Doing Good by Doing Nothing? Passive Ownership and Environmental Performance*

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March 1, 2026

Abstract

We examine how passive ownership shapes firms' environmental performance. Exploiting the staggered creation of 55 equity indexes across 30 countries, we use index inclusion as an exogenous shock to benchmark-tracking ownership. Following inclusion, environmental scores increase and carbon emissions decline, especially among carbon-intensive firms. We identify a demand-elasticity channel: greater benchmark-tracking ownership dampens stock-price reactions to earnings announcements and weakens earnings-based performance pressure. Consistent with this mechanism, capital expenditures and green patenting increase while profitability declines. Our results show that passive investors can promote decarbonization precisely by doing less—*trading less* on firm-specific performance.

JEL Classifications: G23, G31, Q56, G35, G15, G14
Keywords: passive ownership, index inclusion, inelastic demand, environmental performance, earnings response coefficients, climate risk

*We thank Pat Akey, Aleksandar Andonov, Marco Becht, Fabrizio Core, François Derrien (Discussant), Alexander Dobrinevski, Tim Eisert, Michael Ewens, Sebastian Gryglewicz, Marcin Kacperczyk, Christoph Kaserer, Matti Keloharju, Peter Koudijs, Tomislav Ladika, Adrian Lam, Stefano Lovo, Lakshmi Naaraayanan, Don Noh, Yihui Pan, Elisa Pazaj, Simon Rottke, Esad Smajlbegovic, Patrick Verwijmeren, Yupana Wiwattanakantang (Discussant), Zoey Zhou, and participants in the 2024 SGF Conference, the CEPR Advanced Forum in Financial Economics, the HEC-HKUST Workshop on Impact and Sustainable Finance, the PRI research seminar, Erasmus University Rotterdam, and University of Amsterdam for valuable feedback. The usual caveat applies.

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1 Introduction

Global capital has shifted sharply from active to passive strategies. Passive funds now hold more than half of U.S. equity fund assets—up from less than a quarter in 2010—and more than 40% in Europe and Asia. As institutional investors can be a powerful force in corporate decarbonization (Stroebel and Wurgler, 2021), this structural shift raises a central question: how does the rise of passive investing affect the low-carbon transition? Existing research highlights two primary channels through which institutional investors shape corporate climate outcomes: climate-focused engagement and capital reallocation away from polluters to raise their cost of capital.[1] Both mechanisms, however, are likely to weaken under passive ownership. Passive funds prioritize low costs and broad diversification, limiting incentives to engage (Heath et al., 2022), while benchmark tracking constrains divestment. Conventional wisdom, therefore, suggests that the rise of passive ownership could slow corporate decarbonization.

This paper shows the opposite: passive ownership *improves* firms' environmental performance. We argue that this effect operates not through stewardship or divestment, but through a *demand-elasticity channel*. Investor composition shapes the elasticity of stock demand (Koijen and Yogo, 2019; Koijen et al., 2023). When a firm joins an index, benchmark-tracking investors mechanically hold a larger share of its stock.

Because these investors trade less on firm-specific information (Pavlova and Sikorskaya, 2023), stock prices become less sensitive to earnings news, weakening market pressure tied to reported earnings performance.[2] This change in price sensitivity matters for corporate decision-making. Because managers' wealth and career prospects depend on their firm's stock price (Frydman and Jenter, 2010; Jenter and Kanaan, 2015), stock-price reactions to earnings news shape managerial incentives (Graham et al., 2005). When

[1] See, for example, Heinkel et al. (2001), Chava (2014), Zerbib (2019), Krueger et al. (2020), van der Beck (2025), Pástor et al. (2021), Pástor et al. (2022), Pedersen et al. (2021), Kacperczyk and Peydró (2022), and Gormsen et al. (2023).

[2] A vast literature suggests that passive ownership reduces price informativeness (Israeli et al., 2017; Brogaard et al., 2019; Bennett et al., 2020; Bond and Garcia, 2022; Kacperczyk et al., 2025; Sammon, 2024), although other studies find positive (Glosten et al., 2021; Buss and Sundaresan, 2023) or null effects (Coles et al., 2022; Koijen et al., 2023).

earnings disappointments trigger large share price declines, managers may defer projects that reduce reported profitability even if they generate benefits not immediately reflected in reported earnings or mitigate future risks.

Environmental investments are a particularly salient example: they often involve upfront costs, regulatory and technological uncertainty, and delayed payoffs (Hong and Kacperczyk, 2009; Fowlie, 2010; Barber et al., 2021; Aswani et al., 2024a). Consistent with this mechanism, firms facing pressure from profit-sensitive investors often expand carbon-intensive production or defer abatement (Thomas et al., 2022).[3] By dampening price reactions to earnings news, index-induced inelastic demand relaxes this earnings-based performance pressure. Importantly, this channel does not require passive investors to hold environmental preferences, nor does it require environmental investments to be value-enhancing. Instead, it operates through a purely mechanical change in how markets react to earnings news.

To test this mechanism empirically, we require plausibly exogenous variation in benchmark-tracking ownership. We obtain such variation from the staggered creation of 55 new index launches across 30 markets between 2010 and 2018, which leads to the inclusion of 988 firms. We identify these events by reviewing more than 50,000 press releases from 32 major index providers. This setting offers three advantages. First, new indexes are typically unanticipated: providers release constituents within days of announcing a new index (12 days on average, median 3), limiting firms' ability to anticipate or influence inclusion. Second, these launches provide a new source of exogenous variation, alleviating concerns about repeatedly exploiting the same natural experiments, such as the Russell 1000/2000 reconstitution design (Heath et al., 2023). Third, the international scope allows us to test how institutional and regulatory environments moderate the effects of passive ownership.

We find that index inclusion leads to significant improvements in environmental performance. Within three years, indexed firms increase their Sustainalytics environ-

[3]Financial constraints further bias investment toward dirty, capital-light technologies (Xu and Kim, 2022; Gilje et al., 2020b; Lanteri and Rampini, 2025), as well as older, cheaper capital (Eisfeldt and Rampini, 2007; Ma et al., 2022).

mental score (E-Score) by 2.3 points (15.3% of its standard deviation) relative to matched non-indexed peers. Treated firms also reduce Scope 1 and 2 greenhouse gas (GHG) emissions intensity by 12.9 tCO_2e per USD 1 million in revenue. These gains are concentrated among carbon-intensive ("brown") firms, which reduce emissions by 79.4 tCO_2e per USD 1 million (13.3% of the standard deviation), while greener firms exhibit no significant change. The results are robust across alternative environmental measures, matching procedures, and fixed-effects specifications. A regression discontinuity design (RDD) exploiting a subset of index events with transparent inclusion rules yields consistent estimates; in this sample, the median treated firm lies only 12 ranks above the index inclusion cutoff, making strategic cutoff manipulation unlikely.[4]

Index inclusion could affect environmental investments through several channels, including financing conditions, firm visibility, shareholder engagement, or changes in the sensitivity of stock prices to firm performance. We first examine the demand-elasticity mechanism, which links index-driven ownership changes to stock-price reactions to earnings news.

Consistent with this mechanism, passive ownership rises by 0.36 percentage points (8.4% of its standard deviation) following inclusion, primarily driven by domestic passive investors without explicit decarbonization mandates.[5] Stock-price reactions to earnings news become significantly more muted: cumulative abnormal returns to negative earnings surprises are 2.8 percentage points less negative for treated firms, a 30% reduction relative to the control group. These effects are strongest among brown firms, which initially have lower passive ownership and therefore face more elastic demand. Index inclusion thus expands the base of earnings-insensitive investors precisely where earnings-based

[4] Additional features of our setting further support a causal interpretation. Most index launches do not sort on environmental criteria, instead relying on characteristics such as free float, market capitalization, or liquidity. We detect no pre-treatment trends in environmental performance. Furthermore, index sizes are predetermined by transparent rules, particularly in index families, limiting scope for strategic cutoff manipulation. Finally, the results are unchanged when excluding ESG indexes.

[5] Our passive definition captures only funds labeled "index," likely understating the broader benchmarking shift (Chinco and Sammon, 2024; Pavlova and Sikorskaya, 2023). The 0.36 percentage-point increase is also comparable to estimates from Russell reconstitutions (Glossner, 2024).

performance pressure is strongest.

Real outcomes align with this mechanism. Indexed firms increase capital expenditures, adopt more GHG reduction and renewable-energy programs, and, among patenting firms, file more green patents. Consistent with this investment expansion, instrumental-variables estimates show that improvements in environmental performance are accompanied by lower accounting profitability, indicating that firms accept declines in reported earnings while undertaking these investments.

The demand-elasticity channel is not specific to environmental investment. More broadly, reduced earnings sensitivity should facilitate projects that impose immediate accounting costs while generating delayed and uncertain benefits. Such projects often involve expenditures that are expensed rather than capitalized, long payback periods, cannibalization of existing revenue streams, or the retirement of legacy assets. Because their costs are recognized immediately while the benefits are difficult to quantify, these investments are particularly exposed to earnings-based performance pressure. Environmental investments frequently combine all of these features—large upfront spending, uncertain payoffs, and potential disruption of existing business models—making them a natural margin of adjustment in our setting.

Consistent with this interpretation, the effects are strongest in settings where green projects face greater financing and institutional frictions. The index effect is larger in countries with higher financing costs for low-carbon projects, greater fossil fuel subsidies, and lower renewable energy penetration—environments in which green investment is relatively disadvantaged. The effects are also amplified where climate-related risks are more acute, including countries with weaker baseline environmental performance, lower climate preparedness, and greater regulatory risk. Overall, these patterns indicate that reduced earnings pressure matters most where transition costs and climate exposure are greatest.

We next examine whether index inclusion operates through alternative channels.

Inclusion could improve financing conditions, increase firm visibility and public scrutiny, or stimulate shareholder engagement. The evidence provides little support for these explanations. Analyst coverage and media attention do not increase following index inclusion, and we observe no changes in shareholder proposals, voting behavior, or Big Three ownership. Financing-based explanations also receive little support: announcement returns are modest, systematic risk increases rather than declines, and environmental improvements do not concentrate among financially constrained firms. These patterns contrast sharply with the strong evidence on ownership shifts, earnings sensitivity, and real investment responses.

Overall, the evidence points to a new channel through which passive ownership can shape corporate behavior. By expanding the base of investors who trade less on firm-specific earnings news, index inclusion reduces the stock-price penalty associated with temporary earnings declines and enables firms to undertake investments with immediate accounting costs and delayed or uncertain payoffs. More broadly, the results show that investor composition can influence environmental outcomes even without engagement, divestment, or changes in financing conditions—suggesting that investors can, in effect, do good by doing nothing.

Related literature and contribution. Our paper contributes to the literature on institutional investors and climate outcomes. Existing work emphasizes two primary channels through which investors may affect environmental performance: exclusion and engagement. Divestment can raise polluters' cost of capital (Heinkel et al., 2001; Hong and Kacperczyk, 2009; Davies and Van Wesep, 2018; Edmans et al., 2023; Berk and van Binsbergen, 2025), while engagement and activism can improve environmental practices and disclosure (e.g., Dyck et al., 2019; Dimson et al., 2015, 2023). Despite this progress, the overall climate impact of sustainable investing remains an open question (Krueger et al., 2020), and the causal evidence on passive ownership is mixed. Most causal evidence relies on Russell

1000/2000 reconstitutions: Azar et al. (2021) document emissions reductions driven by Big Three engagement, whereas Glossner (2024) and Hou and Zhang (2025) find limited or negative effects on environmental ratings.

We propose and document a distinct channel through which passive ownership can affect environmental performance. Index inclusion mechanically expands a firm's base of benchmark-tracking investors, making stock demand more inelastic and dampening stock-price reactions to earnings news. By weakening the market penalty for earnings shortfalls, this shift relaxes performance pressure and enables firms to undertake environmental investments that depress reported profitability. We test this mechanism using a novel setting: the creation of 55 equity indexes across 30 countries, providing plausibly exogenous variation in passive ownership beyond the heavily studied Russell setting (Heath et al., 2023). We show that index inclusion improves environmental performance and reduces emissions, and document a novel concentration of these effects among carbon-intensive firms. We also find that the effects are strongest where environmental investment faces greater financial frictions and climate risks. Because ownership shifts in our setting are driven primarily by smaller benchmark trackers without explicit climate mandates, the evidence isolates a channel that operates independently of engagement or ESG preferences.

Our mechanism builds on a growing literature showing that investor composition shapes stock-demand elasticity and the sensitivity of prices to fundamentals. Greater passive ownership makes demand more inelastic and weakens the link between cash-flow news and stock prices (Koijen and Yogo, 2019; Koijen et al., 2023). Related work shows that benchmarked investors trade less on firm-specific information (Barberis et al., 2005; Greenwood, 2008; Boyer, 2011; Breugem and Buss, 2019; Bond and Garcia, 2022; Baruch and Zhang, 2022). Recent theoretical work demonstrates that such changes in demand elasticity can have real effects: mechanically benchmarked portfolios dampen stock price reactions to adverse cash-flow shocks and lower the valuation penalty for projects with delayed or uncertain payoffs (Kashyap et al., 2020; Buss and Sundaresan, 2023). We extend this framework to environmental investment by showing that the dominant real effect of index inclusion operates through reduced earnings sensitivity rather than through traditional cost-of-capital channels.

Our findings also connect to research on investor horizon and financing conditions as determinants of corporate decarbonization. Long-horizon and sustainability-oriented investors tolerate earnings volatility and trade less in response to transitory shocks (Pozen, 2009; Starks et al., 2025; Cao et al., 2023; Hitzemann et al., 2024). A large literature similarly emphasizes financing-based channels, arguing that divestment or ESG financing can alter firms' cost of capital and investment incentives (Lanteri and Rampini, 2025; Landier and Lovo, 2025; Oehmke and Opp, 2025; Chava, 2014; Pástor et al., 2022; Gormsen et al., 2023).

We highlight a distinct and mechanical source of these features. Passive investors need not hold ESG preferences or long-horizon mandates; yet index inclusion mechanically expands a firm's base of benchmark-tracking shareholders who trade less on earnings news. In our setting, index inclusion does not reduce systematic risk or relax financing constraints. Instead, it reduces the stock price penalty associated with earnings declines, facilitating environmental investment, particularly among carbon-intensive firms. Overall, our results show that shifts in investor composition can shape environmental outcomes not only through engagement or capital allocation, but also through the pricing of earnings risk.

2 Data

2.1 Identification of index events

We identify new equity index launches worldwide by reviewing more than 50,000 press releases issued by 32 major index providers between 2010 and 2018.[6] We begin the sample

[6] Although some press releases announced new index launches, the vast majority concerned the performance or reconstitution of existing indexes. We obtain the list of index providers from the World Federation of Exchanges (WFE) and add the NYSE to address a notable omission.

in 2010 to ensure at least one year of pre-treatment environmental data from Sustainalytics, which initiated coverage in 2009, and end in 2018 to allow for at least one year of post-inclusion data. Most identified indexes were customized for specific clients, likely for internal benchmarking purposes, and are excluded, as are indexes covering only financial firms. We restrict attention to indexes whose constituents are available through Thomson Reuters, Datastream, or Bloomberg and for which ESG and financial data are available for at least one year before and after inclusion. Our final baseline sample comprises 55 index launches affecting 1,353 treatment observations, corresponding to 988 unique firms, as some firms are included in multiple index launches. If we do not require ESG data, the sample expands to 169 index launches; we use this larger sample in tests that examine only financial outcomes.[7]

Table 1 summarizes the characteristics of treatment firms affected by the 55 index launches in our sample.[8] Panel A reports the geographical distribution of firms across 30 countries. Japan accounts for the largest share (36.1%), followed by South Korea (9.2%), the United Kingdom (9.2%), Germany (4.7%), and France (4.4%). Panel B lists the index providers, including STOXX, Nikkei, MarketVector Indexes (MVIS), the Korean Exchange, the China Securities Index Company (CSI), Standard & Poor's, FTSE, and Nasdaq. Panel C distinguishes between ESG and conventional indexes. Non-ESG indexes account for nearly 72% of treatment firms and represent 48 of the 55 sample index launches.[9] Panel D shows that 98.4% of indexes use objective, rule-based selection criteria rather than committee-based (discretionary) selection. Panel E indicates that market capitalization is the dominant selection criterion across indexes. Finally, Panel F shows that most indexes rebalance either annually or semiannually.

Our research design differs from prior studies that exploit index reconstitutions,

[7]As Goyal et al. (2025) note, the Index Industry Association reports 3.3 million indexes as of January 2018, the vast majority of which are bespoke, client-specific products. More than 5,000 indexes serve as benchmarks for funds reporting to EPFR and Morningstar, spanning both equity and non-equity segments.

[8]A complete list of index events is in Internet Appendix IA.

