withdrawn* is the fraction of ES proposals that are withdrawn before the shareholders vote. Data from ISS Voting Analytics.

A3. Examining Exogeneity and Relevance Assumptions

A3.1. Exogeneity of Treatment Status

This section presents additional tests of the hypothesis that our matched treated and control funds are indistinguishable, ex ante, on all characteristics except their Morningstar star rating.

Table A1 Panel A shows the comparison between the treated and control fund-cohort-years, measured as of December just prior to treatment. The first row illustrates the main idea behind our research design: Treated funds were assigned exactly a one-star higher rating than the matched control funds. Otherwise, as well as belonging to the same Morningstar fund category in each case, the two groups of funds are very closely matched in terms of their size and fundamentals. In particular, the mean differences in the three, five, and ten year Morningstar returns—the inputs that determine the Morningstar star ratings—are 8, 10 and 9 basis points respectively. None of these differences is economically or statistically significant, as is also evident in Figure 2.

Like a regression discontinuity design (RDD), in our setting unconfounded causal inference rests on conditional independence of treatment status. Because the Morningstar star ratings are determined by lagged fund returns, we cannot use fund ratings directly as our treatment variable. Instead, we construct matched pairs of funds near the star-rating thresholds. If the matched pairs are sufficiently similar ex ante, then lagged fund returns should not predict treatment status within the matched sample.

Table A1 Panel B examines this requirement. The first two columns regress the Morningstar star rating of each fund-year on the fund's lagged Morningstar returns using fund category-by-year fixed effects (the groups within which the star ratings are determined). We see that both in the full sample and our matched sample, the lagged Morningstar returns strongly predict a fund's Morningstar star rating, reflected by both their statistical significance and the adjusted R^2 of the estimates. In contrast, in Column 3, the dependent variable is treatment versus control status within the matched sample. Here, the lagged Morningstar returns have *no* predictive power.

The coefficients on the individual 3, 5 and 10 year lagged returns are economically small and statistically insignificant. Moreover, the adjusted R^2 of the model is substantially negative. We conclude that our matched funds are similar ex ante on all characteristics including, crucially, the lagged Morningstar returns that determine treatment assignment.

A third test is that if the difference in star ratings between treated and control funds was due *only* to the arbitrary breakpoints of the Morningstar star function, the funds should satisfy the parallel trends requirement—in the absence of their different star ratings, their AUM would have evolved similarly. To examine how our treated and control funds' assets evolve over time, we take each set of matched funds and examine their assets under management in event time for three years before and after the cohort-year. Figure 3 in the main paper shows evidence consistent with the parallel trends assumption.

A3.2. Relevance of Treatment

A subtle concern is that if our identifying assumptions are valid, then it might have been equally likely for any matched SRI fund to land just above or just below the given star cutoff. In fact, if we rerun our matching process for SRI funds on the lower side of the star cutoffs (that is, matching SRI funds that were just below the cutoff to funds that were just above the same cutoff), we match 139 SRI funds that were "treated" in the opposite direction to our main sample.

This is potentially a concern if downward-shocked SRI funds' holdings overlap with the holdings of our main sample funds whose assets are shocked upward. For example, if all SRI funds held exactly the same portfolio, then the resulting shocks to SRI investment would (on average) net out to zero. On the other hand, if all SRI funds' holdings were disjoint from one other, then there would be no overlap in the effects of the Morningstar star assignments. SRI funds cover a wide range of fund sectors, and are almost all (by assets) actively managed, so the latter possibility seems plausible.

We examine this possibility in two ways. First, we check the overlap in holdings between

upward-shocked (our main sample) and downward-shocked SRI funds. Out of 7,508 firm-years held by treated fund-years in our sample, 4,251 = 47% have any co-holdings at all with downward-shocked funds. Within those co-held stocks, the correlation between their portfolio weight in upward-shocked funds vs downward-shocked funds is insignificant and slightly *negative*, -0.013. Thus, SRI funds hold diverse portfolios both in terms of stock holdings and portfolio weights.