[9]To identify ESG indexes, we search index names for one or more of the following keywords: *ESG, Green, Ecology, Fossil Fuel Free, Carbon Efficient, Responsible Investment, Environment, Eco, Öko*.

such as those involving the S&P 500 (e.g., Shleifer, 1986; Harris and Gurel, 1986; Aghion et al., 2013; Antón et al., 2023), the Russell 1000/2000 indexes (e.g., Boone and White, 2015; Appel et al., 2016; Ben-David et al., 2018; Coles et al., 2022), and international MSCI indexes (e.g., Aggarwal et al., 2011; Bena et al., 2017; Kacperczyk et al., 2021). A central concern in reconstitution-based studies is that firms may attempt to influence their inclusion through actions such as M&A transactions or the strategic purchase of ratings (e.g., Chattopadhyay et al., 2020; Li et al., 2022). In contrast, new index launches are typically unanticipated, limiting firms' ability to influence inclusion. We document that index providers generally release constituent lists shortly after announcing a new index, on average within 12 days and with a median of 3 days. An additional advantage of studying new index launches globally is that it allows us to exploit cross-country variation in the environmental effects of index inclusion.

Although firms cannot directly determine their inclusion, index providers may retain some discretion in constituent selection. Index providers typically assert that their benchmarks are designed to reflect the market broadly rather than to target firms expected to outperform. Under the "Publishers' Exemption," index providers are generally not subject to the same regulatory scrutiny as investment advisors, and courts have declined to classify benchmark design as investment advice. Prior empirical evidence suggests index additions rarely convey new firm-specific information (Kaul et al., 2000; Greenwood, 2008). Nevertheless, index providers could potentially tailor constituent selection to appeal to investors with stronger sustainability preferences. If such considerations shaped the creation of new benchmarks, the criteria guiding index construction could be correlated with firms' environmental characteristics, raising concerns about selection.

As Table 1 shows, most indexes rely on objective, rule-based criteria, with market capitalization as the primary selection variable. This is true even for ESG-oriented benchmarks. ESG indexes in our sample typically apply screening rules to define the eligible universe, after which constituents are weighted using market capitalization or similar mechanical rules. Thus, index inclusion continues to generate benchmark-driven demand even when ESG screens are present. Consistent with this interpretation, our main results are unchanged when we exclude ESG index launches.

A remaining concern is that index providers could disproportionately select firms with strong recent environmental or financial performance. Because larger and more profitable firms tend to exhibit strong environmental outcomes, such selection could mechanically predict subsequent improvements after inclusion. We therefore test for differential pre-trends in both environmental performance and profitability. We find no pre-treatment trends in either dimension (Internet Appendix IK), indicating that index inclusion is unlikely to reflect selection based on anticipated financial performance.

In addition, we implement a regression discontinuity design (RDD) for the subset of index launches with publicly available inclusion thresholds. This design compares firms narrowly above and below the cutoff and enables us to assess whether index providers strategically set thresholds to include firms expected to improve their environmental performance following index addition (cf. Section ??). Across these complementary research designs, we find no evidence that our results are driven by selection.

2.2 Data sources

Our primary measure of corporate environmental performance is the Sustainalytics Environmental Pillar Score ("E-Score").[10] We additionally examine corporate carbon emissions reported under the Greenhouse Gas (GHG) Protocol, obtained from S&P Global Trucost. We complement the environmental data with institutional ownership information from the FactSet Ownership database, which aggregates holdings data from regulatory filings, company reports, mutual fund disclosures, and stock exchanges.[11] Ownership data are available at the investor-firm-year, allowing us to distinguish investor types, including benchmark-tracking funds and the Big Three asset managers. Finally, we incorporate

[10] Retrieved from the Sustainalytics Global Historical Weighted Scores (Legacy version) via WRDS on October 20, 2022.
[11] FactSet is widely used in the institutional ownership literature (e.g., Ferreira and Matos, 2008; Aggarwal et al., 2011).

firm-level data from Worldscope, stock prices and market capitalization from Datastream, and analyst forecasts and earnings announcement dates from I/B/E/S.

2.3 Difference-in-differences (DID) sample

For each firm added to an index (the "treated" firm), we select a matched control firm from the same industry, country, and year, based on proximity in log total assets and the E-Score at the end of the fiscal year preceding the index announcement. Control firms must not be included in any index event in our sample. Industries are defined using the Fama-French five-industry classification. Matching is implemented using a propensity score algorithm with a caliper equal to one standard deviation of the logit of the estimated propensity score (Rosenbaum and Rubin, 1983). We assess robustness to alternative matching procedures in Section 4.

The final DID sample comprises 1,353 treatment-control pairs, representing 988 unique treatment and 288 unique control firms. The smaller number of unique control firms reflects the strict matching criteria (same year, industry, and country), which constrain donor pools in smaller markets or sectors and therefore necessitate the reuse of control firms. Appendix A provides variable definitions, and Appendix B reports descriptive statistics for the DID sample. Unless otherwise noted, we use this matched sample in all baseline DID analyses.

Figure 1 plots Epanechnikov kernel densities of the residualized Log Assets and E-Score after removing industry, country, and year fixed effects. Panels (a) and (c) show that treated firms are substantially larger and have higher E-Scores than unmatched firms from the same country, industry, and year. Panels (b) and (d) show that matching substantially improves overlap in both variables, yielding close alignment in the distributions of size and E-Score between treated and control firms.

Panel A of Table 2 compares pre-event characteristics measured in $t-1$ and tests for differences in means. Treated and control firms have similar average E-Scores. Size differences, however, persist even after matching on firm size. The normalized difference in log assets is 0.41, exceeding the conventional 0.25-threshold (Imbens and Wooldridge, 2009). This imbalance likely reflects index providers' selection criteria, which emphasize firms with higher free-float market capitalization and trading volume.[12]

To address these imbalances, Section 4 evaluates alternative matching strategies, including tighter calipers and matching on additional covariates such as ROA, Tobin's Q, PPE, and leverage. Although treated and control firms are broadly similar along these dimensions, we test robustness by incorporating them, alongside size and E-Scores, into the matching procedure. These approaches reduce sample size but improve covariate balance and match quality. We also implement a synthetic matching procedure to mitigate sample attrition arising from propensity-score matching.

2.4 Regression discontinuity design (RDD) sample

We complement the DID analysis with a regression discontinuity design (RDD) based on a subsample of 25 index events for which index providers disclose detailed construction methodologies. For each index, we rank firms within the eligible universe according to the published methodology and classify firms just below the inclusion threshold as control observations.

The RDD compares changes in environmental performance between firms just above and just below the index inclusion threshold, using bandwidths of ± 30, ± 40, and ± 50 firms around the cutoff. Narrower bandwidths sharpen identification by focusing on firms closest to the cutoff, but come at the cost of reduced sample size and statistical power. Panel B of Table 2 reports mean characteristics for treated and control firms within the ± 30-firm bandwidth. Treated firms are somewhat larger and exhibit slightly higher baseline E-Scores.

The two research designs reflect a trade-off between sample size and identification

[12] Similar mechanical size differences are documented in the Russell index literature (e.g., Boone and White, 2015).

precision. The DID approach leverages a broader set of index events because it does not require detailed construction rules, whereas the RDD delivers sharper identification by comparing firms narrowly around the inclusion threshold. Despite their differences, both approaches yield consistent results.

3 Index events and environmental performance

3.1 Main result

We analyze changes in corporate environmental performance around index inclusion using a staggered DID design:

$$\begin{aligned} \text{E-Score}_{i,j,k,m,t} =& \alpha \text{ Treated}_{i,m} \times \text{Post}_{m,t} + \gamma \text{ Log Assets}_{i,j,k,m,t-1} \\ & + \delta_{j,t} + \eta_{k,t} + \phi_{i,m} + \psi_{m,t} + \varepsilon_{i,j,k,m,t}, \end{aligned} \tag{1}$$

where E-Score$_{i,j,k,m,t}$ is firm i's environmental score in year t. Treated$_{i,m}$ equals one for firms added to index m and zero for matched control firms. Post$_{m,t}$ equals one for years after inclusion ($t = 0$) and zero otherwise. The coefficient α captures the average differential change in environmental performance for treated firms relative to matched control firms after index inclusion. Control variables include lagged firm size (Log Assets) and Fama-French 49 industry-year ($\delta_{j,t}$) and country-year ($\eta_{k,t}$) fixed effects. To address heterogeneous treatment effects in staggered DID settings (de Chaisemartin and D'Haultfœuille, 2020; Goodman-Bacon, 2021; Sun and Abraham, 2021; Baker et al., 2022), we create separate panels for each event and include firm-index event ($\phi_{i,m}$) and index event-year ($\psi_{m,t}$) fixed effects, yielding a stacked OLS regression (see, e.g., Gormley and Matsa, 2011; Deshpande and Li, 2019; Cengiz et al., 2019). Standard errors are Huber-White robust and clustered at the index event level.

Model 1 in Table 3 estimates changes in E-Score from one year before to one year after index inclusion. Treated firms exhibit a statistically significant 1.49-point E-Score increase, corresponding to 9.9% of the sample standard deviation. Models 2 and 3 extend the event window. In Model 3, our preferred specification, treated firms experience a 2.27-point increase three years after inclusion, equivalent to approximately 15% of the standard deviation.

Figure 2 plots coefficients (with 95% confidence intervals) from interactions between the treatment indicator and relative year dummies, normalized to the year before inclusion ($t = -1$). Pre-treatment coefficients are close to zero and statistically insignificant, consistent with parallel pre-trends between treated and control firms. Following index inclusion, treated firms exhibit persistent improvements in environmental performance relative to control firms over the post-event horizon.

Models 4 to 6 examine heterogeneity by pre-treatment environmental performance. We partition firms into brown (bottom quintile of the E-Score distribution), mixed (quintiles 2–4), and green (top quintile) groups based on their E-Scores measured at $t = -1$. The results show that the overall improvement in E-Scores is concentrated among brown firms, whose E-Scores increase by 3.04 points following index inclusion. In contrast, green firms exhibit no statistically or economically meaningful change in environmental performance (+0.02, t=0.04). This pattern is consistent with the view that index inclusion primarily affects firms for which environmental improvements are more salient and potentially more costly, rather than firms that are already environmentally strong (Hartzmark and Shue, 2024).

To assess whether the documented improvements in environmental scores translate into real environmental outcomes, we examine firms' greenhouse gas (GHG) emissions. Emissions are measured in tons of carbon dioxide equivalents (CO_2e). Because raw emissions mechanically scale with firm size and sales (Aswani et al., 2024a,b; Hartzmark and Shue, 2024), we focus on emissions intensity, defined as emissions per unit of sales. We analyze Scope 1 (direct emissions from owned or controlled sources) and Scope 2 emissions (indirect emissions from purchased electricity and heat) using company-reported data compiled by Trucost from annual reports, regulatory filings, CSR reports, or third-party sources such as CDP. Following prior work, we exclude Trucost's model-imputed emissions to avoid measurement error (Aswani et al., 2024a). We omit Scope 3 emissions due to inconsistent and implausible measures and limited managerial control (Busch et al., 2022). Emissions data are highly consistent across major providers, consistent with strong evidence on data reliability.[13]

Table 4 reports DID estimates of the effect of index inclusion on emissions intensity. Model 1 shows that treated firms reduce Scope 1 emissions intensity by 20.1 tons of CO_2e per USD 1 million in revenue following index inclusion, corresponding to 3.6% of the sample standard deviation. Model 2 documents a modest increase in Scope 2 emissions intensity. This pattern is consistent with firms shifting abatement toward the electricity sector, where emission reductions are often less costly, and technologies are more mature (e.g., Azevedo et al., 2021; Clarke et al., 2022). Model 3 combines Scope 1 and Scope 2 emissions and shows a net reduction of 12.9 tons of CO_2e per USD 1 million in revenue, significant at the 10% level.

Models 4 to 6 examine heterogeneity by firms' pre-treatment emissions intensity. Firms in the highest pre-treatment emissions quintile ("brown" firms) experience a large and statistically significant reduction in combined Scope 1 and 2 emissions following index inclusion, amounting to 79.4 tons of CO_2e per USD 1 million in revenue, or 13.3% of the sample standard deviation. In contrast, firms with moderate or low baseline emissions show no economically meaningful changes. This concentration of emissions reductions among the most carbon-intensive firms closely mirrors the heterogeneity observed for environmental scores and indicates that the improvements documented earlier reflect substantive changes in environmental outcomes rather than purely cosmetic improvements in ESG ratings.

The fixed-effects structure in Equation (1) helps rule out several alternative explana-

[13] Bolton and Kacperczyk (2021) and Busch et al. (2022) report correlations exceeding 0.99 for Scope 1 emissions across five major data providers: CDP, Trucost, MSCI, Sustainalytics, and Thomson Reuters.

tions emphasized in the literature. Industry-year fixed effects absorb sector-wide shocks such as changes in environmental regulation, technological progress, or shifts in consumer demand that could simultaneously affect firms' environmental performance and their likelihood of index inclusion. Country-year fixed effects control for time-varying national factors, including climate policy, regulatory enforcement, macroeconomic conditions, and broader ESG-related trends that evolve differentially across countries.

Firm-index event fixed effects ensure identification from within-event, within-firm changes around a specific index inclusion, ruling out time-invariant differences between treated and control firms in size, profitability, or baseline environmental orientation. Index event–year fixed effects further absorb shocks common to all firms associated with a given index launch, such as increased public attention, media coverage, or index-provider–specific initiatives. Taken together, this fixed-effects structure substantially narrows the set of plausible explanations for the observed post-inclusion improvements in environmental performance, which is particularly important in a cross-country setting. In the next sections, we subject the baseline results to a range of robustness tests and complementary identification strategies to further assess their sensitivity to alternative assumptions.

4 Robustness

We evaluate the sensitivity of our findings to alternative specifications, sample constructions, and remaining identification concerns. Across a wide range of tests, the estimated effect of index inclusion on firms' environmental performance remains stable in magnitude and statistical significance. The robustness exercises address three broad concerns: specification and inference, sample construction and measurement, and potential spillovers and local identification. We conclude with a regression discontinuity design that provides tighter identification for a subset of index events with transparent inclusion thresholds.

4.1 Specification and inference

We first examine the sensitivity of our results to alternative fixed-effects structures. Internet Appendix IB reports specifications with progressively richer fixed effects. Across all specifications, the Treated $\times$ Post coefficient remains positive and statistically significant, with economically similar magnitudes. In a parsimonious specification without fixed effects, the estimated treatment effect equals 2.003 E-Score points. Adding firm and year fixed effects increases the estimate to 2.578, indicating that time-invariant firm characteristics and common macroeconomic shocks do not drive the results. Introducing event $\times$ firm and event $\times$ year fixed effects leaves the estimate virtually unchanged (2.572), and adding country $\times$ year and industry $\times$ year fixed effects yields similar estimates (2.568 and 2.303, respectively). Across all specifications, the point estimate remains between 2.0 and 2.6 E-Score points, suggesting that neither omitted firm characteristics nor country- or industry-specific trends explain the results.

We next examine the sensitivity of statistical inference to alternative clustering schemes. Internet Appendix IC shows that clustering by firm, firm $\times$ event, or country yields very similar standard errors, with t-statistics ranging from 3.97 to 4.84. The statistical significance of the treatment effect is therefore robust to alternative assumptions about within-cluster correlation.

Finally, we test whether treated and control firms follow differential trends in firm characteristics. Following Gipper et al. (2020), we interact firm-level controls (Log Assets, ROA, Tobin's Q, PPE, and Leverage) with the DID term as well as country and industry fixed effects. The estimated treatment effect remains stable and statistically significant (Models 1-3 in Internet Appendix IH), indicating that differential evolution in firm fundamentals does not account for the observed improvements in environmental performance.

4.2 Matching, sample construction, and measurement

We next examine whether the findings depend on the construction of the matched sample, the inclusion of ESG-labeled indexes, or the choice of environmental rating provider. We first assess the sensitivity of our results to alternative matching procedures. We implement a tighter propensity-score caliper (0.05) and expand the set of matching covariates to improve overall balance. Panels A and B of Internet Appendix ID report pre-treatment characteristics under these alternatives. Panel A matches on E-Score and Log Assets using the tighter caliper; Panel B additionally includes ROA, Tobin's Q, PPE, and leverage as matching covariates. Both approaches implement exact matching on country, industry, and year. The stricter matching criteria substantially reduce the number of treated firms—from 988 in the baseline sample to 557 (Panel A) and 491 (Panel B). Despite the smaller samples, the estimated treatment effects remain similar in magnitude and precisely estimated (Models 1 and 2 in Internet Appendix IE), indicating that the results are not sensitive to the matching procedure.

To further address concerns about sample attrition, particularly in smaller markets or narrowly defined industries, we implement a synthetic matching procedure following Abadie (2021). For each treated firm, we construct a synthetic control firm from firms in the same geographic region[14] and Fama-French 5 industry group by matching on the three-year pre-treatment E-Score trajectory. This approach allows us to include an additional 122 treated firms that were previously excluded due to insufficient matches. As shown in Panel C of Internet Appendix ID, synthetic control firms closely resemble treated firms on observables. The estimated treatment effect remains consistent with the baseline result (cf. Model 3 in Internet Appendix IE), indicating that sample attrition or limited match availability does not drive results.

We next address the concern that ESG-labeled index launches may mechanically

[14]Africa (South Africa), Americas (Canada, Mexico, Puerto Rico, U.S.), Asia (China, Hong Kong, Japan, Singapore, South Korea), Europe (Austria, Denmark, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland, U.K.), and Oceania (Australia, New Zealand).

link inclusion to environmental outcomes or reflect the preferences of sustainability-oriented investors. We therefore re-estimate our baseline specification excluding ESG index events, identified through keyword searches in index names.[15] Although only seven ESG index launches are identified, they account for roughly 30% of firm-year observations, and, unsurprisingly, constituent firms have higher baseline E-Scores (65 vs. 58). Excluding these events yields treatment effects similar in magnitude and statistical significance to baseline estimates (Internet Appendix IF), indicating that the results are not driven by ESG-specific index construction or sustainability-oriented investor demand.

Finally, we verify that our results are not specific to Sustainalytics' ratings. Although prior research documents relatively high consistency in environmental (E) scores, especially compared to composite ESG ratings, which often diverge across providers (Gibson Brandon et al., 2021; Berg et al., 2022)), we validate our findings using an alternative environmental score from the MSCI ESG Intangible Value Assessment (IVA) database.[16] The IVA E-Score assesses firms' exposure to material environmental risks and the quality of their mitigation strategies, covering carbon emissions, energy efficiency, pollution and waste, and opportunities in clean technology and renewable energy. Unlike Sustainalytics' 0-100 scale, IVA scores range from 0 to 10. As reported in Internet Appendix IG, treated firms exhibit a statistically significant post-inclusion increase of 0.22 IVA points three years after index addition, corresponding to approximately 10% of the sample standard deviation. The consistency of results across rating providers reinforces the conclusion that index inclusion is associated with sustained improvements in environmental performance.

4.3 Spillovers and external validity

We next examine whether spillover effects violate the stable unit treatment value assumption (SUTVA). Following Berg et al. (2021), we construct a measure of treatment intensity defined as the share of treated firms in a given country–year relative to all Worldscope

[15] Keywords include: *ESG, Green, Ecology, Fossil Fuel Free, Carbon Efficient, Responsible Investment, Environment, Eco, Öko.*

[16] See, for example, Ferrell et al. (2016) and Liang and Renneboog (2017).

firms. Re-estimating the specification in first differences over the [-1,3] window yields results similar to the baseline, and interaction terms between treatment status and treatment intensity are statistically indistinguishable from zero (Model 4 in Internet Appendix IH). These findings indicate that spillovers do not materially affect our estimates. Although the interaction coefficients are relatively large, the low share of treated firms in most country-years implies that any spillover effects are economically negligible.

We also assess whether the results are driven by specific index events or countries. Sequentially excluding each index event and each country leaves the estimated treatment effect largely unchanged (Internet Appendix II). Given the central role of the U.S. equity market in passive investing, we also analyze index inclusions affecting U.S. firms separately. Although the U.S. subsample is small (seven events affecting 24 firms), the results are consistent with our baseline findings (Internet Appendix IJ). Following index inclusion, U.S. firms experience a large and statistically significant improvement in environmental performance, with E-Scores increasing by nearly six points.[17] Together, these tests indicate that the main results are not driven by particular events, countries, or spillover dynamics and generalize across different institutional settings.

4.4 Regression discontinuity design

Finally, we complement the DID analysis with a regression discontinuity design (RDD) that provides tighter identification for a subset of index events with transparent inclusion thresholds:

$$\Delta\text{E-Score}_{i,j,k,t_1,t_2} = \beta \text{ Treated}_i + \sum_{p=1}^{3} \theta_p D_i^p + \sum_{p=1}^{3} \vartheta_p D_i^p \times \text{Treated}_i + \delta_{j,t} + \eta_{k,t} + \epsilon_{i,j,k,t}. \quad (2)$$

The outcome variable is the change in firm i's Sustainalytics E-Score from year t_1 to t_2. Treated$_i$ equals one if the firm falls above the index inclusion threshold. The running

[17] Index inclusions affecting U.S. firms are also associated with a substantial increase in passive ownership of about 1.1 percentage points. Estimates for capital expenditures and R&D are positive but statistically insignificant, reflecting limited statistical power in this small subsample. We analyze investment responses and the underlying mechanism in detail in Section 5.

variable D_i measures the firm's distance from the cutoff implied by the index methodology. We include local polynomials of order one to three on either side of the cutoff, along with Fama-French 5 industry-year and country-year fixed effects. Standard errors are clustered at the index-event level.

Figure 3 provides graphical evidence using quadratic fits.[18] Firms just above the inclusion threshold exhibit E-Score increases of roughly 2–4 points relative to firms just below it. Table 5 reports the regression estimates across alternative event windows, polynomial orders, and bandwidths. In the narrow $[-1, 1]$ window, the quadratic specification with a 30-firm bandwidth yields an estimated effect of 0.82 points ($t = 0.8$). The estimated effect rises to 3.97 points ($t = 3.2$) over the $[-1, 2]$ window and 5.43 points ($t = 1.8$) over the $[-1, 3]$ window. These estimates are obtained within a very tight bandwidth: the median treated firm lies only 12 ranks above the cutoff, underscoring the quasi-random nature of index assignment in this setting.

The remaining specifications focus on the $[-1, 2]$ window, which balances statistical power with the time required for firms to implement environmental changes. Results are stable across alternative polynomial orders and wider bandwidths. We also address the possibility that index providers strategically set thresholds to favor firms expected to improve their environmental performance. In the Internet Appendix IL, we re-estimate the RDD after restricting the sample to index families with fixed and uniform constituent counts, which limits provider discretion. Despite the resulting loss of statistical power, the estimated effects remain consistent.

Overall, the RDD evidence confirms that firms just above the inclusion cutoff experience larger improvements in environmental performance, reinforcing the causal interpretation of the baseline results. We next turn to the mechanisms linking index inclusion to these outcomes.

[18] The x-axis shows the distance from the inclusion threshold, and the y-axis plots changes in E-Score. Observations are grouped into bins using an evenly spaced mimicking-variance method, and local polynomial estimates are constructed using a uniform kernel. Each plot includes up to 30 firms on either side of the threshold, or fewer when an index adds fewer constituents.

5 Mechanism: Inelastic demand and environmental investment

Why does index inclusion cause improvements in environmental performance? Executives frequently cite pressure to meet earnings targets as a barrier to investments that reduce reported profitability. In a global CEO survey, one respondent noted that "if the near-term pressures are very great then some of the longer-term corporate social responsibility pressures will just get pushed to one side" (Bertels et al., 2016). Consistent with this view, 92% of institutional investors report that the risk to near-term performance outweighs the perceived benefits of many ESG investments (EY, 2024). These observations suggest that pressure to deliver strong reported earnings can constrain environmental investments.

We argue that index additions mechanically shift ownership toward investors with relatively inelastic demand. As benchmark trackers become more important at the margin, stock price reactions to earnings surprises become more muted, reducing the market penalty associated with earnings declines. This change in price sensitivity matters because many environmental investments depress reported profitability while generating benefits that are uncertain and difficult to verify. When stock prices react strongly to earnings shortfalls, managers may be reluctant to undertake such projects. By reducing the stock-price penalty associated with temporary earnings declines, index inclusion relaxes this constraint. The remainder of this section presents evidence consistent with this earnings-sensitivity channel.

5.1 Why earnings pressure constrains environmental investment

A key ingredient of our mechanism is that many environmental investments are front-loaded and depress reported accounting performance. Their benefits are often uncertain, difficult to measure, and not immediately reflected in earnings. As a result, undertaking these projects frequently produces earnings shortfalls even when they increase firm value. When earnings-sensitive investors remain marginal in price formation, stock prices penalize such profitability declines, creating a binding earnings-based constraint on environmental investment.

Importantly, this constraint can bind even when some investors value sustainability. A large literature documents meaningful demand for ESG attributes (e.g., Hartzmark and Sussman, 2019; Pástor et al., 2021). However, such preferences are often concentrated among a subset of investors and may not translate into immediate price support when the benefits of decarbonization are back-loaded, uncertain, and difficult to verify. As a result, investors who trade aggressively on earnings news can remain price-setting at the margin, leaving managers exposed to stock-price penalties for reported earnings shortfalls.

Index inclusion relaxes this constraint by shifting ownership toward investors who trade less on firm-specific information. Passive ownership does not directly create incentives to decarbonize; instead, it reduces the stock-price penalty associated with investments that depress reported earnings.

Firms nevertheless face multiple forces that tilt investment toward environmental initiatives. Physical climate risks and regulatory uncertainty create incentives to invest ahead of potential policy changes (Pindyck, 1993; Brogaard and Detzel, 2015), while institutional and societal pressures (including stakeholder expectations and employee preferences) encourage firms to improve environmental performance (Edmans, 2011, 2012; Liang and Renneboog, 2017; Edmans et al., 2024). These forces may not translate into action when stock prices react strongly to earnings shortfalls, because environmental projects often involve upfront costs and delayed payoffs that reduce reported profitability. By weakening the market penalty for earnings declines, index inclusion allows these underlying incentives to materialize in realized investment. The empirical analysis below evaluates this mechanism in three steps. We first document increases in passive ownership and declines in earnings sensitivity. We then examine firms' real investment responses, and finally study cross-country variation consistent with the channel.

5.2 Index inclusion increases inelastic ownership

We begin with the ownership implication of the mechanism: index inclusion should expand the firm's base of benchmark-tracking investors and increase inelastic demand. We measure passive ownership using FactSet's investor-style classifications and define passive funds as those labeled "index." This measure is conservative. Many institutions benchmark closely to indexes without being formally classified as index funds, implying that FactSet "index" holdings understate the broader shift toward benchmark-driven demand (Cremers and Petajisto, 2009; Amihud and Goyenko, 2013; Doshi et al., 2015; Pavlova and Sikorskaya, 2023; Chinco and Sammon, 2024). The estimated change in measured passive ownership should therefore be interpreted as a lower bound on the overall increase in inelastic ownership.

Model 1 of Table 6 reports the DID estimate using passive ownership as the outcome. Three years after index inclusion, measured passive ownership rises by 0.36 percentage points, or 8.4% of its sample standard deviation. This estimate is comparable to estimates from the Russell reconstitution setting (Glossner, 2024). Although modest in levels, even small shifts in inelastic ownership can be economically meaningful because price formation depends on marginal investors. Benchmark-tracking investors trade less on firm-specific news, so incremental increases in their ownership can dampen price reactions to earnings surprises.[19]

Internet Appendix IM examines whether this ownership increase reflects a shift toward investors with stronger climate mandates. We find no evidence of such compositional change. The increase is driven primarily by domestic passive investors, does not reflect greater ownership by CDP signatories, and does not increase Big Three ownership. These patterns indicate that index inclusion raises inelastic ownership without attracting investors with explicit decarbonization mandates.

Model 2 of Table 6 examines non-index institutional ownership (total institutional

[19]Internet Appendix IJ also shows higher increases in passive ownership for the subsample of U.S. firms, where passive ownership levels are also considerably higher compared to the rest of the world.

minus passive ownership). The estimate is positive but statistically indistinguishable from zero, consistent with offsetting forces because some benchmarked active managers may add the stock while other active investors exit. Model 3 shows that total institutional ownership rises by 0.66 percentage points (3.8% of its standard deviation). Index inclusion, therefore, increases index ownership and overall institutional ownership without evidence of a systematic reallocation away from other institutions.

Finally, Model 4 links passive ownership directly to environmental outcomes using a two-stage least squares design in which passive ownership is instrumented with Treated $\times$ Post from Model 1 of Table 6 as the first stage (Duflo, 2001; Field, 2007). In the second stage, we regress the E-Score on predicted passive ownership. The second-stage coefficient is positive and statistically significant, indicating that index-induced increases in passive ownership contribute to improvements in environmental performance. The Kleibergen–Paap Wald F-statistic of 23.48 confirms strong instrument relevance. Quantitatively, the average post-treatment increase in passive ownership (0.36 percentage points) implies a 2.1-point increase in the E-Score (0.363×5.779).

5.3 Index demand reduces earnings sensitivity

If the above ownership shifts increase inelastic demand, the next implication is weaker stock-price responses to firm-specific earnings news. We test this pricing implication by estimating earnings response coefficients (ERCs), regressing cumulative abnormal returns (CARs) around earnings announcements on unexpected earnings (UE). Following Gipper et al. (2020), UE is defined as actual EPS minus the median I/B/E/S forecast, where forecasts are based on analysts' most recent annual EPS estimates issued between 95 and 3 days before the announcement. We scale UE by the Datastream price two trading days prior to the announcement.

CARs are computed using a market model with the FTSE All-World index as the benchmark. The estimation window spans 250 trading days and ends one month before the announcement. Stock returns are obtained from Datastream and cleaned using the procedures of Ince and Porter (2006). Consistent with the baseline specification, we focus on annual earnings announcements within three years before and after the index event and measure CARs over the $[-1, 2]$ trading-day window. For brevity, we report the coefficient on Treated $\times$ Post $\times$ UE, which captures the change in earnings sensitivity for treated firms after index inclusion.[20]

Model 1 of Table 7 reports a negative and statistically significant coefficient for Treated $\times$ Post $\times$ UE, indicating that earnings sensitivity declines following index inclusion. Internet Appendix IN confirms robustness across alternative event windows. We also find no differential pre-trends. The muted response persists for up to 60 trading days after the announcement, consistent with a sustained shift in demand elasticity (Pavlova and Sikorskaya, 2023) rather than temporary mispricing. Models 2 and 3 distinguish between positive and negative surprises using top- and bottom-quartile UE indicators. We find no change in the response to positive earnings surprises. In contrast, treated firms experience significantly less negative reactions to bad news, indicating that earnings sensitivity declines primarily in response to adverse shocks.

Models 4 to 6 examine heterogeneity by pre-treatment environmental performance. Brown firms exhibit the largest decline in their sensitivity to negative earnings surprises. This pattern is consistent with a larger shift toward inelastic ownership among brown firms. Green firms show smaller changes, consistent with their higher baseline passive ownership (5.49% vs. 2.75%) and greater ownership by CDP and PRI signatories. Because sustainability-oriented investors trade less on earnings news(Hitzemann et al., 2024), green firms likely faced less elastic demand even before index inclusion. Overall, the results show that earnings sensitivity declines most where inelastic ownership was initially lowest.

The decline in ERC raises an important question: Does index inclusion change how

[20]Untabulated results confirm the standard positive association between UE and CARs.

markets respond to environmental information, or does it specifically reduce sensitivity to earnings news? If newly indexed firms attract sustainability-oriented investors, stock prices should respond more strongly to environmental news. In contrast, the demand elasticity mechanism predicts muted reaction to firm-specific earnings shocks without necessarily changing responses to environmental news.

To distinguish between these explanations, we examine stock price reactions to environmental news using RepRisk events. RepRisk identifies and categorizes negative ESG-related risk incidents linked to companies. Each incident is classified according to predefined ESG issue categories (e.g., environmental degradation, labor violations, corruption, human rights abuses), and we identify all incidents labeled as "environmental". Internet Appendix IO shows no evidence of a change in cumulative abnormal returns in response to environmental incident announcements between the treatment and control group. Across event windows and across all, novel, and sharp environmental incidents, the Treated $\times$ Post coefficient is small and statistically insignificant. In contrast to the decline in earnings response coefficients documented above, we find no change in market reactions to environmental incidents. Combined with the absence of increased ownership by investors with explicit decarbonization mandates (Internet Appendix IM), the evidence points to a more muted pricing of earnings news rather than a reweighting toward sustainability-oriented price setters.

5.4 Real effects of reduced earnings pressure

The decline in earnings sensitivity implies greater managerial scope to undertake investments that depress accounting profitability. We therefore examine whether index inclusion is followed by real outcomes consistent with increased environmental investment. If environmental improvements require earnings-intensive expenditures, we should observe higher investment accompanied by lower reported profitability.

We begin with profitability. Consistent with reduced earnings pressure, Table 8, Model 1, shows that return on assets (net income over assets) declines by 0.9 percentage points following index inclusion, equivalent to 13% of the sample standard deviation. Model 2 reports a comparable decline in EBITDA over assets.

To assess whether these profitability declines reflect the costs of environmental improvements, we estimate a two-stage least squares (2SLS) specification that links exogenous E-Score changes to profitability. Using index inclusion to instrument for changes in environmental performance (Table 3, Model 3), the second stage shows that a one-point increase in the E-Score reduces net income over assets by 0.05 percentage points. Model 4 yields similar results using EBITDA/assets. These estimates indicate that environmental improvements are associated with lower short-run profitability, consistent with increased spending on environmental initiatives.

We next examine whether the decline in reported profitability is accompanied by higher real investment. If reduced earnings pressure allows firms to undertake projects with upfront costs, investment should increase following index inclusion. Model 1 of Table 9 shows a 0.3 percentage point increase in capital expenditures over assets, significant at the 5% level. Model 2 finds no significant change in R&D expenditures over assets, likely reflecting limited statistical power due to missing R&D data (unreported R&D is coded as zero).

Models 3–6 examine Sustainalytics E-Score subdimensions that capture firm-level environmental initiatives.[21] These measures allow us to move beyond aggregate scores and identify where the additional investment is directed. We find significant improvements across all program-related subdimensions: indexed firms expand GHG reduction programs, undertake renewable energy initiatives, increase renewable energy use, and strengthen green procurement policies. This evidence indicates that the investment increase documented above is directed, at least in part, toward environmental programs.