Second, we check the relevance of our treatment condition by regressing the realized level of SRI investment on the predicted level of SRI investment from our diff-in-diff setup. That is, we regress $SRI\ Investment$ on $SRI\ \widehat{Investment}$. The estimated coefficient from this regression is 0.380 with standard error (clustered by firm) = 0.032 and t=12.02, corresponding to an F-statistic of 144.5. In other words, our predicted treatment effects are strongly predictive of the actual realized level of SRI investment, and we conclude that our difference-in-differences research design produces significant and relevant shocks to SRI investment.

Table A1
Comparison of treated and control funds

The table presents comparisons of treated versus control funds, measured as of the December prior to the treatment year. In Panel A, for each fund we examine Morningstar stars, fund assets, Morningstar returns, and fund turnover and fees. In Columns (1) and (3) we report the mean for treatment and control funds respectively, in Columns (2) and (4) we report the standard deviation for treatment and control funds respectively, and in Columns (5) and (6) we report the difference in means and the associated t-statistics. In Panel B, we report tests of the conditional independence of treatment status. We regress the Morningstar stars (*MS Star Rating* on their inputs (3, 5, and 10 years returns, and fund category-year fixed effects) in the whole sample (Column 1), and matched sample (Column 2). In Column (3) we regress the treatment status on the same inputs described above.

Panel A: Two-Sample Comparison

Variable	Treated Funds		Control Funds		Difference	t-stat
	Mean	St.Dev.	Mean	St.Dev.		
	(1)	(2)	(3)	(4)	(5)	(6)
MS Star Rating	3.88	0.65	2.88	0.65	1.00***	(11.28)
Fund Assets ($M)	952.45	1395.67	894.92	1492.70	57.53	(0.29)
3 year MS Return	10.81	3.59	10.72	3.55	0.08	(0.17)
5 year MS Return	10.35	4.34	10.25	4.28	0.10	(0.16)
10 year MS Return	5.59	3.56	5.50	3.56	0.09	(0.19)
Turnover Ratio	0.33	0.34	0.43	0.82	-0.10	(-1.13)
Management Fee	0.47	0.33	0.48	0.29	-0.01	(-0.21)
Expense Ratio	0.75	0.33	0.83	0.37	-0.08	(-1.58)
Observations	108		108			

Panel B: Testing Conditional Independence

	MS Star Rating	MS Star Rating	Treated
	(1)	(2)	(3)
3 year MS Return	0.09***	0.16**	0.01
	(0.00)	(0.07)	(0.07)
5 year MS Return	0.15***	0.20***	0.01
	(0.01)	(0.08)	(0.07)
10 year MS Return	0.17***	0.29***	0.06
	(0.02)	(0.08)	(0.07)
Funds	All	Matched	Matched
Observations	20,662	208	208
Adjusted R-squared	0.650	0.513	-0.175
MS Fund Category × Year FE	Yes	Yes	Yes

A4. Heterogeneous Treatment Effects in a Staggered Event-Study Setting

A recent set of papers point out potential issues with differences-in-differences estimation, in particular in the presence of heterogeneous treatment effects over time (Borusyak et al., 2017; Goodman-Bacon, 2021). Sun and Abraham (2021) analyze the case of staggered event-study designs, which applies to our research design using stacked cohorts of treated and control funds. Since the treatment effects of Morningstar ratings on investor capital could plausibly vary over time, we investigate this possibility using the approach of Sun and Abraham (2021).

Figure A1 plots the implicit weighting function of our difference-in-differences estimate for the effect of Morningstar ratings on fund assets. We see that the implicit weights are well-behaved according to their recommended interpretation. In particular, the weights are of the same sign for all cohorts within each event-time group, with one small exception namely observations 2 years post-treatment for the 2017 cohort. Dropping this cohort from our estimates yields nearly identical results. Moreover, when we use the Sun and Abraham (2021) robust estimator, we recover a treatment effect of +0.156 (standard error = 0.061), which is similar in magnitude and significance to our baseline estimates. Thus, there is little concern that heterogeneous treatment effects may be biasing our estimates.

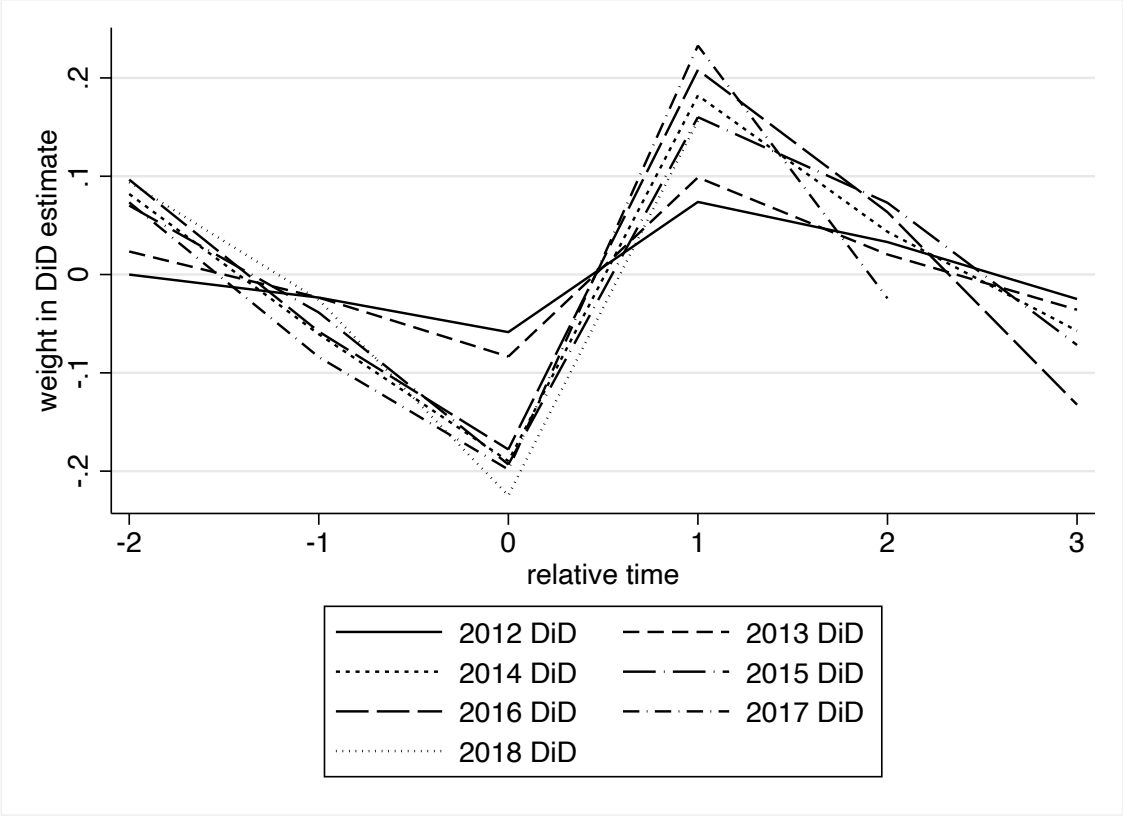


Figure A1. Implicit Weights in the Diff-in-Diff Estimate of Morningstar Star Ratings on Fund AUM

The figure plots the implicit weights estimated by the Sun and Abraham (2021) decomposition of our main difference-in-difference estimator in event time.

A5. Effects on Treated Funds' Holdings

An important condition of our research design is that SRI funds do not change their portfolio allocation as a result of different star ratings. In particular, did treated funds increase their holdings *pro rata*, or did they channel the inflows into relatively low-ES or relatively high-ES portfolio firms? In this section, we examine the effects of exogenous changes in funds' AUM on treated funds' holdings.

Results are reported in Table A2. This analysis is conducted at the fund by cohort year by portfolio firm level. In Column 1, we regress an indicator variable for whether a firm held is a new holding (that is, a firm that the fund did not hold at all in the previous year) on post-treatment status for treated funds. We find no effect, i.e., funds did not add a new firm to their holdings in post-treatment years. Similarly, in Column 2 we observe that funds do not drop a firm from their holdings in post-treatment years. Thus, the inflows into treated funds are channeled into their existing holdings.