Model 7 provides more direct evidence of environmentally oriented innovation

[21] Sustainalytics E-Scores aggregate 15 attributes; additional subdimensions, including fines and reporting are presented in Internet Appendix IP.

through patenting. Using patent data from Bena et al. (2017) and Atta-Darkua et al. (2025), we examine the probability that innovative firms, i.e., those filing at least one patent in a given year, submit green patents.[22] Indexed firms are more likely to file green patents following index inclusion ($p = 0.10$), indicating a shift toward environmentally oriented innovation.

To assess whether these investment responses generalize beyond the sample limited by E-Score availability, we repeat the analysis using a larger set of index events that does not require Sustainalytics coverage (Internet Appendix Table IQ). Across this broader sample with 169 index events, index inclusion is associated with economically and statistically significant increases in capital expenditures, R&D spending, and firm size. In contrast, selling, general, and administrative expenses do not change. This pattern indicates that firms expand investment and scale rather than increase their overhead or administrative spending. The broader-sample evidence therefore reinforces the interpretation that reduced earnings pressure leads to real investment responses rather than general empire building.

Overall, the evidence shows that index inclusion is followed by lower reported profitability, higher capital expenditures, expanded environmental programs, increased green innovation, and broader increases in investment and firm size. These patterns are consistent with a mechanism in which reduced earnings pressure facilitates environmental investment.

5.5 When reduced earnings pressure matters most

The mechanism yields a clear cross-country prediction: environmental responses to index inclusion should be largest where the incentives to decarbonize are strong, and the earnings-based constraint is most binding. Our international setting allows us to test both dimensions directly. We examine two sources of heterogeneity. First, we study

[22]The patent data can be downloaded from UvA Darden: https://patents.darden.virginia.edu/get-data/.

countries where green investment faces greater financial or competitive barriers. Second, we examine countries where climate and regulatory pressures to decarbonize are strongest.

We begin by examining whether the environmental response to index inclusion is strongest where green investment is most financially difficult. If reduced earnings pressure enables firms to undertake projects with upfront costs and delayed payoffs, the effect should be largest in countries where low-carbon investment faces greater financial and competitive obstacles.

We proxy these frictions using three country-level measures. First, we use the estimated cost of capital for low-carbon investments from Ameli et al. (2021). Second, we measure the share of fossil-fuel subsidies using data from the OECD and the IISD Fossil Fuel Subsidies Tracker; larger subsidies increase the relative attractiveness of brown energy and raise the hurdle rate for green projects. Third, we use the share of renewables in a country's energy mix from the International Renewable Energy Agency; where renewables are already widespread, the cost and uncertainty of green investment are likely lower. Together, these measures capture cross-country variation in the financial and competitive barriers to environmental investment.

All country variables are measured at $t-1$ (except the cost of green projects, which is cross-sectional). We augment the baseline difference-in-differences specification with a triple interaction term (Treated $\times$ Post $\times$ Country characteristic) to test whether the treatment effect varies with these frictions. Country characteristics are mean-centered to facilitate interpretation.

Table 10 supports these predictions. The environmental effect of index inclusion is significantly stronger in countries where the cost of capital for low-carbon projects is higher and where fossil-fuel subsidies are larger. In contrast, the effect is weaker in countries where renewables already represent a larger share of the energy mix. Environmental improvements following index inclusion are therefore largest precisely where green investments face the greatest financial and competitive barriers, consistent with the idea that reduced earnings pressure relaxes otherwise binding constraints.

We next examine whether the environmental response to index inclusion is strongest where climate-related pressures to decarbonize are greatest. Firms operating in countries with weaker environmental performance, lower adaptive capacity, or less developed regulatory frameworks face stronger incentives to improve environmental practices. Yet these investments often involve upfront costs and reduce reported profitability. If earnings-based performance pressure constrains such investments, reducing that pressure should have the largest impact in these settings.[23]

We measure climate risk using three country-level proxies. First, we use the Yale Environmental Performance Index (EPI), which ranks countries on climate change, environmental health, and ecosystem vitality; lower scores indicate weaker baseline environmental performance (e.g., Dyck et al., 2019; Starks, 2023).[24] Second, we use climate change preparedness from the Notre Dame Global Adaptation Initiative, which captures a country's capacity to translate investments into adaptation actions, with higher scores indicating greater preparedness. Third, we use the stringency of climate-related regulatory enforcement from the World Economic Forum, where higher values reflect stricter environmental regulation. Regulatory risk directly affects firms' costs and cash flows (Krueger et al., 2020; Stroebel and Wurgler, 2021; Seltzer et al., 2025) because changes in environmental standards alter compliance costs and operating conditions (Karpoff et al., 2005; Meng, 2017). In countries with weaker current regulation, firms may therefore face greater future adjustment pressure, strengthening incentives to improve environmental performance.

Models 4–6 of Table 10 show that the treatment effect is stronger in countries

[23]A growing literature examines firm responses to climate change. Addoum et al. (2023) document earnings losses from extreme temperatures, consistent with Dell et al. (2012). Cuculiza et al. (2025) find that temperature-sensitive firms experience lower future profitability and adopt riskier policies. Xiao (2024) show that extreme heat reduces labor productivity, prompting capital deepening and automation. Pankratz and Schiller (2023) highlight supply-chain adjustments to suppliers' climate exposures. Park et al. (2024) find that higher temperatures increase workplace injuries, though adaptation mitigates this sensitivity over time.

[24]The EPI is based on 58 indicators across 11 categories and is compiled by the Yale Center for Environmental Law and Policy and the Center for International Earth Science Information Network.

with lower EPI scores, weaker climate preparedness, and less stringent environmental regulation. Environmental improvements following index inclusion are therefore largest where the need for environmental investment is greatest and baseline adaptation is lowest.

Across both sets of tests, environmental gains following index inclusion concentrate where the incentives to decarbonize are strongest but the constraints are most binding. This pattern is consistent with a mechanism in which reduced earnings pressure enables firms to undertake environmental investments that would otherwise be difficult to justify in the short run.[25]

6 Alternative mechanisms

The evidence in the previous section supports a mechanism in which index inclusion reduces earnings-based performance pressure and facilitates environmental investment. However, index inclusion could also influence environmental performance through other channels. In particular, inclusion may increase firm visibility and public scrutiny, stimulate shareholder engagement by passive investors, or relax financing constraints by improving funding conditions. This section evaluates these alternative explanations. Each channel generates distinct empirical predictions regarding attention, voting behavior, and financing conditions, allowing us to assess whether the observed environmental improvements are consistent with mechanisms other than reduced earnings pressure.

6.1 Visibility

One alternative explanation is that index inclusion increases firm visibility, strengthening reputational pressure to improve environmental performance. Prior research shows that index membership can raise firm salience and media coverage (Chen et al., 2004; Goyal et al., 2025). If heightened scrutiny drives the environmental improvements we docu-

[25]Other motives may also encourage firms to become greener after index inclusion, including stakeholder expectations or flows from sustainability-focused investors (Hartzmark and Sussman, 2019; Edmans, 2011, 2012; Edmans et al., 2024).

ment, index inclusion should increase analyst coverage and media attention. Internet Appendix IR tests this prediction using analyst coverage from I/B/E/S and media attention from RepRisk. Index inclusion does not affect analyst coverage: the Treated $\times$ Post coefficient in Model 1 is economically small and statistically insignificant, implying a negligible 1.2% decline in the log number of analysts.

We next examine media attention along both extensive and intensive margins, testing whether firms are more likely to experience any media-reported incident, the total number of incidents, and the number of low-reach and low-severity incidents, i.e., measures that should be especially sensitive to incremental changes in visibility. Across all specifications, the Treated $\times$ Post coefficient remains small and statistically insignificant. Overall, we find no evidence that index inclusion materially improves firm visibility.

6.2 Investor engagement

Index inclusion may also affect environmental performance through passive investor engagement. Theory offers competing predictions: diversification and low-cost mandates may weaken engagement incentives (Bebchuk and Hirst, 2019; Gilje et al., 2020a), whereas limited exit options and economies of scale may strengthen them (Bhide, 1993; Fisch et al., 2020; Brav et al., 2023). Empirical evidence is similarly mixed (Azar et al., 2021; Iliev et al., 2021; Heath et al., 2022).

We test this channel using ISS Global voting data. Specifically, we examine the share of environmental proposals, the share of shareholder-sponsored environmental proposals, voting alignment with management, and proposal acceptance rates. An engagement channel predicts more environmental proposals, greater shareholder sponsorship, and increased dissent with management.

Internet Appendix IS shows no systematic changes in any of these measures following index inclusion. Environmental proposals are rare in the sample, accounting for only 0.04% of environment-related proposals and 0.18% of all shareholder-sponsored environmental proposals, and their frequency does not increase. Voting alignment and proposal outcomes also remain unchanged. Consistent with this evidence and contrary to Azar et al. (2021), our index events do not increase Big Three ownership (Internet Appendix IM); the ownership shifts we document are driven primarily by smaller passive investors without substantial stewardship capacity.

6.3 Financial constraints

A final alternative mechanism is that index inclusion relaxes financing constraints or lowers the cost of capital. If inclusion improves funding conditions, firms, particularly those that are financially constrained, may increase environmental investment.

Announcement returns. We first examine cumulative abnormal returns around index announcements (Internet Appendix IT). Announcement returns range from 0.35% to 0.55% across event windows. Although statistically significant in some specifications, these magnitudes are economically modest and unlikely to materially change firms' financing capacity.

Systematic risk. If financing conditions improve, systematic risk, and hence the cost of equity, should decline. We calculate firm betas based on Claessens and Yafeh (2013) and find increases in betas following index inclusion (Internet Appendix IU). In the $[-3, 3]$ window, daily beta rises by 0.047 ($t = 2.62$) and weekly beta rises by 0.038 ($t = 2.98$). Higher beta implies a higher, not lower, cost of equity. The results are therefore more consistent with increased comovement than with improved financing conditions, and the magnitude of the changes is small.

Heterogeneity by ex-ante financial constraints. Finally, if relaxed financing constraints were driving environmental improvements, treatment effects should be strongest among ex-ante constrained firms. We run two types of tests: First, we examine well-established SA, WW, and KZ financial-constraints indices as the outcome variable, and second, we interact Treated $\times$ Post with the financial-constraints indices measured at $t-1$ (Internet Appendix Table IV). We find no improvement in the WW and KZ financial-constraints index post treatment, and only a small improvement in the SA index. The latter is likely due to an increase in total assets resulting from additional investments. When we examine the effect of pre-treatment financial constraints, the baseline treatment effect remains positive, while the triple interaction terms are small and statistically insignificant. Environmental improvements do not differ systematically by pre-treatment constraint levels.

Across announcement returns, risk measures, and cross-sectional heterogeneity, we find little indication that index inclusion materially relaxes financing constraints. More broadly, none of the tests in this section produces evidence consistent with the key empirical predictions of the visibility, engagement, or financing channels. While these mechanisms are inherently difficult to measure and may operate in specific settings, the absence of supporting patterns across attention, voting, and financing tests contrasts with the strong and consistent evidence on earnings sensitivity documented earlier. Overall, the evidence points most strongly to a mechanism operating through changes in earnings sensitivity and performance pressure.

7 Conclusion

This paper examines how inclusion in equity indexes influences firms' environmental performance. We show that index additions mechanically shift ownership toward more passive, inelastic investors, reducing stock-price sensitivity to earnings news. This change in shareholder composition reduces pressure from profit-sensitive investors, allowing firms to undertake investments that impose short-run earnings costs, including environmentally oriented projects. Empirically, indexed firms increase capital expenditures, expand green programs, improve renewable energy usage, and file more green patents, alongside lower reported profitability.

We further show that the effect is heterogeneous across firms and countries. Brown firms (i.e., those with lower pre-existing environmental performance) experience the largest reductions in stock-price reactions to negative earnings surprises and the greatest increases in environmental initiatives. At the country level, the index effect is stronger where green projects face higher financing costs, fossil fuel subsidies are larger, renewable energy penetration is lower, and climate-related risks are more pronounced. Together, these findings suggest that inelastic demand interacts with environmental incentives to amplify firms' environmental responses.

Our results highlight a previously underappreciated channel through which financial markets can influence corporate behavior: passive, index-driven investors can alter managerial incentives by mitigating stock-price sensitivity to earnings news. This mechanism provides important insights for policymakers, investors, and firms interested in how investor composition shapes corporate responses to environmental challenges.

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Appendix A Variable definitions and data sources

Panel A: Environmental outcomes

Sustainalytics E-Score Firm-level environmental performance score from Sustainalytics, measured on a 0–100 scale. *Source:* Sustainalytics.

Sustainalytics E-Score Subdimensions Level 1 components of the Sustainalytics E-Score (e.g., 1.1, 1.2, 1.3, ...), capturing specific environmental policies, programs, and outcomes. *Source:* Sustainalytics.

Scope 1 Scope 1 greenhouse gas emissions (tons of CO_2 equivalent) scaled by sales in millions of U.S. dollars and winsorized at the 2.5th and 97.5th percentiles. *Source:* Trucost.

Scope 2 Scope 2 greenhouse gas emissions (tons of CO_2 equivalent) scaled by sales in millions of U.S. dollars and winsorized at the 2.5th and 97.5th percentiles. *Source:* Trucost.

Scope 1+2 Combined Scope 1 and 2 greenhouse gas emissions (tons of CO_2 equivalent) scaled by sales in millions of U.S. dollars and winsorized at the 2.5th and 97.5th percentiles. *Source:* Trucost.

Green Patent Indicator for patents classified by the OECD as environmentally related. *Source:* UVA Darden Global Corporate Patent Dataset developed by Bena et al. (2017), classification following Atta-Darkua et al. (2025).

Panel B: Institutional ownership

Passive Ownership (PO) Holdings by institutional investors classified by FactSet as following an "index" investment strategy, measured at fiscal-year end as a share of the firm's market capitalization. *Source:* FactSet Ownership.

Institutional Ownership (IO) Holdings by all institutional investors, measured at fiscal-year end as a share of the firm's market capitalization. *Source:* FactSet Ownership.

Panel C: Firm fundamentals

Log Assets Natural logarithm of total assets, measured in millions of U.S. dollars (WC02999). *Source:* Worldscope.

ROA Net income before extraordinary items (WC01551) divided by total assets (WC02999). *Source:* Worldscope.

Tobin's Q Ratio of the sum of total assets (WC02999) and the market value of equity (WC08001) minus the book value of equity (WC03501) to total assets (WC02999). *Source:* Worldscope.

PPE Net property, plant, and equipment (WC02501) divided by total assets (WC02999). *Source:* Worldscope.

Leverage Total debt (WC03255) divided by total assets (WC02999). *Source:* Worldscope.

Capex Capital expenditures (WC04601) divided by total assets (WC02999). *Source:* Worldscope.

R&D Research and development expenses (WC01201) divided by total assets (WC02999). Missing values are set to zero. *Source:* Worldscope.

Panel D: Stock market response to earnings announcements

UE Unexpected earnings, defined as actual earnings per share (EPS) minus the median I/B/E/S annual earnings forecast, where each analyst's most recent estimate issued between 95 and 3 calendar days prior to the earnings announcement is used. The difference is scaled by the Datastream price two days before the announcement (Gipper et al., 2020). *Source:* I/B/E/S and Datastream.

Positive/Negative Earnings Surprise Indicator variable equal to one if unexpected earnings fall above the 75% percentile (positive surprise) or below the 25% percentile (negative surprise) of the sample distribution. *Source:* I/B/E/S and Datastream.

Earnings Announcement CAR Cumulative abnormal return around earnings announcements, computed using a market model with the FTSE All-World as the benchmark. The estimation window spans 250 trading days and ends one month before the announcement date. *Source:* Datastream.

Panel E: Country heterogeneity

Low Carbon CoC Country-level weighted average cost of capital (WACC) for low-carbon energy technologies. *Source:* Ameli et al. (2021).

Fossil Fuel Subsidies Total fossil fuel production and consumption subsidies as a share of GDP. *Source:* Fossil Fuel Subsidies Tracker.

Share Renewables (in Energy Mix) Share of renewable energy in a country's total energy generation. *Source:* International Renewable Energy Agency.

Environmental Performance Index Composite index measuring a country's environmental performance across climate change, environmental health, and ecosystem vitality. *Source:* Yale Center for Environmental Law and Policy and Center for International Earth Science Information Network.

Climate Change Preparedness Index capturing a country's economic, governance, and social readiness to translate adaptation investments into effective climate-resilience actions. *Source:* Notre Dame Global Adaptation Initiative.

Environmental Regulation Enforcement Index measuring the perceived stringency with which environmental regulations are enforced. *Source:* World Economic Forum.

Panel G: Internet Appendix

ESG Index Indicator equal to one if an index selects constituents based on explicit ESG criteria. ESG indexes are identified using keyword searches in index names: *ESG, Green, Ecology, Fossil Fuel Free, Carbon Efficient, Responsible Investment, Environment, Eco, Öko*. *Source:* Hand-collected.

MSCI IVA E-Score Firm-level environmental score from MSCI Intangible Value Assessment. *Source:* MSCI.

Domestic Holdings by passive institutional investors domiciled in the country of the firm's primary listing, measured at fiscal-year end as a share of market capitalization. *Source:* FactSet Ownership.

Foreign Holdings by passive institutional investors domiciled outside the country of the firm's primary listing at fiscal year-end as a share of market capitalization. *Source:* FactSet Ownership.