It is still possible that treated funds change the portfolio allocation of their existing holdings, by investing more in some of their portfolio firms and less in others. We examine this possibility in Columns 3-5. Here, the dependent variable is the fraction of the fund's total net assets that each portfolio firm represented. We find that both overall and for high- and low-ES firms separately, the inflows into treated funds were not accompanied by any change in their weights in the fund portfolio.

Overall, we conclude that the inflows into treated funds due to their higher Morningstar star ratings were, on average, allocated *pro rata* to the fund's existing portfolio. This finding supports the validity of our research design.

Table A2
Effects on Treated Funds' Holdings

The table presents results examining the effects of the Morningstar ratings on fund holdings. Specifically, we estimate regressions of the form:

$$y_{i,t} = \beta(Treated \times Post) + FE_i + FE_t + \epsilon_{i,t},$$

where $Treated$ is an indicator that equals one for treated funds, and zero otherwise and $Post$ is an indicator that equals one after treatment, and zero otherwise, FE_i is a fund-by-cohort fixed effect, and FE_t is a year fixed effect. Treated funds are SRI funds that have a Morningstar rating that is one star higher than the matched control fund in January of the treatment year. Robust standard errors, clustered at the fund level, are shown in parenthesis. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Added Stock	Dropped Stock	% Total Net Assets		
	(1)	(2)	(3)	(4)	(5)
$Treated \times Post$	-0.001	-0.008	0.001	-0.006	0.003
	(0.010)	(0.008)	(0.011)	(0.013)	(0.014)
Firms	All	All	All	High ES	Low ES
Observations	378,354	378,354	218,941	85,879	77,211
Adjusted R-squared	0.023	0.029	0.437	0.378	0.566
Fund × Cohort FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

A6. Evidence of Longer-Run Effects

One concern with our main estimates of the causal effects of SRI fund investment is that we regress the level of firms' E&S behavior on the predicted, exogenous change in SRI fund investment from the previous year. Firm policies are often slow to change, so it could be that one year is simply not enough time to observe a treatment effect.

In Table A3 we examine firm E&S behavior at longer horizons, namely two and three years post-treatment. To keep this analysis parsimonious, we focus on our main outcomes of interest. Again, we find zero treatment effects on total pollution, and overall employee ratings of the firm. We also continue to find a positive effect on board gender diversity in year 2, but the effect is smaller and insignificant by year 3. The economic magnitude of the coefficients remains tiny, and the minimum detectable effect size (MDES) suggests that our estimates remain well-powered to detect meaningful changes in corporate policy.

Table A3
Evidence of Longer-Run Effects

The table presents estimates of the effect of SRI fund investment on firm behavior over longer periods of time post-treatment. $\Delta\widehat{SRI\ Investment}$ is the predicted change in SRI investment for each firm in the sample from our paired fund-level difference-in-differences regression (to facilitate the interpretation of the results, the measure is standardized). MDES is the minimum detectable effect size (Bloom, 1995). Definitions for all variables are in the Appendix Section A2. Robust standard errors, clustered at the firm level, are shown in parenthesis. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Total Releases		OverallRating		Gender Div.	
Relative to treatment year:	$t+2$	$t+3$	$t+2$	$t+3$	$t+2$	$t+3$
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta\widehat{SRI\ Investment}$	0.036	0.015	0.008	0.003	0.003**	0.002
	(0.050)	(0.062)	(0.011)	(0.011)	(0.001)	(0.002)
MDES	±0.141	±0.174	±0.031	±0.030	±0.004	±0.004
Observations	3,231	2,744	10,588	9,070	13,299	10,992
Adjusted R-squared	0.888	0.886	0.380	0.395	0.783	0.796
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes

A7. SRI Fund Incentives

To better understand our results showing that SRI funds to do not impact firm behavior, we explore the incentives of SRI funds. In Table A4, we examine the relation between third-party E&S scores from KLD, and the *level* and *change* of real E&S outcome variables for firms. Specifically, we examine OLS regressions of the form:

$$E\&SScore_{i,t} = \beta_1 FirmOutputQuintile + \beta_2 \Delta FirmOutputQuintile + FE_i + \epsilon_{i,t}, \quad (3)$$

where $FirmOutputQuintile$ is the quintile in which firm i resides when sorted on the level of the real E&S outcome variable of interest, $\Delta FirmOutputQuintile$ is the quintile in which firm i resides when sorted on the change in the real E&S outcome variable of interest, and FE_i indicates year fixed effects. In all models, the dependent variable is the KLD score. In column 1, firms are sorted into quintiles on the level and change in pollution, in column 2 the sorting variable is investment in pollution abatement, in column 3 the sorting variable is board gender diversity, and in column 4 the sorting variable is employee satisfaction.

In all four columns, the coefficient on the level of real outcomes ($FirmOutputQuintile$) is positive and it is statistically significant in three of the four columns. Thus, E&S ratings are better for firms that pollute less, have more board diversity, and have better employee satisfaction. However, when we examine changes in real outcomes ($\Delta FirmOutputQuintile$), none of the results are positive and statistically significant (and for employee satisfaction, the results are statistically significant in the wrong direction). The results indicate that E&S ratings do not reward firms for recent improvement in their E&S behavior—the results are driven entirely by the level effect. Put differently, recent improvements in E&S conduct do not result in higher E&S ratings, unless a firm's E&S performance passes certain threshold established by third-party rating providers.

Because fund flows respond to funds' E&S ratings (Hartzmark & Sussman, 2019), which are a function of firms' E&S ratings, findings in Table A4 imply that SRI fund managers have weak

incentives to change firm behavior. Instead, the results suggest that to maximize flows, fund managers should simply select stocks that already have good behavior, consistent with our results of no the impact by SRI funds. To further explore this mechanism, we examine the relation between SRI fund holdings and the level and change of real outcome variables for firms.

Specifically, we examine a regression model similar to equation 3, only here the dependent variable is an indicator variable that takes the value one if a firm is hold by an SRI fund, and zero otherwise. The results are shown in Table A5. Consistent with the incentive results in Table A4, the results in Table A5 show that SRI funds hold firms that invest more in pollution abatement, have greater board gender diversity, and have better employee satisfaction. However, when we examine changes in real outcomes ($\Delta FirmOutputQuintile$), none of the results are positive and statistically significant (and two are significant in the wrong direction). The results indicate that SRI funds do not invest in firms with recent improvement in their E&S behavior, but they choose stocks that already behave well. Hence, also these results are driven entirely by the level effect. Put differently, recent improvements in E&S conduct do not result in higher ownership by SRI funds, unless a firm's E&S performance passes certain threshold established by SRI funds.

This finding, coupled with findings in Table A5, indicates that funds select stocks in a manner consistent with their incentives—they choose stocks that already behave well but they do not tend to own stocks that are improving on past bad behavior. This finding is particularly informative about why SRI funds do not have an impact: recent analytical work by Edmans, Levit, and Schneemeier (2022) shows that instead of excluding brown firms, a more effective strategy would hold brown firms that have taken observable corrective actions.[4]

[4]Further, Cohen, Gurun, and Nguyen (2020) show that oil, gas, and energy-producing firms (which tend to have the worst ESG scores) are key contributors to the invention of environmentally friendly technology. See also Harstad (2012).

Table A4

Relation between E&S Scores and Levels and Changes of E&S Output

The table presents evidence on the relation between firms' real E&S output and their E&S rating score from MSCI KLD. In all models, the dependent variable is the KLD E&S score (*ES_Index*). The independent variables are quintile rankings of the level and change of firm E&S output. In column 1, firms are sorted into quintiles on the level (*Firm Output Quintile*) and change (Δ*Firm Output Quintile*) in pollution. In column 2, the sorting variable is investment in pollution abatement, in column 3 the sorting variable is board gender diversity, and in column 4 the sorting variable is employee satisfaction. Robust standard errors, clustered at the firm level, are shown in parenthesis. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)
	Dependent Variable = ES_Index			
Sorting Variable:	Total releases	Abatement	Gender Div.	Overall
Firm Output Quintile	0.032**	0.019	0.153***	0.079***
	(0.014)	(0.016)	(0.006)	(0.008)
ΔFirm Output Quintile	-0.009	0.003	-0.004	-0.018***
	(0.007)	(0.010)	(0.003)	(0.005)
Observations	2,653	2,498	9,635	6,952
Adjusted R-squared	0.067	0.070	0.217	0.105
Year FE	Yes	Yes	Yes	Yes