CDP Signatories Holdings by passive investors that were members of the CDP initiative as of June 2023, measured at fiscal-year end as a share of market capitalization. *Source:* FactSet Ownership.

Big Three Holdings by BlackRock, Vanguard, and State Street Global Advisors, measured at fiscal-year end as a share of market capitalization. *Source:* FactSet Ownership.

Environmental Announcement CAR Cumulative abnormal return around environmental incidents from RepRisk, computed using a market model with the FTSE All-World as the benchmark. The estimation window spans 250 trading days and ends one month before the announcement date. *Source:* RepRisk and Datastream.

SG&A Selling, general & administrative expenses (WC01101) divided by total assets (WC02999). *Source:* Worldscope.

Nr. of Analysts Total number of estimates of earnings per share for the next fiscal year-end. *Source:* I/B/E/S.

Any Non-Environmental Incidents Dummy Dummy set to one if the number of non-environmental risk incidents reported in local and global media during the fiscal year is above zero, and zero otherwise. *Source:* RepRisk.

Number of Non-Environmental Incidents Number of non-environmental risk incidents reported in local and global media during the fiscal year. *Source:* RepRisk.

Number of Non-Environmental Incidents with Low Reach Number of non-environmental incidents reported in low reach media sources during the fiscal year. Reach reflects the "influence [of an information source] based on readership, circulation, and national importance." *Source:* RepRisk.

Number of Non-Environmental Incidents with Low Severity Number of non-environmental incidents classified as low severity during the fiscal year. Severity reflects the consequences, scope, and underlying cause of incident. *Source:* RepRisk.

Share of Proposals Share of shareholder proposals with a given characteristic (environment-related, shareholder-sponsored environment-related, management-aligned, or approved) relative to all proposals in a firm-year. *Source:* ISS Global.

Index Announcement CAR Cumulative abnormal return around the announcement of an index, computed using a market model with the FTSE All-World as the benchmark. The estimation window spans 250 trading days and ends one month before the announcement date. *Source:* Hand-collected and Datastream.

Beta We calculate the beta between each newly included firm's stock returns and the returns of the remaining index constituents (excluding the added firm). For each index event, we limit the sample of index constituents to those observable in our data. Pre-inclusion betas are estimated using daily data for the 12, 13-24, or 25-36 months ending 30 days before inclusion, and post-inclusion betas using the 12, 13-24, or 25-36 months starting 30 days after, thereby avoiding contamination from announcement effects. We repeat the analysis using weekly data. The approach is based on Claessens and Yafeh (2013). *Source:* Datastream.

SA Index SA Index, defined as $-0.737(TA)+0.043(TA^2)-0.040(Age)$ based on Hadlock and Pierce (2010). Higher values indicate more financial constraints. Age measures the year the firm was added to Worldscope. TA measures total assets. *Source:* Worldscope.

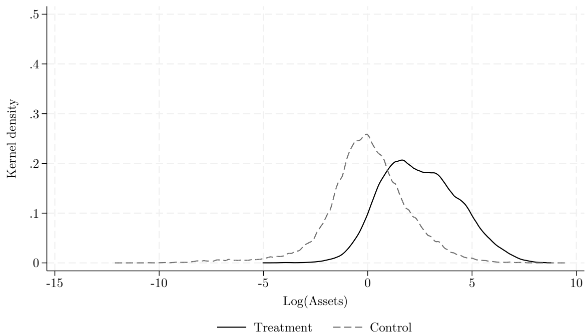
WW Index WW Index, defined as $-0.091(CashFlow/TA)-0.062(DIVPOS)+0.021(TLTD/TA)-0.044(ln(TA))+0.102(ISG)-0.035(SG)$ based on Whited and Wu (2006). Higher values indicate more financial constraints. $CashFlow$ is defined as (net income before extra items + depreciation and depletion). $DIVPOS$ is an indicator for paying dividends. $TLTD$ measures long-term debt. TA measures total assets. ISG measures industry sales growth, SG measures sales growth. *Source:* Worldscope.

KZ Index KZ Index, defined as $-1.002(CashFlow/PPE_{t-1})+0.283(Q)+3.139(Debt/Capital)-39.368(Div/PPE_{t-1})-1.315(Cash/PPE_{t-1})$ based on Lamont et al. (2001). Higher values indicate more financial constraints. $CashFlow$ is defined as (net income before extra items + depreciation and depletion). PPE_{t-1} measures net property, plant, and equipment. Q measures Tobin's Q as defined above. $Debt/Capital$ is defined as (long term debt+short term debt)/(long term debt+short term debt+shareholder equity). Div measures dividend payments. $Cash$ measures the cash balance. *Source:* Worldscope.

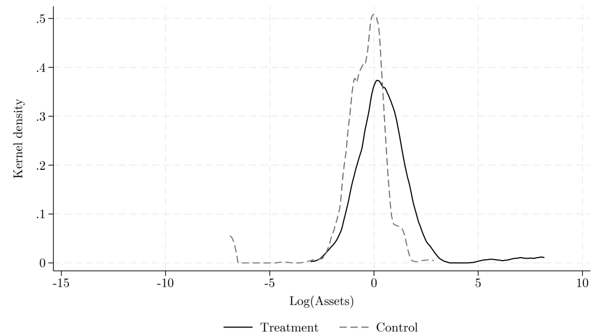
Appendix B Descriptive statistics

This table shows descriptive statistics for the difference-in-differences (DID) sample over the [-3,3] window around index inclusion. All variables are defined in Appendix A.

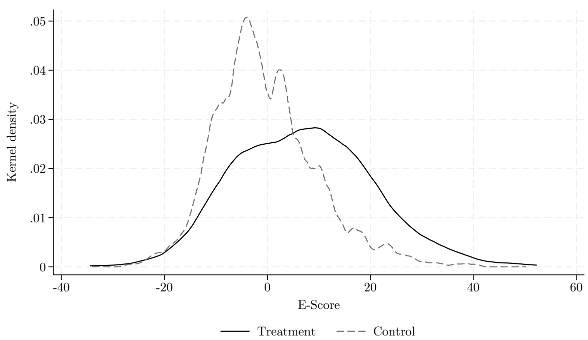
	Mean	P10	Median	P90	SD	Obs.
Environmental measures						
Sustainalytics E-Score	60.27	40.00	61.00	80.00	15.07	15,589
MSCI IVA E-Score	5.69	2.80	5.69	8.7	2.20	12,656
GHG intensity: Scope 1	199.06	0.75	16.97	456.65	553.86	7,920
GHG intensity: Scope 2	60.77	2.61	25.08	183.20	80.06	7,920
GHG intensity: Scope 1 + 2	269.86	6.23	59.06	653.45	597.46	7,920
Ownership [%]						
Passive ownership	5.63	1.27	4.65	11.17	4.29	15,170
Domestic	2.21	0.00	1.22	5.52	3.14	15,170
Foreign	3.10	0.62	2.80	6.15	2.00	15,170
CDP Signatories	1.76	0.25	1.52	3.37	1.44	15,170
Big Three	2.78	0.59	2.32	5.15	2.21	15,170
Institutional ownership	23.45	6.72	18.72	46.74	17.41	14,753
Fundamentals						
Assets (USD million)	18,468.83	1,622.08	7,274.06	66,629.95	23,854.50	15,506
$\frac{NetIncome}{Assets}$	0.04	-0.00	0.04	0.11	0.07	15,386
$\frac{Ebitda}{Assets}$	0.09	0.01	0.09	0.17	0.09	15,167
Tobin's Q	1.42	0.87	1.11	2.31	0.92	15,209
PPE	0.28	0.01	0.24	0.67	0.25	15,456
Leverage	0.24	0.02	0.22	0.51	0.19	15,506
Capex	0.04	0.00	0.03	0.09	0.06	15,464
R&D	0.01	0.00	0.00	0.04	0.03	15,464
Stock market response to earnings announcements						
UE	-0.0005	-0.0107	0.0002	0.0091	0.0102	10,019
CAR	0.0042	-0.0665	0.0027	0.0799	0.0619	10,019



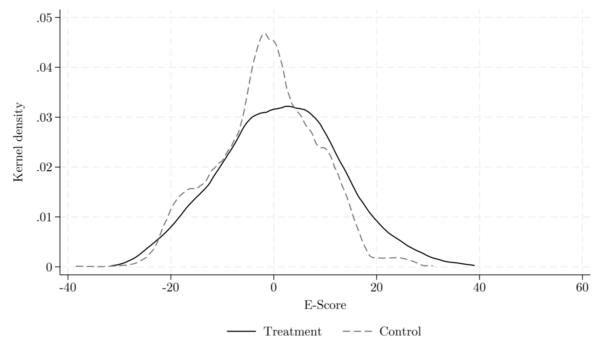
(a) Full Sample: Log(Assets)



(b) Matched Sample: Log(Assets)



(c) Full Sample: E-Score



(d) Matched Sample: E-Score

Figure 1: Balancing of matching covariates before and after matching

This figure shows Epanechnikov kernel densities of the residuals of Log Assets and the Sustainalytics E-Score partialling out industry, country, and year fixed effects. Panels (a) and (c) correspond to the unmatched sample, where control firms are drawn from the same country, industry, and year as each treated firm. Panels (b) and (d) correspond to the matched sample, where we additionally implement propensity score matching with replacement using Log Assets and the Sustainalytics E-Score as matching covariates.

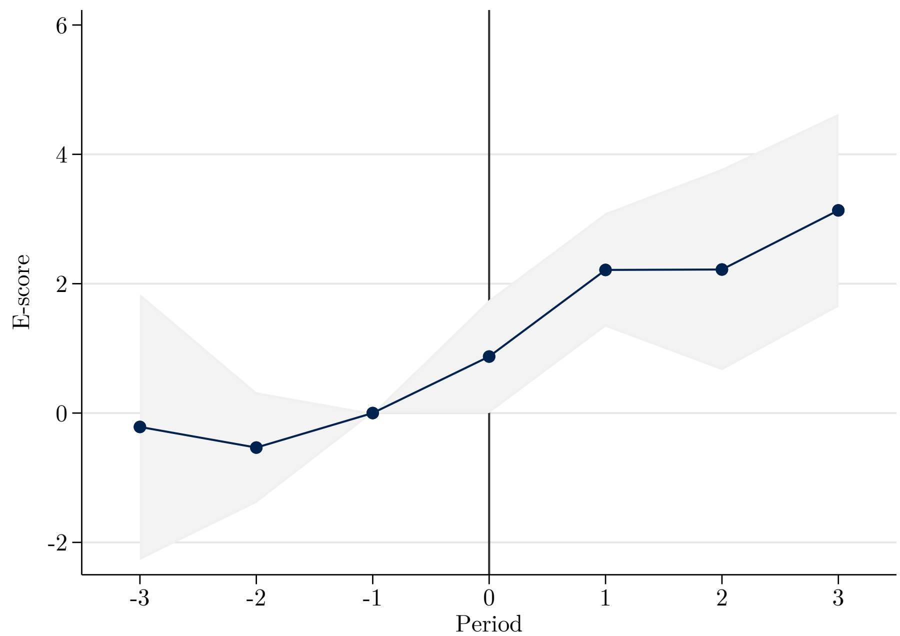
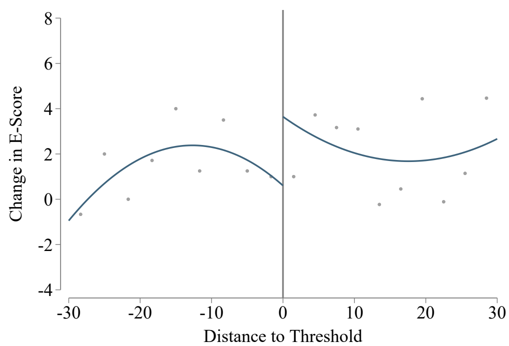
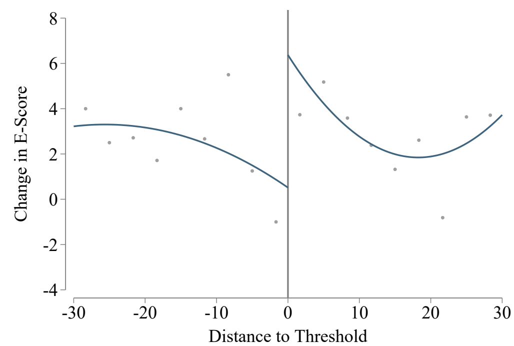


Figure 2: Index membership and environmental performance

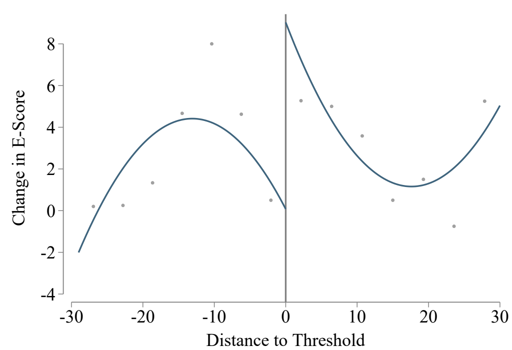
This figure reports estimates from a regression of the Sustainalytics E-Score on interactions between the treatment indicator and relative time dummies. The year immediately preceding treatment ($t = -1$) is omitted. Shaded areas denote 95% confidence intervals. The regression controls for firm size and includes event-firm and event-year fixed effects, as well as industry- and country-specific time trends. Standard errors are clustered at the index-event level.



(a) [-1,1]



(b) [-1,2]



(c) [-1,3]

Figure 3: Regression discontinuity plots of index membership and environmental performance

The figures present regression discontinuity plots with quadratic fits. The y-axis shows the change in the mean Sustainalytics E-Score from one year before to up to three years after the index event, as indicated by the panel titles. The x-axis reports the distance from the index inclusion threshold, where positive (negative) values correspond to firms that are included in (excluded from) the index. Observations are grouped into bins using a mimicking-variance evenly spaced method based on spacings estimators. Local polynomial estimators are constructed using a uniform kernel. All figures use a bandwidth of at most 30 firms per event.

Table 1:
Index events

This table reports the distribution of treated firms across 55 index launches between January 2010 and December 2018. Panel A shows the distribution of treated firms across markets. Panel B presents the distribution by index provider. Panel C distinguishes between ESG and non-ESG indexes. Panel D classifies index launches by selection method, distinguishing objective rules from committee-based ("subjective") criteria. Panel E lists the index eligibility criteria. Panel F reports the reconstitution frequency.

Panel A: Markets		
Japan	489	36.1%
South Korea	125	9.2%
United Kingdom	124	9.2%
Germany	63	4.7%
France	59	4.4%
Hong Kong	57	4.2%
South Africa	56	4.1%
Switzerland	49	3.6%
China	39	2.9%
India	39	2.9%
Canada	31	2.3%
Netherlands	30	2.2%
United States	24	1.8%
Other	168	12.4%
Total	1,353	100.0%

Panel B: Index Provider		
STOXX	424	31.3%
Nikkei	269	19.9%
MVIS	227	16.8%
Korea Exchange	102	7.5%
CSI	101	7.5%
S&P	95	7.0%
FTSE	53	3.9%
Nasdaq	26	1.9%
Euronext	17	1.3%
HKEX	7	0.5%
SIX	7	0.5%
Shanghai Stock Exchange	6	0.4%
TASE	2	0.1%
Other	17	1.4%
Total	1,353	100.0%

Panel C: ESG vs. Non-ESG Index		
Non-ESG	973	71.9%
ESG	380	28.1%
Total	1,353	100.0%

Panel D: Selection Rule		
Objective rule-based	1,332	98.4%
Subjective criteria	21	1.6%
Total	1,353	100.0%

Panel E: Selection Mechanism		
Market capitalization	961	71.0%
ESG factors	44	3.3%
Dividend yield	18	1.3%
Other	330	24.4%
Total	1,353	100.0%

Panel F: Reconstitution Frequency		
Annual	578	42.7%
Bi-annual	322	23.8%
Quarterly	123	9.1%
Missing information	330	24.4%
Total	1,353	100.0%

Table 2:
Balancing of pre-event characteristics of treated and control firms

This table compares treatment and control firms. Panel A reports mean values of covariates in the DID sample, based on 1,353 firm-year observations one year before an index inclusion event. Control firms are selected from the same country, industry, and year, and further refined using propensity score matching with replacement. Matching covariates are the Sustainalytics E-Score and Log Assets. Panel B reports mean values for the same covariates in the RDD sample, based on 214 treatment and 58 control observations observed one year before an index event. Treated firms meet the inclusion threshold, while control firms are eligible firms that fall below the threshold. The bandwidth is ±30 firms. Normalized differences are estimated following Imbens and Wooldridge (2009), with absolute values below 0.25 considered effectively indistinguishable from zero. All variables are defined in Appendix A.

	Panel A: DID Sample			Panel B: RDD Sample		
	Treatment	Control	Normalized Difference	Treatment	Control	Normalized Difference
E-Score	60.42	58.03	0.11	53.24	48.20	0.28
Log Assets	9.29	8.16	0.41	8.75	7.86	0.49
ROA	5.79	3.45	0.22	7.42	5.83	0.13
Tobin's Q	1.58	1.24	0.27	1.83	1.55	0.14
PPE	0.29	0.28	0.01	0.31	0.24	0.20
Leverage	0.22	0.25	-0.13	0.26	0.17	0.36
Observations	1,353	1,353		219	61	
Number of firms	988	288		208	55	

Table 3:
DID analysis of index addition and environmental firm performance

This table reports DID regression estimates of the effect of index addition on environmental performance, measured by the Sustainalytics E-Score. The sample is restricted to firm-year observations within the time windows indicated in the column headers. Models 4 to 6 split the sample by pre-treatment E-Score quintiles observed at $t-1$: brown (bottom quintile), mixed (quintiles 2–4), and green (top quintile). *Treated* equals one for firms included in an equity index and zero otherwise. *Post* equals one for firm-years after the index launch. Control firms have similar characteristics but are not added to an equity index. Continuous variables are winsorized at the 1st and 99th percentiles. All variables are defined in Appendix A. t-statistics based on clustered standard errors by index event are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Window (years)	[-1,1]	[-2,2]	[-3,3]	[-3,3]	[-3,3]	[-3,3]
Sample		All Firms		Brown	Mixed	Green
Dep. Variable	Sustainalytics E-Score					
Treated × Post	1.492***	1.875***	2.267***	3.042***	2.641***	0.018
	(3.58)	(4.45)	(4.97)	(5.51)	(3.89)	(0.04)
Obs.	7,580	12,024	15,589	3,222	9,258	2,921
Nr. of Treated Firms	988	988	988	237	625	185
Nr. of Events	55	55	55	50	50	25
Adj. R-squared	0.95	0.92	0.91	0.72	0.78	0.73
Avg. E-Score at $t-1$				39.46	60.96	81.86
Size Control	Yes	Yes	Yes	Yes	Yes	Yes
Event × Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Event × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country × Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 4:
Index addition and GHG emissions

This table reports DID regression estimates of the effect of index addition on Scope 1 and 2 GHG emissions, measured as tons of CO_2 equivalents over sales in millions of U.S. dollars. The sample is restricted to the [-3,3] window. Models 4 to 6 split the sample by pre-treatment Scope 1 and 2 emission quintiles at $t-1$: brown (top quintile), mixed (quintiles 2–4), and green (bottom quintile). *Treated* equals one for firms included in an equity index and zero otherwise. *Post* equals one for firm-years after the index launch. Control firms have similar characteristics but are not added to an equity index. Continuous variables are winsorized at the 1st and 99th percentiles, except for the emissions variables, which are winsorized at the 2.5th and 97.5th percentiles. All variables are defined in Appendix A. t-statistics based on clustered standard errors by index event are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Sample		All firms		Brown	Mixed	Green
Dep. Variable	Scope 1	Scope 2	Scope 1+2		Scope 1+2	
Treated × Post	-20.068***	3.328*	-12.872*	-79.421**	7.106	0.797
	(-3.61)	(1.86)	(-1.74)	(-2.07)	(1.00)	(1.29)
Obs.	7,920	7,920	7,920	1,630	4,782	1,508
Nr. of Treated Firms	488	488	488	112	310	95
Nr. of Events	41	41	41	26	33	17
Adj. R-squared	0.98	0.97	0.98	0.98	0.85	0.82
Avg. Scope 1+2 at $t-1$				1,619.66	203.31	19.89
Size Control	Yes	Yes	Yes	Yes	Yes	Yes
Event × Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Event × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country × Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 5:
RDD analysis of index addition and environmental firm performance

The table reports regression coefficients from an RDD analysis of index inclusions. The dependent variable is the change in the Sustainalytics E-Score over the time windows indicated in the column headers. Bandwidths of 30, 40, and 50 correspond to samples of 30, 40, and 50 firms on each side of the index inclusion threshold. Polynomials indicates the number of polynomials included on both sides of the inclusion threshold. "Distance to threshold" shows how far the median treatment firm is from the index inclusion threshold. *Treated* equals one for stocks added to an index and zero otherwise. Control firms are those in the eligible index universe that fail to meet the inclusion threshold based on the underlying index construction methodology. Continuous variables are winsorized at the 1st and 99th percentiles. All variables are defined in Appendix A. t-statistics based on clustered standard errors by index event are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Event window (years)	1 vs. -1	2 vs. -1	3 vs. -1	2 vs. -1	2 vs. -1	2 vs. -1	2 vs. -1
Dep. Variable	ΔSustainalytics E-Score						
Treated	0.821	3.972***	5.427*	2.633***	5.762*	2.908**	3.554**
	(0.82)	(3.16)	(1.77)	(3.20)	(1.76)	(2.71)	(2.80)
Obs.	272	259	134	259	259	320	356
Nr. of Treated	214	204	105	204	204	249	281
Nr. of Events	25	23	20	23	23	23	23
Adj. R-squared	-0.00	0.06	0.17	0.07	0.06	0.08	0.05
Bandwidth	30	30	30	30	30	40	50
Polynomial	2	2	2	1	3	2	2
Distance to Threshold	12	12	10	12	12	14	17
Industry × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 6:
Index addition and ownership structures

This table presents DID regression estimates of the effect of index addition on firm ownership (Models 1 to 3) and the relationship between passive ownership and E-Scores (Model 4). In Models 1–3, the dependent variables are a firm's passive ownership (*PO*), active ownership (total institutional ownership (*IO*) minus *PO*), and total *IO*, respectively. Model 4 is a second-stage estimation of a firm's E-Score on its predicted passive ownership from Model 1. Regression samples are restricted to the [-3,3] window. *Treated* equals one for firms included in an equity index, and zero otherwise. *Post* equals one for firm-years after the index launch. Control firms have similar characteristics but are not added to an equity index. KP F-Stat. is the Kleibergen-Paap rk F statistic. Continuous variables are winsorized at the 1^{st} and 99^{th} percentiles. All variables are defined in Appendix A. t-statistics based on clustered standard errors by index event are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)
Test		IV: First Stage		IV: Second Stage
Dep. Variable	PO	IO-PO	IO	E-Score
Treated × Post	0.363***	0.355	0.655**	
	(4.85)	(1.47)	(2.47)	
Passive Ownership				5.779***
				(2.79)
Obs.	15,170	14,655	14,753	15,170
Nr. of Treated Firms	986	955	956	986
Nr. of Events	55	55	55	55
Adj. R-squared	0.94	0.96	0.96	
KP F-Stat.				23.48
Size Control	Yes	Yes	Yes	Yes
Event × Firm FE	Yes	Yes	Yes	Yes
Event × Year FE	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes
Country × Year FE	Yes	Yes	Yes	Yes

Table 7:
Stock market response to earnings announcements

This table reports DID regression estimates of the effect of index additions on the market reaction to earnings announcements. The sample includes annual earnings announcements within the [-3,3] years window surrounding the index event. Models 4 to 6 split the sample by pre-treatment E-Score quintiles measured at $t-1$: brown (bottom quintile), mixed (quintiles 2–4), and green (top quintile). Announcement returns are computed using a 250 trading-day estimation window ending one month prior to the announcement date. We estimate a market model using the FTSE All-World Index as the benchmark. We measure CARs over the [-1,2] trading-day window surrounding the announcement date ($t = 0$). *UE* denotes unexpected earnings. *Positive (Negative) Earnings Surprise* equals one if unexpected earnings are above the 75% percentile (below the 25% percentile). *Treated* equals one for firms added to an equity index and zero otherwise. *Post* equals one for firm-years after the index launch. For brevity, we only report triple-interaction coefficients. Control firms have similar characteristics but are not added to an index. Continuous variables are winsorized at the 1st and 99th percentiles. All variables are defined in Appendix A. t-statistics based on clustered standard errors by index event are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Sample		All Firms		Brown	Mixed	Green
Dep. Variable	Earnings Announcement CAR					
Treated × Post × UE	-1.138**					
	(-2.63)					
Treated × Post × Pos. Surprise		-0.005				
		(-0.48)				
Treated × Post × Neg. Surprise			0.028**	0.153**	0.026	-0.043*
			(2.59)	(2.04)	(1.58)	(-1.93)
Obs.	10,019	5,305	4,635	960	2,604	1,071
Nr. of Treated Firms	912	842	787	167	506	162
Nr. of Events	55	53	52	43	48	23
Adj. R-squared	0.27	0.39	0.47	0.54	0.32	0.78
Size Control	Yes	Yes	Yes	Yes	Yes	Yes
Event × Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Event × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country × Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 8:
Index additions and profitability

This table presents DID regression estimates of the impact of index inclusion on firm profitability (Models 1 and 2) and the relation between profitability and E-Scores (Models 3 and 4). The dependent variables are net income and EBITDA scaled by total assets. Models 3 and 4 are second-stage regressions, where profitability is regressed on the firm's predicted E-Score obtained from Model 3 of Table 3. The sample is limited to the [-3,3] window. *Treated* equals one for firms added to an equity index and zero otherwise. *Post* equals one for firm-years after the index launch. Control firms are matched based on similar characteristics but are not indexed. Continuous variables are winsorized at the 1st and 99th percentiles. KP F-Stat. is the Kleibergen-Paap rk F statistic. All variables are defined in Appendix A. t-statistics based on clustered standard errors by index event are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)
Test	Reduced Form		IV: Second Stage	
Dep. Variable	$\frac{\text{Net Income}}{\text{Assets}}$	$\frac{\text{EBITDA}}{\text{Assets}}$	$\frac{\text{Net Income}}{\text{Assets}}$	$\frac{\text{EBITDA}}{\text{Assets}}$
Treated $\times$ Post	-0.009***	-0.012***		
	(-3.05)	(-3.87)		
E-Score			-0.005***	-0.006***
			(-2.69)	(-2.76)
Obs.	15,386	15,167	15,328	15,105
Nr. of Treated Firms	988	981	984	975
Nr. of Events	55	55	54	55
Adj. R-squared	0.60	0.68		
KP F-Stat.			13.87	12.21
Size Control	Yes	Yes	Yes	Yes
Event $\times$ Firm FE	Yes	Yes	Yes	Yes
Event $\times$ Year FE	Yes	Yes	Yes	Yes
Industry $\times$ Year FE	Yes	Yes	Yes	Yes
Country $\times$ Year FE	Yes	Yes	Yes	Yes

Table 9:
Index additions and firms' green policies

This table reports DID regression estimates of the effect of index inclusion on firm investment, environmental policies, and green innovation. Models 1 and 2 examine capital expenditures and R&D spending scaled by total assets. Models 3 through 6 focus on Sustainalytics E-Score subcomponents related to green policies and environmental actions. Model 7 analyzes the likelihood that a firm files a green patent in a given year, restricting the sample to firms that filed at least one patent in that year. The sample is limited to the [-3,3] window. *Treated* equals one for firms added to an equity index and zero otherwise. *Post* equals one for firm-years after the index launch. Control firms are matched based on similar characteristics but are not included in an equity index. Continuous variables are winsorized at the 1^{st} and 99^{th} percentiles. All variables are defined in Appendix A. t-statistics based on clustered standard errors by index event are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Investments		Green Programs and Policies				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Capex	R&D	GHG Reduction Programs	Renewable Energy Programs	Renewable Energy Use	Green Procure-ment Policy	Green Patent
Treated $\times$ Post	0.004***	0.000	0.076*	0.030***	0.034**	0.041	0.101*
	(2.87)	(0.06)	(1.91)	(2.88)	(2.41)	(1.66)	(1.86)
Obs.	15,464	15,464	15,589	15,589	15,589	15,589	1,757
Nr. of Treated Firms	988	988	988	988	988	988	178
Nr. of Events	55	55	55	55	55	55	15
Adj. R-squared	0.86	0.93	0.71	0.72	0.76	0.87	0.72
Mean of Dep. Variable at $t-1$	0.04	0.01	0.53	0.06	0.06	0.67	1.00
Size Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Event $\times$ Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Event $\times$ Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry $\times$ Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country $\times$ Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 10:
Country heterogeneity: Costs of green projects and climate risk exposure

This table reports DID regression estimates of the effect of index addition on the Sustainalytics E-Score, including triple interactions of the DID term with country-level measures of green financing costs and climate-related risk exposures, which are centered at the mean. The sample is restricted to the [-3,3] window. *Treated* equals one for firms included in an equity index and zero otherwise. *Post* equals one for firm-years after the index launch. Control firms have similar characteristics but are not added to an equity index. Continuous variables are winsorized at the 1^{st} and 99^{th} percentiles. All variables are defined in Appendix A. t-statistics based on clustered standard errors by country are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Cost of Green Projects			Climate Risk Exposure		
Country Char.	Low Carbon CoC [%]	Fossil Fuel Subsidies	Share Renewables	Env. Performance	Climate Change Preparedness	Env. Regulation
Treated × Post	2.648***	2.398***	2.311***	2.386***	2.460***	2.560***
	(5.34)	(4.66)	(4.29)	(5.41)	(5.73)	(5.00)
Post × Country Char.	-0.068	3.723***	0.102*	-0.118	-32.082**	-3.725*
	(-0.21)	(2.91)	(2.04)	(-1.07)	(-2.23)	(-1.80)
Treated × Post	0.473***	1.918**	-0.076**	-0.141**	-13.613***	-1.145*
× Country Char.	(6.24)	(2.58)	(-2.09)	(-2.63)	(-3.00)	(-1.98)
Obs.	13,417	15,330	15,296	14,499	14,494	15,401
Nr. of Treated Firms	842	979	975	911	911	985
Nr. of Clusters	23	28	28	29	29	29
Adj. R-squared	0.91	0.91	0.91	0.90	0.90	0.91
Size Control	Yes	Yes	Yes	Yes	Yes	Yes
Event × Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Event × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country × Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Internet Appendix:
Doing Good by Doing Nothing?
Passive Ownership and Environmental Performance

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March 1, 2026

Internet Appendix IQ: Index addition and firms' investment policies using a larger sample of index events

Internet Appendix IR: Firm visibility around index events

Internet Appendix IS: Engagement around index events

Internet Appendix IT: Announcement returns around index events

Internet Appendix IU: Index addition and firm betas

Internet Appendix IV: Financial constraints around index events

IA Index events

Nr.	Index	Provider	Provider Country
1	CAC PME	Euronext	Europe
2	CES China 120 Index	CSI	China
3	CES Gaming Top 10 Index	HKEX	China
4	Copenhagen 25 index	Nasdaq	Denmark
5	CSI 180 ESG	CSI	China
6	CSI ASEAN 80 Index	CSI	China
7	CSI Caixin Bedrock Economy Index	CSI	China
8	CSI China-ASEAN 180 Index	CSI	China
9	CSI CICC Select 100 Index	CSI	China
10	CSI HK 300 Consumer Discretionary Index	CSI	China
11	CSI HK 300 Consumer Staples Index	CSI	China
12	CSI HK 300 Industrials Index	CSI	China
13	CSI HK 300 Materials Index	CSI	China
14	CSI HK 300 Utilities Index	CSI	China
15	CSI Hong Kong 200 Index	CSI	China
16	CSI Hong Kong 300 Index	CSI	China
17	CSI Hong Kong Middle Cap Select Index	CSI	China
18	DJ Switzerland Select Dividend 15 Index	Dow Jones	USA
19	Euronext BeNe 40 Equal Weight index	Euronext	Belgium
20	FTSE/JSE Responsible Investment	FTSE	South Africa
21	iSTOXX Global Economic Growth Select 50 Index	STOXX	Global
22	iSTOXX MUTB JAPAN QUALITY 150 INDEX	STOXX	Japan
23	JPX-Nikkei 400	Nikkei	Japan
24	KBW Nasdaq Global Bank Index (GBKX)	Nasdaq	USA
25	KRX 300	Korea Exchange	Japan
26	KRX Eco Leaders 100	Korea Exchange	South Korea
27	KRX ESG Leaders 150	Korea Exchange	South Korea
28	MVIS Germany Equal Weight Index	MVIS	Germany
29	MVIS Japan Equal Weight Index	MVIS	Japan
30	MVIS Mexico Equal Weight Index	MVIS	Mexico
31	MVIS South Korea Equal Weight Index	MVIS	South Korea
32	MVIS United Kingdom Equal Weight Index	MVIS	Great Britain
33	S&P All Africa ex-South Africa Capped	S&P	Africa
34	S&P BSE Basic Materials	S&P	India
35	S&P BSE Consumer Discretionary Goods & Services	S&P	India
36	S&P BSE Finance	S&P	India
37	S&P BSE Industrials	S&P	India
38	S&P BSE LargeCap	S&P	India
39	S&P BSE MidSmallCap	S&P	India
40	S&P BSE Telecom	S&P	India

Internet Appendix IA: Continued

Nr.	Index	Provider	Country
41	S&P BSE Utilities	S&P	India
42	S&P South Africa Composite Property	S&P	South Africa
43	S&P/NZX 50 High Dividend Index	S&P	New Zealand
44	S&P/NZX Primary Sector Index	S&P	New Zealand
45	S&P/TSX 60 Equal Weight	S&P	Canada
46	S&P/TSX 60 Fossil Fuel Free Index	S&P	Canada
47	S&P/TSX 60 U.S. Revenue Exposure Index	S&P	Canada
48	SPI Select Dividend 20 Index	SIX	Switzerland
49	SPI Select Dividend 20 Index	SIX	Switzerland
50	SSE Internet plus	Shanghai Stock Exchange	China
51	SSE SH Equities Index	Shanghai Stock Exchange	China
52	SSE Shanghai's Development	Shanghai Stock Exchange	China
53	STOXX Europe Industry Neutral ESG	STOXX	Europe
54	STOXX North America Industry Neutral ESG 150	STOXX	North America
55	TA TechElite Index	TASE	Israel

IB DID robustness: Alternative sets of fixed effects

This table reports DID regression estimates of the effect of index additions on environmental firm performance, measured by the Sustainalytics E-Score. The models use alternative sets of fixed effects, as indicated at the bottom of the table. The sample is restricted to the [-3,3] window. *Treated* equals one for firms included in an equity index and zero otherwise. *Post* equals one for firm-years after the index launch. Control firms have similar characteristics but are not added to an equity index. Continuous variables are winsorized at the 1st and 99th percentiles. All variables are defined in Appendix A. t-statistics based on clustered standard errors by index event are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
Dep. Variable	Sustainalytics E-Score				
Treated	1.026				
	(1.34)				
Post	0.234	-2.309***			
	(0.30)	(-6.17)			
Treated × Post	2.003**	2.578***	2.572***	2.568***	2.303***
	(2.43)	(5.52)	(5.47)	(5.45)	(4.98)
Obs.	15,589	15,589	15,589	15,589	15,589
Nr. of Treated Firms	988	988	988	988	988
Nr. of Events	55	55	55	55	55
Adj. R-squared	0.03	0.89	0.89	0.90	0.90
Size Control	Yes	Yes	Yes	Yes	Yes
Firm FE	No	Yes	No	No	No
Year FE	No	Yes	No	No	No
Event × Firm FE	No	No	Yes	Yes	Yes
Event × Year FE	No	No	Yes	Yes	Yes
Industry × Year FE	No	No	No	No	Yes
Country × Year FE	No	No	No	Yes	No

IC DID robustness: Alternative clustering

This table reports DID regression estimates of the effect of index additions on environmental firm performance, measured by the Sustainalytics E-Score. The models use alternative ways of clustering the standard errors, as indicated in the column headers. The sample is restricted to the [-3,3] window. *Treated* equals one for firms included in an equity index and zero otherwise. *Post* equals one for firm-years after the index launch. Control firms have similar characteristics but are not added to an equity index. Continuous variables are winsorized at the 1^{st} and 99^{th} percentiles. All variables are defined in Appendix A. t-statistics are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)
Clustering	Firm	Firm x Event	Country
Dep. Variable		Sustainalytics E-Score	
Treated × Post	2.267***	2.267***	2.267***
	(3.97)	(4.15)	(4.84)
Obs.	15,589	15,589	15,589
Nr. of Treated Firms	988	988	988
Nr. of Clusters	1,276	55	35
Adj. R-squared	0.91	0.91	0.91
Size Control	Yes	Yes	Yes
Event × Firm FE	Yes	Yes	Yes
Event × Year FE	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes
Country × Year FE	Yes	Yes	Yes

ID Pre-event characteristics: Alternative matching methods

This table compares treatment and control firms in the DID sample across alternative matching methods. It reports mean values of covariates observed in the year prior to treatment. Control firms are selected from the same country, industry, and year, and further refined using propensity score matching with replacement. Panel A uses the Sustainalytics E-Score and Log Assets as matching covariates, while Panel B additionally includes PPE, Leverage, Tobin's Q, and ROA. Panel C presents treatment-control comparisons using a synthetic matching procedure (Abadie, 2021) described in Section 4. Normalized differences with absolute values below 0.25 are considered effectively zero (Imbens and Wooldridge, 2009). All variables are defined in Appendix A.

	Panel A: Matched on E-Score and Log Assets, Caliper 0.05		
	Treatment	Control	Normalized Difference
E-Score	54.32	55.60	-0.07
Log Assets	8.68	8.47	0.11
ROA	6.93	3.67	0.31
Tobin's Q	1.77	1.21	0.37
PPE	0.31	0.30	0.02
Leverage	0.20	0.24	-0.16
Observations	712	712	
Number of firms	557	246	

	Panel B: Matched on E-Score and all Covariates, Caliper 0.05		
	Treatment	Control	Normalized Difference
E-Score	53.61	57.08	-0.18
Log Assets	8.66	8.51	0.09
ROA	6.12	4.75	0.13
Tobin's Q	1.60	1.27	0.24
PPE	0.33	0.26	0.18
Leverage	0.22	0.19	0.10
Observations	590	590	
Number of firms	491	207	

	Panel C: Synthetic Matching		
	Treatment	Control	Normalized Difference
E-Score	61.79	61.45	0.02
Log Assets	9.38	8.35	0.72
ROA	0.06	0.06	0.06
Tobin's Q	1.64	1.68	-0.03
PPE	0.28	0.31	-0.09
Leverage	0.22	0.24	-0.09
Observations	2,319	2,319	
Number of firms	673	673	

IE DID robustness: Alternative matching methods

This table reports DID regression estimates of the effect of index additions on the Sustainalytics E-Score using different matching methods, as indicated in the column headers. Covariate balance for each method is reported in Internet Appendix ID. The sample is restricted to the [-3,3] window. *Treated* equals one for firms included in an equity index and zero otherwise. *Post* equals one for firm-years after the index launch. Control firms have similar characteristics but are not added to an equity index. Continuous variables are winsorized at the 1st and 99th percentiles. All variables are defined in Appendix A. t-statistics based on clustered standard errors by index event are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)
Matching Approach	PSM E-Score and Log Assets, Caliper: 0.05	PSM E-Score Log Assets, and all Covariates, Caliper: 0.05	Synthetic Matching
Dep. Variable		Sustainalytics E-Score	
Treated × Post	2.110***	1.541**	2.428*
	(3.18)	(2.60)	(1.93)
Obs.	8,170	6,719	10,815
Nr. of Treated Firms	557	491	673
Nr. of Events	47	41	37
Adj. R-squared	0.89	0.89	0.89
Size Control	Yes	Yes	Yes
Event × Firm FE	Yes	Yes	Yes
Event × Year FE	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes
Country × Year FE	Yes	Yes	Yes

IF DID analysis of index addition and environmental firm performance: Non-ESG indexes

This table reports DID regression estimates of the effect of index addition to non-ESG indexes on environmental firm performance, measured by the Sustainalytics E-Score. The regression sample is restricted to firm-year observations within the time windows indicated in the column headers. Models 4 to 6 split the sample by pre-treatment E-Score quintiles observed in $t-1$: brown (bottom quintile), mixed (quintiles 2–4), and green (top quintile). *Treated* equals one for firms included in an equity index, and zero otherwise. *Post* is set to one for firm-years after the index launch. Control firms have similar characteristics but are not added to an equity index. Continuous variables are winsorized at the 1st and 99th percentiles. All variables are defined in Appendix A. t-statistics based on clustered standard errors by index event are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Window (years)	[-1,1]	[-2,2]	[-3,3]	[-3,3]	[-3,3]	[-3,3]
Sample		All Firms		Brown	Mixed	Green
Dep. Variable	Sustainalytics E-Score					
Treated × Post	1.151***	1.544***	1.940***	2.430***	1.427**	0.067
	(2.91)	(3.64)	(3.75)	(4.97)	(2.61)	(0.13)
Obs.	5,393	8,506	10,874	2,307	6,297	2,082
Nr. of Treated Firms	753	753	753	181	493	118
Nr. of Events	48	48	48	38	44	19
Adj. R-squared	0.95	0.93	0.91	0.69	0.80	0.78
Avg. E-Score at $t-1$				38.33	58.18	80.02
Size Control	Yes	Yes	Yes	Yes	Yes	Yes
Event × Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Event × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country × Year FE	Yes	Yes	Yes	Yes	Yes	Yes

IG Index addition and the MSCI IVA E-Score

This table reports DID regression estimates of the effect of index addition on the MSCI IVA E-Score. The regression sample is restricted to firm-year observations within the time windows indicated in the column headers. *Treated* equals one for firms included in an equity index and zero otherwise. *Post* equals one for firm-years after the index launch. Control firms have similar characteristics but are not added to an equity index. Continuous variables are winsorized at the 1st and 99th percentiles. All variables are defined in Appendix A. t-statistics based on clustered standard errors by index event are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)
Window (years)	[-1,1]	[-2,2]	[-3,3]
Dep. Variable		MSCI IVA E-Score	
Treated × Post	0.132*	0.152*	0.220**
	(1.85)	(1.79)	(2.05)
Obs.	6,528	9,766	12,656
Nr. of Treated Firms	901	901	901
Nr. of Events	56	56	56
Adj. R-squared	0.92	0.89	0.86
Size Control	Yes	Yes	Yes
Event × Firm FE	Yes	Yes	Yes
Event × Year FE	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes
Country × Year FE	Yes	Yes	Yes

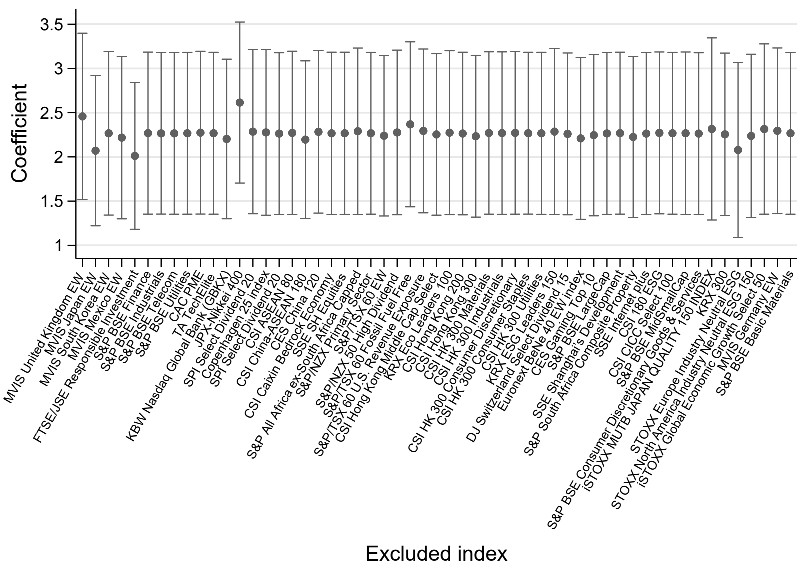
IH DID robustness: Interactions of controls and SUTVA violation

This table reports DID regression estimates of the effect of index additions on environmental firm performance, measured by the Sustainalytics E-Score. Following Gipper et al. (2020), Models 1 to 3 include interactions of control variables (Log Assets, ROA, Tobin's Q, PPE, and Leverage). Model 4 follows Berg et al. (2021) and uses first differences. Regression samples are restricted to firm-year observations in the time windows indicated in the column headers. *Share of Treatment Firms* is the share of treatment firms in a given country-year based on the full Worldscope universe. *Treated* equals one for firms included in an equity index and zero otherwise. *Post* equals one for firm-years after the index launch. Control firms have similar characteristics but are not added to an equity index. Continuous variables are winsorized at the 1st and 99th percentiles. All variables are defined in Appendix A. t-statistics based on clustered standard errors by index event are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

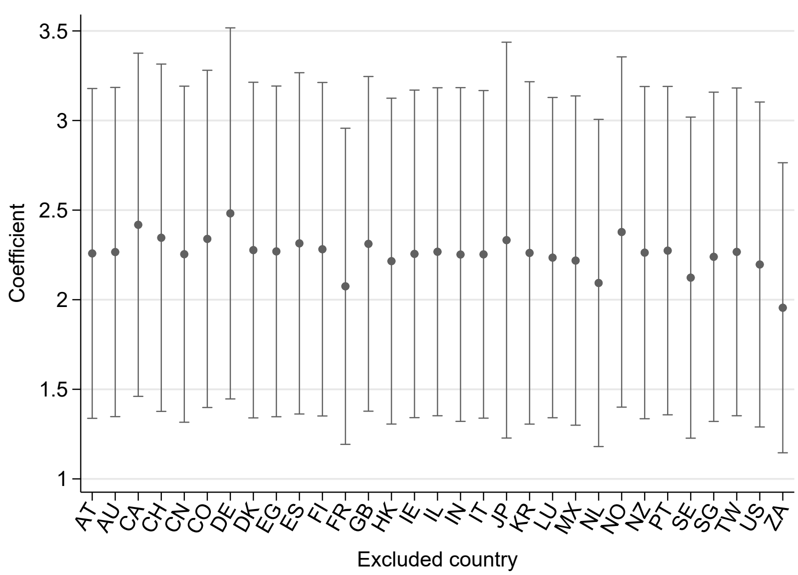
	(1)	(2)	(3)	(4)
Window (years)	[-3,3]	[-3,3]	[-3,3]	[-1,3]
Dep. Variable		Sustainalytics E-Score		
Treated × Post	1.185**	1.085**	1.192**	
	(2.23)	(2.06)	(2.58)	
Treated				2.214**
				(2.04)
Treated × Share of Treatment Firms				-71.782
				(-0.64)
(1-Treated) × Share of Treatment Firms				-95.705
				(-0.88)
Obs.	15,092	15,092	15,092	1,472
Nr. of Treated	8,300	8,300	8,300	881
Nr. of Events	55	55	55	42
Adj. R-squared	0.91	0.91	0.92	0.15
Controls	Yes	Yes	Yes	No
Event × Firm FE	Yes	Yes	Yes	No
Event × Year FE	Yes	Yes	Yes	No
Industry × Year FE	Yes	Yes	Yes	No
Country × Year FE	Yes	Yes	Yes	Yes
Controls × Treated × Post	Yes	Yes	Yes	No
Controls × Country FE	No	Yes	Yes	No
Controls × Industry FE	No	No	Yes	No

II DID Robustness: Excluding index events and countries one by one

This figure reports DID estimates of the effect of index addition on environmental performance, measured by the Sustainalytics E-Score. Each dot represents the estimated coefficient on the DID term from Equation (1). Panel A reports results obtained by sequentially excluding each index event from the sample, while Panel B reports results obtained by sequentially excluding each country. The sample is limited to the [-3,3] event window. Vertical bars indicate 95% confidence intervals based on standard errors clustered at the index-event level.



(a) Indexes



(b) Countries

IJ DID robustness: US only

This table reports DID regression estimates of the effect of index addition on environmental performance, passive ownership, capital expenditures and R&D expenses for the subsample of US firms. The sample is limited to the [-3,3] window. *Treated* equals one for firms included in an equity index and zero otherwise. *Post* equals one for firm-years after the index launch. Control firms have similar characteristics but are not added to an equity index. Continuous variables are winsorized at the 1st and 99th percentiles. All variables are defined in Appendix A. t-statistics based on clustered standard errors by index event are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dep. Variable	(1) E-Score	(2) PO	(3) Capex	(4) R&D
Treated $\times$ Post	5.967**	1.081**	0.015	0.005
	(3.45)	(3.36)	(0.96)	(0.54)
Obs.	305	297	298	305
Nr. of Treated Firms	24	24	24	24
Nr. of Events	7	7	7	7
Adj. R-squared	0.85	0.86	0.94	0.92
Avg. Dep. Variable at $t-1$	64.43	12.85	0.06	0.02
Size Control	Yes	Yes	Yes	Yes
Event $\times$ Firm FE	Yes	Yes	Yes	Yes
Event $\times$ Year FE	Yes	Yes	Yes	Yes
Industry $\times$ Year FE	Yes	Yes	Yes	Yes
Country $\times$ Year FE	Yes	Yes	Yes	Yes

IK DID and RDD: Profitability pre-trends

The table reports tests for profitability pre-trends in the DID and RDD samples. The dependent variable is the first-difference change in net income scaled by total assets over the pre-treatment windows indicated in the column headers. Models 1 and 2 use the DID sample, while Models 3 and 4 use the RDD sample. In Models 1 and 2, *Treated* equals one for firms included in an equity index and zero for matched control firms not added to an index. In Models 3 and 4, *Treated* equals one for firms added to an index and zero for firms in the eligible universe that fall below the inclusion threshold. A bandwidth of 30 includes 30 firms on each side of the inclusion threshold. "Polynomials" denote the order of the polynomial included on each sides of the threshold. "Distance to threshold" reports the median rank distance of treated firms from the inclusion threshold. Continuous variables are winsorized at the 1^{st} and 99^{th} percentiles. All variables are defined in Appendix A. t-statistics based on clustered standard errors by index event are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)
Sample	DID		RDD	
Event window (years)	-2 vs. -1	-3 vs. -1	-2 vs. -1	-3 vs. -1
Dep. Variable	$\Delta\frac{\text{Net Income}}{\text{Assets}}$			
Treated	-0.004	-0.006	-0.006	0.007
	(-0.64)	(-1.60)	(-0.22)	(0.17)
Obs.	1,989	1,702	365	358
Nr. of Treated	815	743	260	256
Nr. of Events	48	40	29	29
Adj. R-squared	0.36	0.34	0.22	0.17
Bandwidth			30	30
Polynomial			2	2
Distance to Threshold			11	11
Industry × Year FE	Yes	Yes	Yes	Yes
Country × Year FE	Yes	Yes	Yes	Yes

IL RDD robustness: Manipulation by index providers

The table reports regression coefficients from an RDD analysis of index inclusions. The table follows Table 5, but restricts the sample to index events where the index provider has less control over the exact index size (e.g., because the index provider creates a whole family of indexes with the same number of constituents). The dependent variable is the change in the Sustainalytics E-Score over the time windows indicated in the column headers. Bandwidths of 30, 40, and 50 correspond to samples of 30, 40, and 50 firms on each side of the index inclusion threshold. Polynomials indicates the number of polynomials included on both sides of the inclusion threshold. "Distance to threshold" shows how far the median treatment firm is from the index inclusion threshold. *Treated* equals one for stocks added to an index and zero otherwise. Control firms are those in the eligible index universe that fail to meet the inclusion threshold based on the underlying index construction methodology. Continuous variables are winsorized at the 1st and 99th percentiles. All variables are defined in Appendix A. t-statistics based on clustered standard errors by index event are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Event window (years)	1 vs. -1	2 vs. -1	3 vs. -1	2 vs. -1	2 vs. -1	2 vs. -1	2 vs. -1
Dep. Variable				ΔSustainalytics E-Score			
Treated	1.374	2.636*	2.651	2.962***	2.392	3.193***	4.065***
	(1.03)	(1.87)	(0.70)	(3.62)	(0.63)	(3.85)	(3.41)
Obs.	179	180	65	180	180	227	261
Nr. of Treated	152	152	58	152	152	189	219
Nr. of Events	14	14	11	14	14	14	14
Adj. R-squared	-0.05	0.01	-0.03	0.02	-0.00	0.01	-0.02
Bandwidth	30	30	30	30	30	40	50
Polynomial	2	2	2	1	3	2	2
Distance to Threshold	13	12	11	12	12	15	19
Industry × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

IM Passive ownership characteristics

This table reports DID regression estimates of the effect of index addition on different types of passive ownership. Models 1 and 2 examine domestic versus foreign passive ownership. Models 3 and 4 compare CDP and non-CDP passive ownership. Model 5 focuses on Big Three passive ownership. The sample is restricted to the [-3,3] window. *Treated* equals one for firms included in an equity index and zero otherwise. *Post* equals one for firm-years after the index launch. Control firms are similar in characteristics but are not added to an equity index. Continuous variables are winsorized at the 1st and 99th percentiles. All variables are defined in Appendix A. t-statistics, clustered by index event, are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dep. Variable	(1) Domestic	(2) Foreign	(3) CDP	(4) Non-CDP	(5) Big 3
Treated × Post	0.315***	-0.030	0.023	0.261***	0.016
	(4.24)	(-0.48)	(0.34)	(7.19)	(0.39)
Obs.	15,170	15,170	15,170	15,170	15,170
Nr. of Treated Firms	986	986	986	986	986
Nr. of Events	55	55	55	55	55
Adj. R-squared	0.96	0.91	0.89	0.96	0.93
Size Control	Yes	Yes	Yes	Yes	Yes
Event × Firm FE	Yes	Yes	Yes	Yes	Yes
Event × Year FE	Yes	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes	Yes
Country × Year FE	Yes	Yes	Yes	Yes	Yes

IN Stock market response to earnings announcements: Robustness

This table reports DID regression estimates of how index addition affects the market reaction to earnings announcements. The sample includes annual earnings announcements within the [-3,3] years window surrounding the index event. Announcement returns are computed using a 250 trading-day estimation window ending one month prior to the announcement date. We estimate a market model using the FTSE All-World Index as the benchmark. We measure CARs over the time windows surrounding the announcement date ($t = 0$) listed in the column titles (in trading days). *UE* denotes unexpected earnings. *Treated* equals one for firms added to an equity index and zero otherwise. *Post* equals one for firm-years after the index launch. For brevity, we only report triple-interaction coefficients. Control firms have similar characteristics but are not added to an index. Continuous variables are winsorized at the 1st and 99th percentiles. All variables are defined in Appendix A. t-statistics, clustered by index event, are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Event Window (days)	[-1,1]	[-2,2]	[-1,3]	[-3,3]	[-5,-3]	[3,60]
Dep. Variable	Earnings Announcement CAR					
Treated × Post × UE	-1.290***	-0.978*	-1.650***	-1.400**	0.006	-0.994
	(-2.90)	(-1.87)	(-3.49)	(-2.10)	(0.02)	(-0.88)
Obs.	10,019	10,019	10,019	10,019	10,019	10,019
Nr. of Treated Firms	912	912	912	912	912	912
Nr. of Events	55	55	55	55	55	55
Adj. R-squared	0.25	0.28	0.28	0.30	0.26	0.34
Size Control	Yes	Yes	Yes	Yes	Yes	Yes
Event × Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Event × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country × Year FE	Yes	Yes	Yes	Yes	Yes	Yes

IO Stock market response to environmental news

This table reports DID regression estimates of the effect of index additions on the market reaction to environmental news obtained from RepRisk. Models 1 and 4 to 8 look at all events. Model 2 only examines "novel" events, defined as the newness of the issues addressed for the firm, i.e., whether it is the first time a firm is exposed to a specific issue in a given location, while Model 3 looks at "sharp" events, excluding unsharp risk incidents where the firm is mentioned but the criticism is complex or not precisely defined. Announcement returns are computed using a 250 trading-day estimation window ending one month prior to the announcement date. We estimate a market model using the FTSE All-World Index as the benchmark. We measure CARs over the trading-day windows surrounding the announcement date ($t = 0$) listed in the column titles. The sample is limited to the [-3,3] window. *Treated* equals one for firms added to an equity index and zero otherwise. *Post* equals one for firm-years after the index launch. Control firms have similar characteristics but are not added to an index. Continuous variables are winsorized at the 1st and 99th percentiles. All variables are defined in Appendix A. t-statistics, clustered by index event, are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
RepRisk Event Type	All	Novel	Sharp			All		
Event Window (days)	[-1,2]	[-1,2]	[-1,2]	[-1,1]	[-2,2]	[-1,3]	[-3,3]	[-5,-3]
Dep. Variable	Environmental Announcement CAR							
Treated × Post	-0.004	-0.019	-0.219	0.161	0.095	0.211	-0.153	-0.253
	(-0.01)	(-0.04)	(-0.43)	(0.29)	(0.26)	(0.60)	(-0.26)	(-0.78)
Obs.	13,231	8,005	8,578	13,231	13,231	13,231	13,231	13,231
Nr. of Treated Firms	12,026	7,140	7,877	487	487	487	487	487
Nr. of Events	50	50	48	50	50	50	50	50
Adj. R-squared	0.10	0.15	0.10	0.09	0.11	0.10	0.11	0.07
Mean of Dep. Variable	-0.01	0.02	-0.11	-0.06	-0.02	-0.06	-0.03	-0.03
Size Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Event × Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Event × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

IP Index addition and components of the Sustainalytics E-Score

This table reports DID regression estimates of the effect of index addition on environmental performance, measured using the first-level Sustainalytics E-Score components (1.1, 1.2,...) not included in Table 9. The sample is restricted to the [-3,3] window. *Treated* equals one for firms included in an equity index and zero otherwise. *Post* equals one for firm-years after the index launch. Control firms have similar characteristics but are not added to an equity index. Continuous variables are winsorized at the 1^{st} and 99^{th} percentiles. All variables are defined in Appendix A. t-statistics based on clustered standard errors by index event are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Treated × Post	N	Adj. R-squared	Nr. of Events
Environmental Policy	0.047 (1.78)	15,589	0.813	55
Environmental Management System (EMS)	0.054* (2.09)	15,589	0.879	55
Environmental Fines and Penalties	-0.001 (-0.15)	15,589	0.947	55
CDP Participation	0.073 (1.84)	15,589	0.768	55
Scope of GHG Reporting	0.028* (2.51)	15,589	0.824	55
Carbon Intensity	0.012 (0.72)	15,589	0.739	55
Carbon Intensity Trend	0.040* (2.04)	15,589	0.668	55
Operations Incidents	-0.056 (-1.65)	15,589	0.972	55
Environmental Supply Chain Incidents	-0.022 (-1.95)	15,589	0.978	55
Product and Service Incidents	-0.032 (-0.88)	15,589	0.948	55

IQ Index addition and firms' investment policies using a larger sample of index events

This table reports DID regression estimates of the impact of index addition on firm investment using a wider sample of index creation events, which, unlike the main sample, does not require the availability of environmental data from Sustainalytics. Model 1 and 2 examine capital expenditures and R&D spending relative to assets. Models 3 and 4 focus on selling, general, and administrative expenses (SG&A) over assets and the natural logarithm of assets. The sample is limited to the [-3,3] window. *Treated* equals one for firms added to an equity index and zero otherwise. *Post* equals one for firm-years after the index launch. Control firms are matched based on total assets with a caliper of 0.05, but are not included in an equity index. Continuous variables are winsorized at the 1st and 99th percentiles. Variable definitions are provided in Appendix A. t-statistics, based on standard errors clustered by index event, are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1) Capex	(2) R&D	(3) SG&A	(4) Log Assets
Treated × Post	0.009***	0.003***	0.002	0.039***
	(5.41)	(2.66)	(0.77)	(4.30)
Obs.	74,064	77,419	65,016	75,235
Nr. of Treated Firms	4,371	4,397	3,842	4,380
Nr. of Events	169	169	169	169
Adj. R-squared	0.56	0.59	0.88	0.98
Size Control	Yes	Yes	Yes	Yes
Event × Firm FE	Yes	Yes	Yes	Yes
Event × Year FE	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes
Country × Year FE	Yes	Yes	Yes	Yes

IR Firm visibility around index events

This table reports DID estimates of the effect of index inclusion on firm visibility. The dependent variables are the log number of analysts following the firm (Models 1 and 2); an indicator for any non-environmental incident in a given year (Model 3); the total number of incidents (Model 4); and, conditional on at least one report, the number of low-reach incidents (Model 5) and low severity incidents (Model 6). Models 1 and 3 are estimated using OLS, while Models 2 and 4–6 use Poisson regressions. The sample is restricted to $[-3, 3]$ event window. *Treated* equals one for firms added to an equity index and zero otherwise. *Post* equals one for firm-years after the index launch. Control firms are matched on observable characteristics but are not included in the index. Continuous variables are winsorized at the 1^{st} and 99^{th} percentiles. All variables are defined in Appendix A. t-statistics based on clustered standard errors by index event are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	I/B/E/S	RepRisk: Extensive margin		RepRisk: Intensive margin	
	(1)	(2)	(3)	(4)	(5)
	Ln(Nr. of Analysts)	Any Incidents Dummy	Number of Incidents	Number of Low Reach Incidents	Number of Low Severity Incidents
Treated × Post	-0.012	0.024	0.120	-0.020	0.038
	(-0.79)	(0.41)	(0.70)	(-0.18)	(0.26)
Obs.	12,828	10,585	8,837	4,541	5,218
Nr. of Treated Firms	885	778	691	477	550
Nr. of Events	49	46	45	35	40
Adj. R-squared	0.91	0.55			
Pseudo R-Squared			0.82	0.58	0.76
Mean of Dep. Variable	0.53	0.53	5.08	2.53	5.73
Size Control	Yes	Yes	Yes	Yes	Yes
Event × Firm FE	Yes	Yes	Yes	Yes	Yes
Event × Year FE	Yes	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes	Yes
Country × Year FE	Yes	Yes	Yes	Yes	Yes

IS Engagement around index events

This table reports DID regression estimates of the effect of index addition on shareholder engagement. The dependent variables are the share of E-related proposals among all proposals, the share of shareholder-sponsored E-proposals, the share of votes aligned with management, and the share of accepted proposals. The sample is restricted to the [-3,3] window. *Treated* equals one for firms included in an equity index and zero otherwise. *Post* equals one for firm-years after the index launch. Control firms have similar characteristics but are not added to an equity index. Continuous variables are winsorized at the 1st and 99th percentiles. All variables are defined in Appendix A. t-statistics based on clustered standard errors by index event are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1) Share E-Proposals [%]	(2) Share Shareholder Sponsored E-Proposals [%]	(3) Share Aligned Votes [%]	(4) Share Accepted Votes [%]
Treated × Post	-0.0555	-0.0634	0.9827	-0.5604
	(-1.17)	(-1.64)	(1.05)	(-0.74)
Obs.	15,589	15,589	15,589	15,589
Nr. of Treated Firms	988	988	988	988
Nr. of Events	55	55	55	55
Adj. R-squared	0.27	0.42	0.89	0.88
Mean of Dep. Variable	0.07	0.04	71.23	85.29
Size Control	Yes	Yes	Yes	Yes
Event × Firm FE	Yes	Yes	Yes	Yes
Event × Year FE	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes
Country × Year FE	Yes	Yes	Yes	Yes

IT Announcement returns around index events

The table reports the effect of index addition on cumulative abnormal returns (CARs) around index announcements. Announcement returns are computed using a 250 trading-day estimation window ending one month prior to the announcement date. We estimate a market model using the FTSE All-World Index as the benchmark. We measure CARs over the trading-day windows surrounding the announcement date ($t = 0$) listed in the column titles. *Treated* equals one for firms added to an equity index and zero otherwise. Control firms are matched based on similar characteristics but are not included in an equity index. Variable definitions are provided in Appendix A. t-statistics, based on standard errors clustered by index event, are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Event Window (days)	[0,0]	[-1,1]	[-1,2]	[-1,3]	[-2,2]	[-3,3]	[-5,-3]
Dep. Variable	Index Announcement CAR						
Treated	0.112	0.349*	0.298	0.436**	0.483**	0.545**	-0.001
	(0.82)	(1.85)	(1.61)	(2.15)	(2.24)	(2.27)	(-0.24)
Obs.	2,467	2,467	2,467	2,467	2,467	2,467	2,467
Nr. of Firms	1,199	1,199	1,199	1,199	1,199	1,199	1,199
Nr. of Events	55	55	55	55	55	55	55
Adj. R-squared	0.36	0.36	0.35	0.35	0.39	0.41	0.49
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

IU Index addition and firm betas

This table reports DID regression estimates of the effect of index addition on firm betas. The sample is limited to the [-3,3] window. We calculate the beta between each newly included firm's stock returns and the returns of the remaining index constituents (excluding the added firm). For each index event, we limit the sample of index constituents to those observable in our data. Pre-inclusion betas are estimated using daily data for the 12, 13-24, or 25-36 months ending 30 days before inclusion, and post-inclusion betas using the 12, 13-24, or 25-36 months starting 30 days after, thereby avoiding contamination from announcement effects. We repeat the analysis using weekly data. We trim betas at the 5^{th} and 95^{th} percentiles and exclude firms with fewer than three index constituents. *Treated* equals one for firms included in an equity index and zero otherwise. *Post* equals one for firm-years after the index launch. Control firms have similar characteristics but are not added to an equity index. Continuous variables are winsorized at the 1^{st} and 99^{th} percentiles. All variables are defined in Appendix A. t-statistics based on clustered standard errors by index event are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)
Window (years)	[-1,1]	[-3,3]	[-1,1]	[-3,3]
Dep. Variable	Daily Beta		Weekly Beta	
Treated × post	0.079	0.047**	0.093**	0.038***
	(1.68)	(2.62)	(2.13)	(2.98)
Obs.	3,974	10,905	3,894	10,850
Nr. of Treated Firms	826	954	815	957
Nr. of Events	37	39	37	39
Adj. R-squared	0.82	0.74	0.64	0.55
Size Control	Yes	Yes	Yes	Yes
Event × Firm FE	Yes	Yes	Yes	Yes
Event × Year FE	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes
Country × Year FE	Yes	Yes	Yes	Yes

IV Financial constraints around index events

This table reports DID regression estimates of the effect of index addition on the Sustainalytics E-Score, including triple interactions of the DID term with firm-level measures of financial constraints, which are centered at the mean and observed in $t-1$. The sample is restricted to the [-3,3] window. *Treated* equals one for firms included in an equity index and zero otherwise. *Post* equals one for firm-years after the index launch. Control firms have similar characteristics but are not added to an equity index. Continuous variables are winsorized at the 1st and 99th percentiles. All variables are defined in Appendix A. t-statistics based on clustered standard errors by index event are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	SA		WW		KZ	
Dep. Variable	SA Index	E-Score	WW Index	E-Score	KZ Index	E-Score
Treated × Post	0.003*	2.344***	-0.000	2.844***	0.690	2.034***
	(1.74)	(5.31)	(-0.26)	(3.92)	(0.56)	(3.90)
SA Index$_{t-1}$ × Post		2.252				
		(1.44)				
SA Index$_{t-1}$ × Treated × Post		0.940				
		(0.48)				
WW Index$_{t-1}$ × Post				3.116*		
				(1.81)		
WW Index$_{t-1}$ × Treated × Post				-1.967		
				(-0.40)		
KZ Index$_{t-1}$ × Post						0.005
						(0.59)
KZ Index$_{t-1}$ × Treated × Post						-0.001
						(-0.09)
Obs.	15,456	15,346	11,930	12,704	12,602	12,733
Nr. of Treated Firms	987	982	923	800	840	822
Nr. of Events	55	52	51	44	50	49
Adj. R-squared	0.99	0.91	0.81	0.91	0.91	0.91
Mean of Variable	-3.63	0.03	-0.45	-0.00	-12.80	-0.21
Size Control	Yes	Yes	Yes	Yes	Yes	Yes
Event × Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Event × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country × Year FE	Yes	Yes	Yes	Yes	Yes	Yes