Table A5

Relation between SRI Fund Ownership and Levels and Changes of E&S Output

The table presents results from a linear probability model on the relation between ownership by SRI funds and the level and change of firm E&S output. In all models, the dependent variable is an indicator variable that takes the value one if a firm is owned by at least one SRI fund, and zero otherwise. The independent variables are quintile rankings of the level and change of firm E&S output. In column 1, firms are sorted into quintiles on the level (*Firm Output Quintile*) and change (Δ*Firm Output Quintile*) in pollution. In column 2, the sorting variable is investment in pollution abatement, in column 3 the sorting variable is board gender diversity, and in column 4 the sorting variable is employee satisfaction. Robust standard errors, clustered at the firm level, are shown in parenthesis. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)
	Dependent Variable = $\mathbb{1}_{[FirmHeldbySRIFund]}$			
Sorting Variable:	Total releases	Abatements	Gender Div.	Overall
Firm Output Quintile	0.007	0.022***	0.066***	0.033***
	(0.008)	(0.008)	(0.004)	(0.005)
ΔFirm Output Quintile	0.002	-0.011**	0.001	-0.011***
	(0.004)	(0.005)	(0.002)	(0.003)
Observations	3,530	2,959	13,281	9,902
Adjusted R-squared	0.024	0.021	0.073	0.036
Year FE	Yes	Yes	Yes	Yes

A8. Selection and Treatment Effects on Firm E&S Ratings

In this section, we examine the selection and treatment effects of SRI investing on the firm-level E&S ratings from KLD. A concern with our analyses based on micro-level data is that it is unclear whether SRI fund managers directly rely on those data that we examine. Hence, we repeat our main estimates using as outcome variables the firm-year sustainability ratings issued by KLD. Table A6 shows the results. Consistent with our main results, in Panel A we find a significant positive association between SRI fund investment and the aggregate KLD rating for environmental and social conduct of a firm (*ES_Index*). We also observe a positive association between SRI fund investment and *ES_Index* subcategories, *Env* and *Soc*. Furthermore, Panel B shows that again consistent with our main results, shocks to SRI fund investment are followed by zero, and indeed slightly negative, changes to firm E&S ratings.

Thus, the association of KLD ratings with SRI fund investment (strong positive selection effects, zero treatment effects) are consistent with our main findings. These results suggest two conclusions. First, the KLD firm-year ratings are meaningfully correlated with both the real outcomes that we examine and with funds' selection process. Second, third-party E&S ratings again confirm that SRI funds carry out portfolio selection, but have no real effects on their portfolio firms.

Table A6
Selection and Treatment Effects on Firm E&S Ratings

The table presents estimates of the effect of SRI fund investment on firm-year E&S ratings issued by KLD. $\Delta\widehat{SRI\,Investment}$ is the predicted change in SRI investment for each firm in the sample from our paired fund-level difference-in-differences regression (to facilitate the interpretation of the results, the measure is standardized). MDES is the minimum detectable effect size (Bloom, 1995). Definitions for all variables are in the Appendix Section A2. Robust standard errors, clustered at the firm level, are shown in parenthesis with raw and Romano and Wolf (2005) p-values shown below. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Selection

	(1) ES_Index	(2) Env	(3) Soc
SRI Investment	0.018	0.004	0.014
	(0.005)	(0.001)	(0.005)
Unadjusted p	0.001***	0.001***	0.004***
Romano-Wolf p	0.001***	0.001***	0.007***
Observations	11,780	11,780	11,780
Adjusted R-squared	0.100	0.088	0.127
Year FE	Yes	Yes	Yes

Panel B: Treatment

	(1) ES_Index	(2) Env	(3) Soc
$\Delta\widehat{SRI\,Investment}$	-0.021	-0.014	-0.006
	(0.012)	(0.003)	(0.011)
Unadjusted p	0.082*	0.001***	0.555
Romano-Wolf p	0.113	0.001***	0.558
MDES	±0.034	±0.007	±0.031
Observations	11,637	11,637	11,637
Adjusted R-squared	0.555	0.547	0.527
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes