

# Which institutional investors drive corporate sustainability?\*

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## Abstract

Many institutional investors publicly commit to some form of responsible investment. This raises concerns about the credibility of such claims. We use participation in collaborative engagements to identify “Leaders”, i.e., institutional investors that are truly committed to improving firms’ sustainability outcomes. Despite owning only 2.2% of the average firm, Leaders alone explain the positive relationship between institutional ownership and firms’ environmental and social performance. In line with committed owners facilitating corporate change, engagement campaigns are successful only when targeted firms are substantially owned by Leaders. We also find that these firms are less at risk of experiencing negative incidents.

**JEL Classifications:** F39, G23, G32, G40

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# 1 Introduction

Environmental and social (E&S) concerns are playing an increasingly important role in discussions about the appropriate objective of firms (Hart and Zingales, 2017). As a consequence, investors, policymakers, and activists call for institutional investors to make the firms they invest in more sustainable.<sup>1</sup> Several studies suggest that institutional ownership (IO) indeed drives corporate sustainability (Dyck, Lins, Roth, and Wagner, 2019; Chen, Dong, and Lin, 2020). What is less clear, however, is *which* institutions drive this association and *how* these improvements occur. Having this information would allow investors looking to generate a positive societal impact to allocate assets more effectively.

Our paper argues that not all institutional investors are made equal: A small group of investors – which we call “Leaders” – are alone responsible for the positive link between institutional ownership and firms’ sustainability performance. Different from other institutions, Leaders demonstrate a strong commitment to sustainability by taking the lead role in collaborative engagements organized by the Principles for Responsible Investing (PRI).<sup>2</sup>

We identify two channels through which Leaders improve firms’ E&S outcomes: direct engagement and incident prevention.<sup>3</sup> Engagements are effective in improving the sustainability performance of firms, but only for those firms that have ex-ante a sizeable institutional ownership stake by Leaders. These firms also exhibit a smaller likelihood of experiencing negative incidents – particularly when they have already experienced incidents in the past. Therefore, having Leaders as shareholders appears instrumental in nudging firms towards more sustainable business practices.

The main contribution of our paper is to show that the positive effect of institutional

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<sup>1</sup>See respectively Bauer, Ruof, and Smeets (2020), EU (2021), and Reuters (2019) for examples where clients, policymakers, and climate activists call for institutional investors to up sustainability commitments.

<sup>2</sup>The PRI is the largest investor association whose aim is to improve the sustainability performance of its signatories. For the purpose of this paper, we make use of data from their collaborative engagement platform. We describe this in more detail in the next section of the paper.

<sup>3</sup>We focus on engagements because prior literature has shown them to be effective measures to change firm behavior (Dimson, Karakaş, and Li, 2015, 2021; McCahery, Sautner, and Starks, 2016). We refrain from analyzing shareholder voting since such data is only available for a small set of countries, and in many cases, is self-reported. Incidents are telling as they represent *tangible* realizations of poor E&S practices.

ownership on firms’ environmental and social performance hinges on a small group of investors. In line with recent survey evidence (Krueger, Sautner, and Starks, 2020), we argue that some institutional investors are more committed to sustainability than others. This can be due to pecuniary or non-pecuniary reasons (Hartzmark and Sussman, 2019; Riedl and Smeets, 2017), clientele effects (Ceccarelli, Ramelli, and Wagner, 2021b), or a mixture of these.

Measuring the degree of investors’ ambition for sustainability is challenging because self-reported data is unreliable. Suppose institutional investors believe it is desirable to signal a strong commitment to sustainability, but a genuine commitment is costly. As a result, some institutions will have an incentive to engage in cheap talk when the cost of untruthful signaling is low (Ross, 1977). This is particularly likely in our setting as sustainability reporting is usually voluntary, unstandardized, and unaudited.

A similar consideration applies to the *revealed preferences* of investors through their portfolio holdings (Gibson, Krueger, and Mitali, 2020; Starks, Venkat, and Zhu, 2020). First, asset allocation decisions might be driven by a number of factors other than investors’ commitment to sustainability. Second, keeping risk and return expectations constant, ownership of sustainable firms in itself is not costly (Lindsey, Pruitt, and Schiller, 2021). To identify investors that are truly committed to sustainability, we need an expensive, and thus credible, signal (Spence, 1973). Participating in collaborative engagements is such a signal of commitment because it requires significant effort and responsibility from investors (Dimson et al., 2021).<sup>4</sup>

We call “Leaders” institutions that lead collaborative engagements during a given year; to make sure that the signal is not a one-off, Leaders also need to support at least another collaborative engagement during a given year. In support of our definition, Leaders also stand out in other ways of responsible ownership, like filing and voting in favor of environ-

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<sup>4</sup>Moreover, in line with Broccardo, Hart, and Zingales (2020) and Berk and van Binsbergen (2021), we expect “voice” to be effective in driving E&S improvements, unlike a strategy based purely on selection or exclusion.

mental and social shareholder proposals or pursuing individual firm engagements outside the engagements organized by the PRI.

We divide the remaining institutional investors into two groups: *Non-Leaders* and *Conventional*. The former are institutions that do not qualify as Leaders but are still signatories of the Principles for Responsible Investment. The latter are the remaining institutional investors. At the start of our sample period in 2010, we classify 26 investors as Leaders. This number gradually increases to reach 109 in the last sample year of 2019. Our definition is very persistent over time, with almost 95% of the Leaders retaining their classification year-over-year.

After dividing institutional investors into three groups along their commitment to sustainability, we want to establish their relative effect on the environmental and social performance of firms in our sample. To this end, we first obtain the global holdings of institutional investors from FactSet (formerly Lionshares). Then, for each firm-year, we compute institutional ownership measures separately for Leaders, Non-Leaders, and conventional investors. Our main measures of firms' sustainability performance, "E&S Consensus Scores," are averages of the normalized ratings from MSCI IVA, Sustainalytics, and Refinitiv (formerly Asset4). We complement this ESG data with incident data from RepRisk.

In our first set of regressions, we examine the role of Leaders in explaining the association between institutional ownership and firms' environmental and social performance. We regress E&S Consensus Scores on our three lagged institutional ownership variables (*IO Leaders*, *IO Non-Leader*, and *IO Conventional*) and a set of controls and fixed effects. We find that greater ownership by Leaders is significantly associated with higher firm-level E&S scores; ownership by other institutional investors – even PRI signatories – is not. This result is striking given the small size of Leaders, which hold only 2.2% of the average company.

This finding is also economically meaningful: A one standard deviation increase in Leader ownership is associated with an increase in E-Scores (S-Scores) of 7.5 (5.8) percent of a standard deviation.

We perform a battery of robustness tests. In our main specifications, we require firm-year observations to have E&S Scores from a minimum of two rating agencies to reduce noise (Berg, Koelbel, and Rigobon, 2019). Our results are robust when we use both more lenient and stricter Consensus Scores. Moreover, the findings are consistent when we look at each rating agency individually, examine ownership changes instead of levels, run the regressions separately by region, or exclude financial institutions from the sample.

After establishing a positive relationship between institutional ownership by Leaders and firms' sustainability performance, we ask *how* this association occurs. We start by examining the role of Leaders in the context of collaborative engagements organized by the PRI. In PRI collaborative engagements, firms are targeted on specific themes related to sustainability, such as fracking or labor standards. If Leaders drive corporate sustainability, then collaborative engagements should improve the sustainability performance of targeted companies more when pre-existing ownership by Leaders is high. This is exactly what we find.

We estimate our results using a difference-in-differences (DID) setting with matching. To construct a control group, we first perform exact matching on region, industry, and year. Then, we choose the control firm by nearest neighbor propensity score matching (PSM) along firm characteristics.

In the years after being engaged, targeted firms significantly improve their environmental performance, but only when ownership by Leaders is high. Hence, institutional investors that are committed to sustainability play a catalyzing role in improving firms' sustainability outcomes.<sup>5</sup>

Finally, we test the influence of Leaders in preventing environmental and social incidents as an alternative measure of corporate sustainability.<sup>6</sup> We find that ownership by Leaders is

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<sup>5</sup>We do not find significant results for firms' social performance. This is probably driven by the limited number of collaborative engagements that focus on social issues: The firms specifically engaged on the social dimension represent only 7% of the entire population of 1,238 company engagements.

<sup>6</sup>Several papers argue that reputation-damaging incidents in the E&S domains constitute an outcome-driven and perhaps more direct indicator of corporate sustainability. Some examples include Derrien, Krueger, Landier, and Yao (2021), Gantchev, Giannetti, and Li (2021), Glossner (2021), and Yang (2021).

associated with a significantly lower likelihood of a firm experiencing environmental incidents. This effect becomes even more pronounced for firms that have already experienced an incident in the past. We document that this association does not exist for ownership by the other institutional investors. Moreover, after incidents occur, institutional investors who are not part of the PRI tend to divest from affected companies. Leaders, on the other hand, tend to remain invested, reducing endogeneity concerns.

While collaborative engagements and incident prevention constitute two ways through which Leaders affect firm-level E&S outcomes, they do not fully explain our baseline association between institutional ownership by Leaders and firms' E&S performance. Ownership by Leaders is also significantly linked to corporate sustainability for firms that were never targeted by a PRI collaborative engagement and irrespective of their incident history. Therefore, we argue that parts of the effect relate to unobservable factors such as private behind-the-scenes engagement activity ([McCahery et al., 2016](#)).

Identifying investors who “walk the talk” on responsible ownership is especially important today, as more than half of institutional investors by assets publicly commit to responsible investing ([Brandon, Glossner, Krueger, Matos, and Steffen, 2021](#)). This prevalence raises questions about the credibility of these commitments; therefore, recognizing active investors' real intentions and actions becomes more critical than ever. We argue that our selection measure based on engagement allows deriving a set of investors that exhibit superior practices across the full spectrum of responsible ownership.

Our paper makes two contributions to the literature. First, we contribute to the studies of the role of institutional ownership on firm behavior (see, e.g., [Edmans and Holderness \(2017\)](#) for a literature overview), in particular regarding firms' sustainability performance. [Dyck et al. \(2019\)](#) and [Chen et al. \(2020\)](#) find a positive relationship between institutional ownership and firms' environmental and social performance. We add to these papers by showing that only a small portion of institutional investors, the Leaders, is primarily accountable for this relation.

Our second contribution is to the stream of papers that advocate for a more nuanced understanding of the effect of institutional ownership on firm-level E&S outcomes. The two most closely related to ours in this literature are [Azar, Duro, Kadach, and Ormazabal \(2021\)](#) and [Heath, Macciocchi, Michaely, and Ringgenberg \(2021\)](#). [Azar et al. \(2021\)](#) explore the impact of ownership by the “Big Three” (BlackRock, Vanguard, and State Street) on firms’ CO<sub>2</sub> emissions. Different from their paper, we focus on the entire universe of global institutional investors. [Heath et al. \(2021\)](#) show that there is *no* causal link between an exogenous increase in ownership by socially responsible mutual funds and a broad range of firms’ sustainability metrics. We take a different approach to demonstrate that ownership by Leaders matters. Namely, we highlight concrete instances where the presence of investors that are committed to sustainability impacts firms’ outcomes: ensuring that engagements are successful and preventing incidents.

We begin our paper in Section 2 where we provide a detailed outline of our definition of Leaders and a summary of their characteristics. In Section 3, we describe the data we use, how we construct the sample, and our measurement choices. We discuss the link between ownership by Leaders and corporate E&S performance in Section 4. Sections 5 and 6 discuss the importance of Leaders in collaborative engagements and incident prevention. A discussion about selection and voice is provided in Section 7, and Section 8 concludes.

## 2 Identifying sustainability Leaders

Our definition of Leaders aims to objectively identify investors with a strong commitment to corporate sustainability. Section 2.1 describes how we identify these investors. Section 2.2 then presents summary statistics and the geographical distribution of Leaders compared to other institutional investors. Section 2.3 show that our definition is consistent with other signals of commitment towards sustainability.

## 2.1 Defining Leaders – The role of collaborative engagements

To identify Leaders, we rely on proprietary data from the Principles for Responsible Investment (PRI). The PRI is an UN-supported investor association that seeks to “support and empower” signatories to incorporate sustainability in their investment practices. As of 2021, more than 4,300 investors that manage over \$120 trillion in assets are PRI signatories, representing more than half of the institutional assets under management (AUM) globally (Brandon et al., 2021). Given the extensive coverage of the PRI, we argue that this setting grants us information about most sustainability-conscious institutional investors in the world.

One of the main functions of the PRI is to organize collaborative engagements. In collaborative engagements, investors form a coalition on a specific Environmental, Social, or Governance theme and target focal companies to improve their sustainability in the respective domain. The PRI operates the largest platform for collaborative engagements globally, with 45 engagement campaigns organized in the 2007–2020 period. Each engagement campaign is originated and coordinated by the PRI, which selects the theme of the engagement. PRI signatories can subsequently join the engagement as leaders or supporters, where leaders bear the primary responsibility for the campaign.<sup>7</sup>

We use involvement in collaborative engagements as a selection criterion for Leaders, as it constitutes an objective and credible signal of commitment to sustainability: Engagement campaigns require substantial costs and resources from investors – especially when leading the campaign (Dimson et al., 2021). Finally, we require Leaders to lead *and also support* collaborative engagements to focus on investors whose commitment is not a one-off event.<sup>8</sup> Figure 1 presents a schematic illustration of our Leader definition. In this example, the institutional investor  $\beta$  is the only Leader, as she both supports and leads engagements in

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<sup>7</sup>See Dimson et al. (2021) for a detailed study of the characteristics of PRI collaborative engagements.

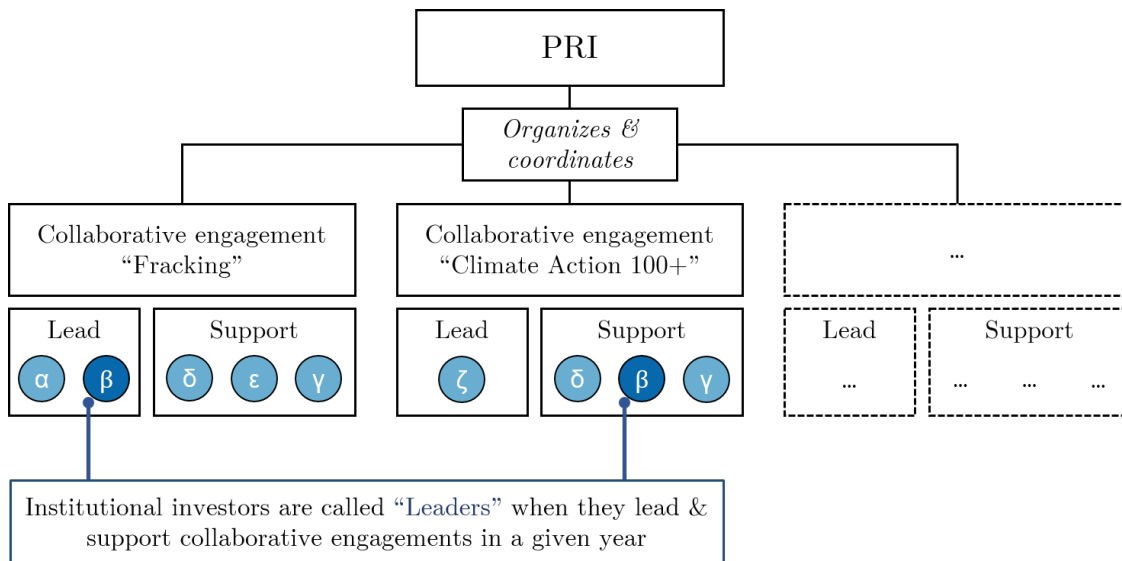
<sup>8</sup>A central reason for this additional requirement is the largest engagement in our sample, *Climate Action 100+*. This engagement was co-led by a large number of institutional investors with no collaborative engagement activity beyond this singular event.



the respective year.

**Figure 1: Definition of Leaders**

This figure provides a schematic overview of how institutional investors that qualify as Leaders are identified in the sample. This figure shows a cross-sectional snapshot of engagements ongoing during one year. Greek letters denote exemplary institutional investors. In this illustration,  $\beta$  is the only Leader.



We choose a definition based on engagement, as opposed to portfolio holdings, since recent literature has questioned the impact of approaches based on screening for the change of firms’ E&S behavior. Related studies argue that a strategy based on “voice” will be more effective than one based on “exit” (Berk and van Binsbergen, 2021; Broccardo et al., 2020). Moreover, the choice of which firms to hold is complex and driven by several factors, including aspects other investors’ sustainability commitment. Disentangling commitment from factors such as risk-return considerations is challenging and possibly noisy. Furthermore, we refrain from using voting in shareholder meetings as data on a global level is not extensively available.<sup>9</sup>

<sup>9</sup>Proxy Insights provides voting information for a sample of international institutional investors. However, disclosing voting records is voluntary in most countries outside of the U.S. Thus, using such data in our classification of Leaders would introduce selection bias.

## 2.2 Who are the Leaders?

Figure 2 below shows how the group of Leaders evolved over time. In the first quarter of the sample, about 25 institutional investors qualify as Leaders, and this number grows to more than 105 in the last quarter. In 2019, Leaders held a combined \$3.5 trillion in listed equity AUM, 15.1% of the total equities held by PRI signatories.

Most Leaders come from Europe or North America. Investors from other geographies rarely qualify as Leaders. Over the 2009–2019 sample period, the number of Leaders and their AUM has steeply increased, consistent with the growing prevalence of coordinated ESG engagement activity. Still, as shown by Panel (c) of Figure 2, the average firm-level equity ownership by Leaders is relatively low at 2.2% over the full sample period, slightly increasing to 2.9% in 2019.

Table 1 shows summary statistics for institutional investors that are PRI signatories, separately by Leaders and Non-Leaders. Compared to other PRI signatories, Leaders are smaller on average. However, median AUM is *larger*, pointing out that the largest institutional investors rarely qualify for our Leaders definition. The statistics are consistent with very large investors engaging firms individually. The average Leader joined the PRI in 2009, two years earlier than other signatories. Similar to other PRI signatories, 82% of Leaders are investment managers, while the remaining are asset owners.<sup>10</sup>

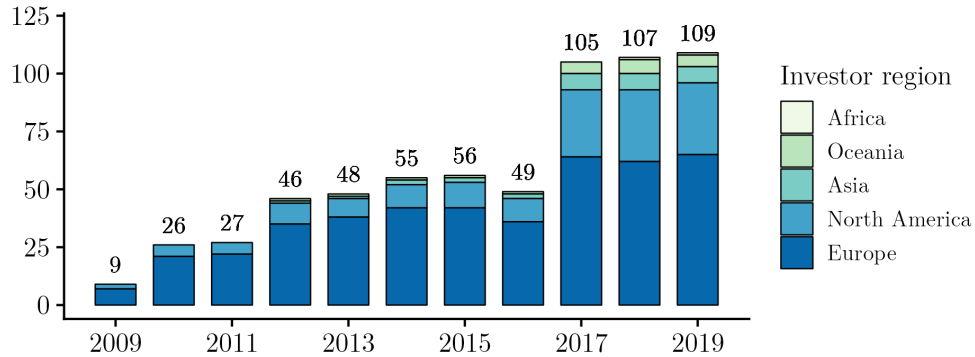
Table A3 shows that our Leader’s definition is consistent over time. In most years, more than 90% of Leaders retain their Leader classification also in the following year.

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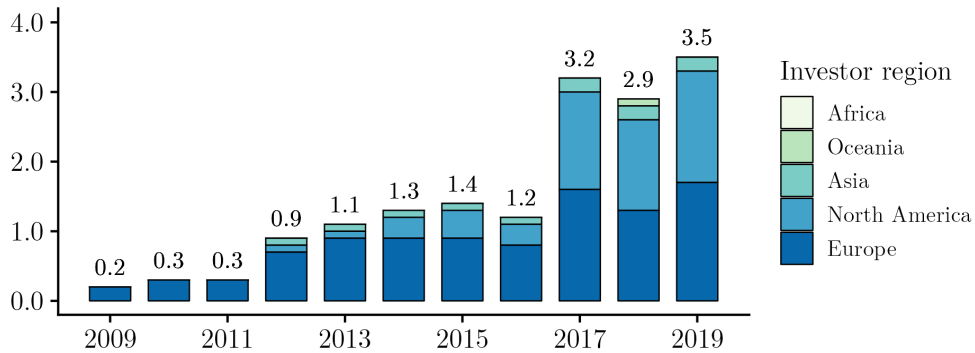
<sup>10</sup>Besides asset owners and investment managers, also service providers like rating agencies or firms offering proxy voting services can join the PRI. We do not use these firms since they do not manage assets by themselves.

## Figure 2: Prevalence of Leaders over time

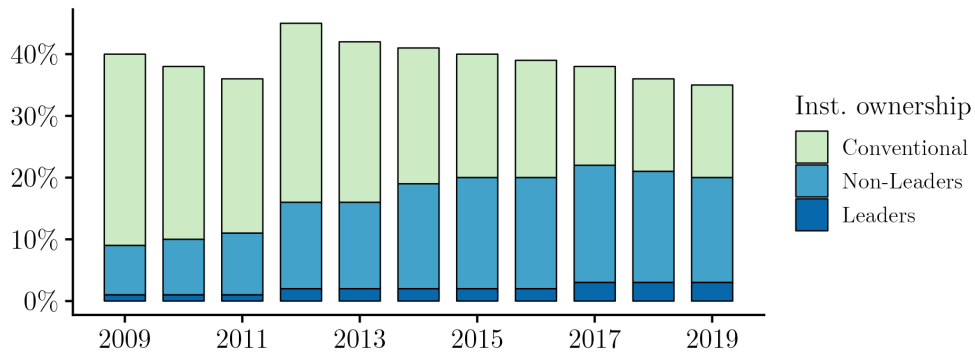
This figure illustrates how the sample of institutional investors that qualify as Leaders evolves over time. Panels (a) and (b) summarize the number of PRI Leaders and their size measured by the total listed equity AUM. Panel (c) shows the average institutional ownership of firms in our sample by year and investor group. Non-Leaders denote PRI signatories that do not qualify as Leaders. Conventional institutions are those that are not PRI signatories. Institutional ownership in figures (b) and (c) is calculated based on FactSet Ownership. Institutional ownership variables are defined in Appendix A1.



(a) Number of Leaders by year and investor region



(b) AUM of Leaders by year and investor region (in \$ trillion)



(c) Average firm-level institutional ownership breakdown by year

We observe a significant spike in the number of Leaders in the years 2017–2019. This increase coincides with the largest collaborative engagement in our sample, “Climate Action 100+” (FT, 2017). Given its large size, we argue that participation in “Climate Action 100+” is cheaper for the marginal investor, similar to a decreasing cost of monitoring with increasing stake size (Shleifer and Vishny, 1986). We make use of this feature in a later section of the paper.<sup>11</sup>

– Table 1 –

## 2.3 Validating the Leaders definition

While we rely on collaborative engagements to identify Leaders, these investors also stand out in other aspects of responsible ownership. Figure 3 below compares different ownership practices for Leaders and other PRI signatories.

Using Proxy Insights data, we summarize investors’ voting behavior in Panels A and B. Leaders are more likely to support environmental and social shareholder proposals in all sample periods. Moreover, according to the annual reporting & assessment (R&A) framework sent out by the PRI,<sup>12</sup> Leaders self-report a three times higher likelihood of filing shareholder proposals and also engage with a higher number of firms individually (Panels C and D). Based on investors’ responses, the PRI also awards scores on how committed to sustainability institutions are. Signatories can receive scores ranging from A+ (6) to E (1). As Panels E and F illustrate, Leaders consistently outperform other signatories, both in the “Listed Equity Active Ownership” and “Strategy & Governance” modules.

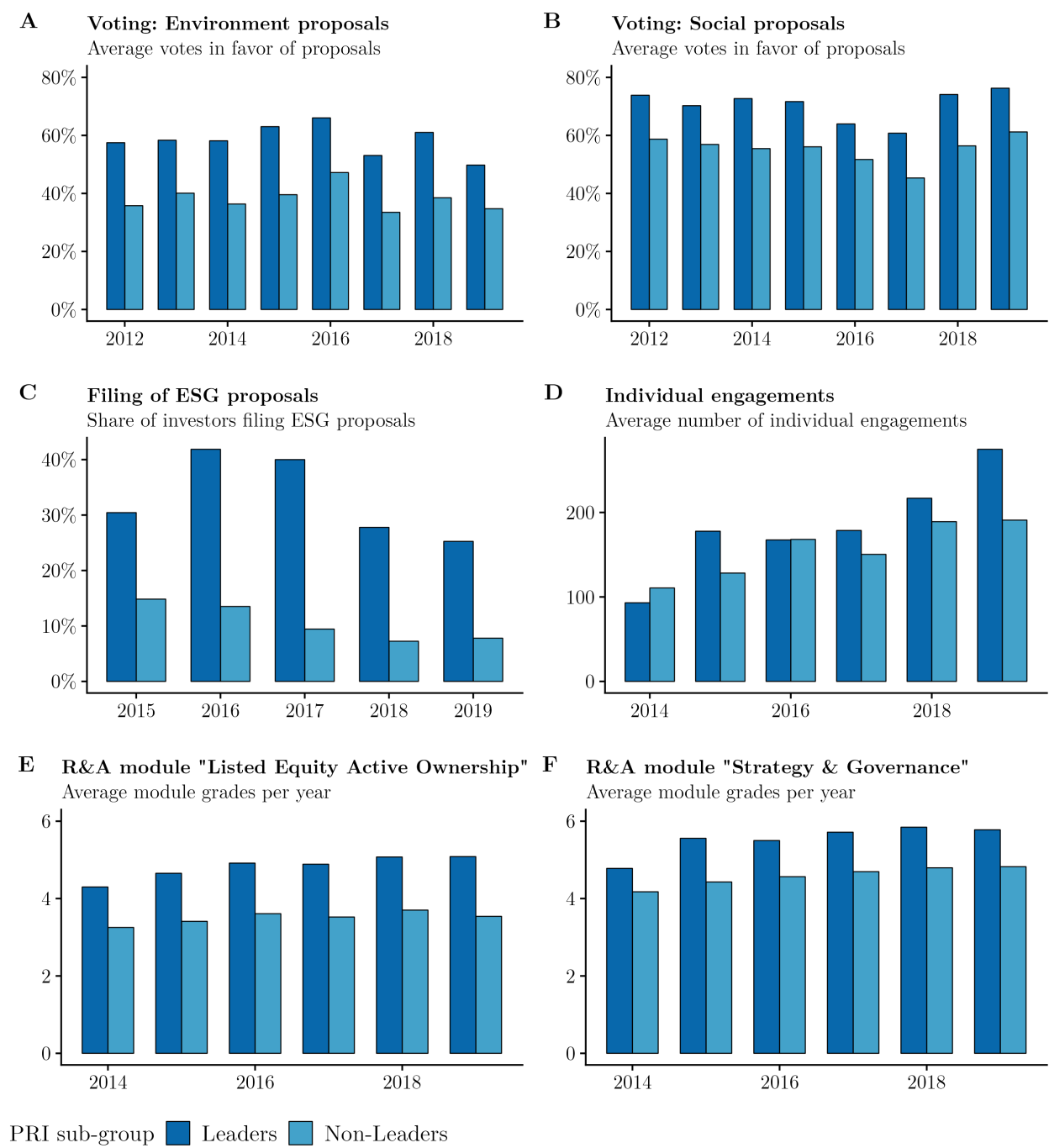
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<sup>11</sup>Note that after the launch of Climate Action 100+, our marginal Leader changes. Beforehand, some institutions were on the margin of joining a collaborative engagement but arguably did not do so due to high costs. Since in the Climate Action 100+ campaign, engagement costs are spread over a greater pool of participants, the marginal investor is more likely to choose to engage.

<sup>12</sup>PRI signatories must fill out a yearly survey describing their sustainable investing practices. This survey covers several modules, each relating to a specific asset class and investing practice. The PRI then gives investors scores as a function of the answers to the survey. For a more detailed description of the Reporting & Assessment framework, see Brandon et al. (2021) and Ceccarelli, Glossner, and Homanen (2021a).

### Figure 3: Summary of ownership practices: Leaders & other PRI signatories

This figure illustrates the ownership practices of Leaders and other PRI signatories during the sample period. Data for Panels A and B come from Proxy Insights; data for Panels C–F comes from the PRI Reporting & Assessment (R&A) framework and is self-reported. R&A grades are calculated by the PRI and express the performance of a signatory in the respective module. Higher grades represent better performance. The figures show years where at least 20 observations are available per Leader/Non-Leader subgroup.



Finally, we also compare our list of Leaders with a third-party approach to identifying investors with a high commitment to corporate sustainability. In May 2021, the Morningstar ESG Commitment Level report ([Morningstar, 2021](#)) rated asset managers based on a qualitative analyst assessment.<sup>13</sup> All five of the top-rated equity asset managers by Morningstar are also Leaders, while most of the asset managers rated “low” are neither Leaders nor PRI signatories.

Overall, we argue that our Leaders’ definition is sound: It identifies institutions that perform well across a broad spectrum of ownership practices, and it aligns with alternative approaches to identifying E&S-conscious investors.

### 3 Data

We start this section with an exposition of data sources and sample composition. Section 3.2 shows how the main variable of interest, the environmental and social Consensus Scores, are computed and what controls we include in the main analyses.

#### 3.1 Data sources and sample construction

We start our sample construction with the universe of public firms covered by at least one of the ESG rating providers Sustainalytics, MSCI IVA, and Refinitiv (formerly Asset4).<sup>14</sup> All three rating agencies regularly assess the environmental and social performance of a large number of international firms. When an agency provides more than one firm rating yearly, we keep the most recent one.

We obtain data on institutional ownership from the FactSet Ownership database (formerly LionShares). FactSet collects institutional ownership data worldwide from different public sources, including institutional filings, investor reports, and press releases. Data is at an institutional investor-firm-year level, which allows us to calculate ownership stakes

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<sup>13</sup>Morningstar is a large information provider for mutual fund investors. See, for instance, [Chen, Cohen, and Gurun \(2021\)](#) for an illustrative discussion.

<sup>14</sup>Scores for Refinitiv are as of March 23, 2021. The date of retrieval is relevant, as Refinitiv has a history of retrospectively adjusting its firm ESG ratings ([Berg, Fabisik, and Sautner, 2021a](#)).

separately for different groups of investors. FactSet has been widely used in previous studies (Ferreira and Matos, 2008; Bena, Ferreira, Matos, and Pires, 2017). We complement this with data on company fundamentals from FactSet Fundamentals and data on environmental and social incidents from RepRisk.<sup>15</sup>

Data on collaborative engagements is provided directly by the PRI. The dataset contains all campaigns that occurred between 2009 and 2019. For these campaigns, we know the institution(s) that took the role of leader or supporter, the set of targeted firms, the ESG dimensions that the campaigns seek to improve, and their respective duration.

To be included in our firm sample, we require non-missing data on institutional ownership and company fundamentals, as well as E&S scores from at least one rating agency. The resulting dataset consists of 67,043 firm-years from 11,352 companies between 2009 and 2019. We choose 2009 as the start of our sample as it is the first time investors could lead a collaborative engagement and, consequently, qualify as Leaders.

### 3.2 Measurement choices and descriptive statistics

We measure the sustainability performance of firms through E&S scores from three leading ESG rating agencies: Sustainalytics, MSCI IVA, and Refinitiv. Prior literature has documented a substantial disagreement between E&S ratings across agencies (Berg et al., 2019; Brandon, Krueger, Riand, and Schmidt, 2019) and highlighted the importance of using a *combination* of several E&S scores (Berg, Kölbel, Pavlova, and Rigobon, 2021b).

To mitigate the noise induced by this disagreement, we follow Brandon et al. (2021) and compute average E&S scores for all firm-years in our sample. As rating agencies use different rating scales, we normalize E&S scores per agency every year to a mean of zero and unit variance. We compute the average of all available E&S scores per firm-year in our sample and denote the resulting ratings *Consensus Scores*. Consensus Scores are the

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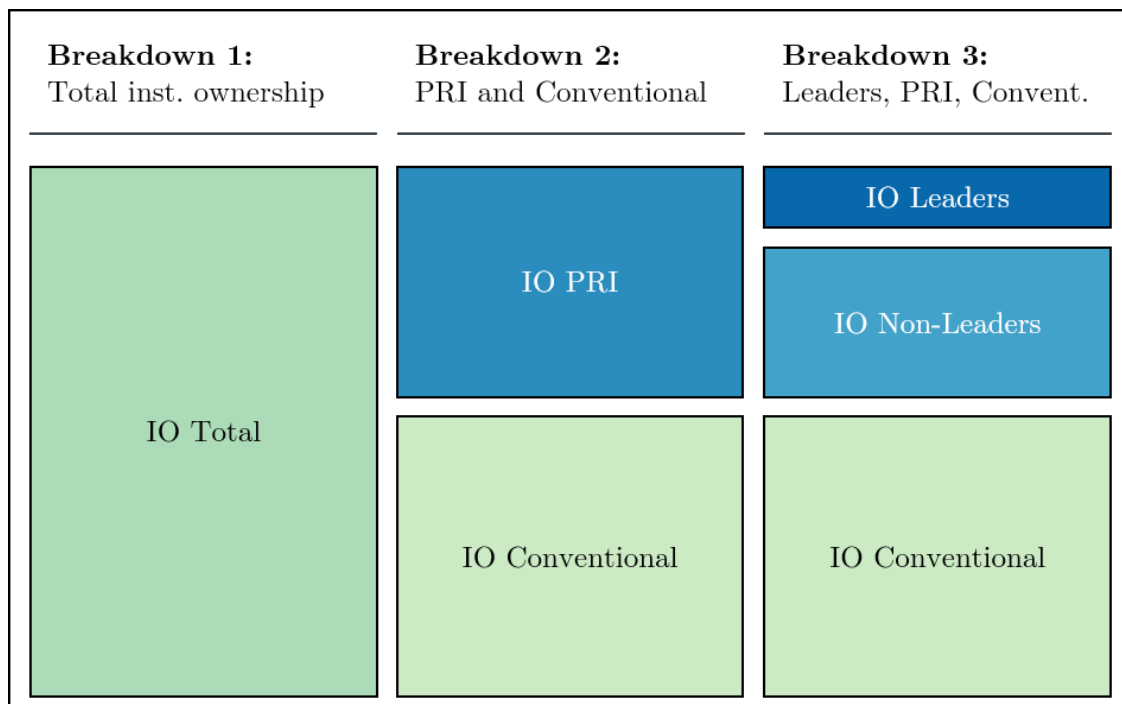
<sup>15</sup>RepRisk is a data provider that identifies ESG incident news by continuously screening more than 100,000 public sources. Identified incidents are reviewed and categorized in a multi-step process and linked to affected companies. See Section 5.1 for a more detailed description of the dataset.

primary dependent variables of this study. “E-Score” and “S-Score” refer to environmental and social performance, respectively. Similar to consensus earning forecasts, we argue that Consensus Scores represent the market view on corporate sustainability and are more reliable than individual ratings. If not stated otherwise, we require Consensus Scores based on at least two agency ratings per firm-year.

We use the FactSet Ownership database to construct variables of institutional ownership. We distinguish between three institutional ownership breakdowns with an increasing degree of granularity. Figure 4 presents a schematic illustration of the ownership breakdowns.

**Figure 4: Schematic breakdown of used institutional ownership variables**

This figure provides a schematic overview of the institutional ownership variables used in this study. Breakdown 1 only accounts for total institutional ownership (IO Total). Breakdown 2 explicitly accounts for ownership by PRI signatories (IO PRI). Breakdown 3 distinguishes PRI ownership further between Leaders (IO Leaders) and other PRI signatories (IO Non-Leaders). All variables are defined in Appendix A1.





Breakdown 1 only accounts for total institutional ownership, while breakdown 2 differentiates between holdings by PRI signatories and conventional investors. Breakdown 3 is the most granular as it divides PRI signatories further into Leaders and Non-Leaders. All three breakdowns collectively add up to total institutional ownership, and all variables of one breakdown are mutually exclusive. Breakdown 3 is the one used most frequently.

To measure ownership, we merge a list of 3,439 PRI signatories to FactSet. We obtain matches for 756 signatories. The low match rate stems from the high share of PRI signatories with no substantial equity holdings; these institutions are not covered in FactSet. We record equity positions as *IO PRI* when held either by a PRI signatory or an institution whose ultimate parent is a signatory. Similarly, we record equity positions as *IO Leaders* when held by a PRI signatory who qualifies as Leader or whose ultimate parent is a Leader.<sup>16</sup>

Our empirical analyses include a vector of firm-level control variables that could influence firms' sustainability performance directly. *Log Assets* is the natural logarithm of total assets in millions of U.S. dollars. The variable controls for the size of business activity and external pressures over environmental and social behavior. *PPE* denotes property, plant, and equipment divided by total assets; *Leverage* represents total debt divided by total assets. PPE and Leverage measure corporate credit constraints and discretion to invest in environmental and social initiatives. *Tobin's Q* is defined as total assets and market value of equity subtracted by the book value of equity, scaled by total assets. *Profitability* is EBITDA divided by total assets. Both variables capture past company performance, which could affect firms' investment in E&S. Detailed variable definitions are in Appendix A1. All continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles to mitigate the effect of outliers.

– Table 2 –

Table 2 presents descriptive statistics for the firm-level variables used in our analyses. Average institutional ownership by Leaders is small at 2.2%, with a standard deviation of

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<sup>16</sup>This definition implies that PRI signatories pass on their signatory status to subsidiaries. In a few instances, both the institution and its ultimate parent have signed the PRI separately. In these cases, the institution's own status applies, and the parent does not pass on the Leader status to its subsidiary.

2.9%. PRI signatories (including Leaders) hold 18.0% of the average firm, while the total average institutional ownership is 38.8%. The statistics are in line with other studies, e.g., [Bena et al. \(2017\)](#) and [Ferreira and Matos \(2008\)](#).

Consensus Scores are, on average, based on ratings from two providers. The table also documents a substantial variety of firm size, leverage, market valuation, and profitability. [Table A2](#) shows the correlations between the variables in our main sample. E/S-Scores are positively correlated with size, profitability, and leverage.

– [Table 3](#) –

[Table 3](#) summarizes the geographical distribution of the firm sample. 32.1% of all observations come from firms headquartered in the United States, followed by Japan and the United Kingdom. Ownership by Leaders varies substantially across regions. It is highest in the United Kingdom and Scandinavian countries and relatively small in Asian countries, such as China, India, and Japan. Institutional ownership by investors other than Leaders is distributed similarly across geographies.

## **4 Ownership by Leaders and corporate E&S performance**

This section starts with testing the empirical relationship between institutional ownership and firms' environmental and social performance. [Subsection 4.1](#) shows that there is a positive relationship between the two, but that it is driven by ownership of the sustainability Leaders. In [Subsections 4.2–4.5](#), we highlight the robustness of this finding. Among others, we show that the results are stronger for firms headquartered in countries with low environmental and social values and we rule out several alternative explanations.

## 4.1 Baseline results

To study the relationship between firms’ environmental and social performance and institutional ownership we run the following OLS regression:

$$E/S\ Score_{i,t} = \alpha + \beta' IO_{i,t-1}^{\theta} + \gamma' X_{i,t-1} + \delta_t + \phi_i + \varepsilon_{i,t} \quad (1)$$

$IO_{i,t-1}^{\theta}$  are the institutional ownership variables for firm  $i$  in year  $t-1$ .  $\theta$  denotes the different ownership breakdowns, as outlined in Section 3.2.  $X_{i,t-1}$  is a vector of time-varying firm controls as outlined in Section 3.2, including size, leverage, capital intensity (PPE), Tobin’s Q, and profitability. Independent variables are lagged by one year to avoid simultaneity bias.  $\delta_t$  are time fixed effects and  $\phi_i$  denotes country and industry fixed effects.<sup>17</sup>  $\varepsilon_{i,t}$  is the error term. We follow Bena et al. (2017) and cluster standard errors at the country level.<sup>18</sup> In robustness analyses, we ensure that the significance of our results does not hinge on the standard error clustering choice.

– Table 4 –

Table 4 shows our baseline regression results. We start our analyses with models 1 and 2, which show a positive, albeit insignificant, correlation between firms’ total institutional ownership and environmental scores. For social scores, this relationship is positive and significant.<sup>19</sup> To obtain a more granular view on institutional ownership, in models 3 and 4 we differentiate between PRI signatories (*IO PRI*) and other institutional investors (*IO Conventional*). The regression coefficients show a positive relationship between sharehold-

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<sup>17</sup>Industry fixed effects are based on SIC industries. We refrain from using firm-fixed effects to ensure sufficient variation in our variables of interest and avoid over-fitting. The empirical model is in line with other papers studying E&S ratings, e.g., Dyck et al. (2019).

<sup>18</sup>We refrain from additionally clustering along the time dimension since our panel is relatively short, and we would not have enough clusters (Abadie, Athey, Imbens, and Wooldridge, 2017).

<sup>19</sup>At first sight, this result contradicts Chen et al. (2020) and Dyck et al. (2019). First, our sample period is different. Second, these papers use E&S scores from Refinitiv (formerly Asset4). Also, Refinitiv has a history of changing its ESG ratings and back-filling the adjusted scores to its database (Berg et al., 2021a). Instead of relying only on one rating agency, we follow the advice of (Berg et al., 2021b) and aggregate scores from several providers.

ings by PRI signatories and firms' E&S performance, each significant at the 1% level. For conventional investors, both coefficients are small and insignificant.

In the last two models, we single out ownership by Leaders, institutional owners that demonstrate a strong commitment to sustainability through their active role in collaborative engagements. We expect Leaders to drive the positive association between institutional ownership and corporate sustainability. Models 5 and 6 confirm this conjecture: After accounting for *IO Leaders* explicitly, there is no significant link between E-Scores and other institutional ownership groups, not even for PRI signatories (*IO Non-Leaders*). This finding is striking, as Leaders own only 2.2% of the average sample firm, a small portion of the total institutional ownership (on average 38.8%). There is a small and marginally significant residual effect of ownership by Non-Leaders on firms' S-Scores.<sup>20</sup>

The association between ownership by Leaders and environmental and social performance is also economically meaningful: A one standard deviation increase in IO Leaders correlates to an increase in E-Scores (S-Scores) of 5.3% (4.9% ) of a standard deviation.

## 4.2 Climate Action 100 +

It seems that Leaders are driving the relationship between firm-level sustainability and institutional ownership, supporting the soundness of our identification mechanism based on participating in collaborative engagements. We argued that this participation is a credible signal as it entails substantial costs to the investors. However, these costs are inversely proportional to the size of the engagement. Keeping overall engagement costs constant, an increase in the pool of participating institutional investors will bring down the costs for the marginal institutional investors (Edmans and Holderness, 2017). We exploit the “Climate Action 100+” (“CA100+”) collaborative engagement as a shock to the size and thus the cost of being a Leader.

Climate Action 100+ is the “largest ever global investor initiative” (Climate Action 100+,

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<sup>20</sup>This relationship is not robust to using alternative Consensus Scores or fixed effects and – as shown in Table A5 – is mainly driven by Asian firms.

2021). For this reason, we argue that participation in this campaign should be relatively less expensive to the marginal investor than other collaborative engagements in our sample. Against this backdrop, we expect the additional, arguably less committed, investors that became Leaders through CA100+ to dilute the *IO Leaders* variable. To test this conjecture, we run two analyses. First, we examine whether the *IO Leaders* coefficient diminishes after 2017 – the period when CA100+ was active – by interacting our IO variables with a *Post 2017* dummy. Second, we decompose our *IO Leaders* variable into ownership by investors that would not be Leaders without CA100+ (*IO CA100+ Leaders*) and all other Leaders (*IO Leaders ex. IO CA100+ Leaders*).

– Table 5 –

Models 1 and 2 of Table 5 present results for the regressions involving the *Post 2017* dummy. We find a significantly negative interaction effect between the *Post 2017* variable and ownership by Leaders. This finding is consistent with a reduction in the average sustainability commitment within the Leaders group after the start of the CA 100+ campaign. Models 3–4 show results for the decomposed *IO Leaders* variables and confirms a dilution of the Leaders group through CA100+. A significantly positive relationship between ownership and corporate sustainability only exists for the investors that would also be Leaders without the CA100+ campaign, but not for the remaining Leaders. Overall, the analysis underlines the soundness of the Leaders definition.

### 4.3 Regressions based on changes

While we cannot fully rule out endogeneity, in this section we perform additional robustness tests that provide circumstantial evidence on the direction of our effects. If our hypothesis holds that institutional ownership by Leaders is associated with improvements in sustainability performance, also *changes* in institutional ownership, particularly in *IO Leaders*, should lead to changes in E&S scores. We test this formally in Table 6, where we focus on changes

rather than levels of institutional ownership. The dependent variables are  $\Delta E/S\text{-Score}$  ( $t-s, t$ ), defined as the change in E/S-Scores from year  $t-s$  to year  $t$ , i.e.,  $\Delta E\text{-Score}_{t-s,t} = E\text{-Score}_t - E\text{-Score}_{t-s}$ . Similarly, the independent IO variables are the change in ownership from year  $t-s-1$  to year  $t-1$ .

– Table 6 –

Table 6 presents the results. Increases in institutional ownership by Leaders are significantly followed by higher environmental and social performance. The results also show that this effect monotonously increases over time as we move from changes over one year to those occurring over four years. This is consistent with the idea that changes in sustainability performance take some time to materialize (Azar et al., 2021). Moreover, changes in none of the other institutional ownership variables are significantly correlated with firms’  $\Delta E/S\text{-Scores}$ .

In the spirit of a Granger causality test, we check if the temporal relation of changes leads from *IO Leader* to *E/S-Scores* or vice versa. In Table A4, we reverse the  $\Delta IO\text{ Leaders}$  and the  $\Delta E/S\text{ Score}$  variables and find no significant relationship in any of the model specifications. These results demonstrate that corporate sustainability increases after increases in *IO Leaders* – but not vice versa. Changes in sustainability do not lead to changes in institutional ownership by Leaders. Thus, our baseline results are unlikely to mainly stem from Leaders’ screening practices.

#### 4.4 Geographical heterogeneity

Leaders should have a stronger impact on firms’ sustainability performance where social norms are weak since these firms have larger improvement potential. We can test whether this is the case as our sample has a rich geographical heterogeneity. We begin by splitting firms headquartered in countries with low or high environmental and social values. To this end, we use data from the World Value survey, which measures social norms across countries.

Higher index values indicate stronger values and beliefs regarding sustainability.<sup>21</sup>

– Table 7 –

Table 7 shows the results of our baseline specification separately for firms headquartered in countries with low or high E&S values. Our hypothesis is confirmed: The effect of a standard deviation increase in ownership by Leaders is about 50% stronger in firms from low E&S values countries than in those from countries with high values.<sup>22</sup>

We also examine if our baseline results are concentrated in firms headquartered in certain geographies. To test whether this is the case, we run our tests separately by region in Table A5. We do not observe significant differences in our effect across geographies.<sup>23</sup>

## 4.5 Additional robustness tests

The results thus far document a positive association between institutional ownership and firms’ environmental and social performance, which is solely driven by the small group of sustainability Leaders. This section rules out several alternative explanations of our findings.

In the main tests, we measure E&S performance with Consensus Scores based on a minimum of two rating agencies. To ensure that this requirement is neither too lenient nor too strict, we re-run our main specification with firm-year observations that are covered by all three or by a minimum of one rating agency (Table A6). In both cases, our findings

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<sup>21</sup>Data from the World Value Survey has been used extensively in the literature, e.g., by [La Porta, Lopez-de Silanes, Shleifer, and Vishny \(1997\)](#) and [Guiso, Sapienza, and Zingales \(2003\)](#). We follow [Dyck et al. \(2019\)](#) in the choice of questions from the survey and how they are aggregated. Countries belong to the low (high) E&S group when their index values of social E&S norms are below (above) the median across countries.

<sup>22</sup>The standard deviation of IO Leaders in the low E&S values sample is slightly smaller than in the high E&S values sample (2.1% vs. 3.1%).

<sup>23</sup>For firms headquartered in Asia, there is also a positive effect of ownership by Non-Leaders on E&S performance. First, since investors have a home bias ([Chan, Covrig, and Ng, 2005](#)), we expect institutional owners from Asia to tilt their portfolios towards Asian firms. Since most of the collaborative engagements we use to identify Leaders are led by European and North American investors, Leaders will be under-represented in Asia. This could be due to Asian investors being less committed to sustainability altogether, in which case we should see a smaller effect of overall institutional ownership in Asia. Alternatively, their level of commitment might be similar, but cultural differences make participating in collaborative engagements more expensive for such investors. This seems to be the case, since there is a spillover of our main effect from Leaders to Non-Leaders in the sub-sample of Asian firms.

remain unchanged. In a similar vein, it could be that our results are driven by a single rating agency and that – since we have only data from three raters – aggregating them will not remove this bias. In Table A7 we confirm this is not the case: Our results hold irrespective of the E&S score provider used. Moreover, we report results separately for the full sample of each provider and for the sub-sample of firms covered by all rating agencies (“Common sample”). We obtain comparable results and confirm that our findings are not driven by rating agencies choosing to cover specific firms.

Another concern might be that financial services firms, given their special structure, can bias our estimations. We exclude these firms from our sample in Table A8 and find unchanged results. Further, while we account for industry fixed effects, it could be that the relationship between industry and E&S Scores changes throughout our sample period or that our definition of industry (SIC Industry Divisions) might be too broad. We account for these possibilities in Table A9, where we first add industry-times-year fixed effects and second, use a stricter definition of industry. In both cases, the results remain unchanged. We also rule out the possibility that our findings are driven by the influence of small countries in our dataset. In an untabulated set of regressions, we include region-fixed effects instead of country-fixed effects and obtain almost identical results. Finally, we verify that our results do not hinge on the choice of standard error clustering. Table A10 reports standard errors clustered by (1) firm, (2) industry, and (3) two-dimensionally by country and year. Our results are robust across specifications.

Overall, these tests underscore our main results. The small group of Leaders drives firm-level E&S performance, and this link holds for different Consensus Score definitions, E&S rating providers, fixed effects, regional sub-samples, and regression specifications.



## 5 Leaders and collaborative engagements

Section 4 established a positive relationship between institutional ownership by Leaders and firms' sustainability performance. This section examines how this link materializes by focusing on a channel that could plausibly drive environmental and social firm outcomes: collaborative engagements organized by the PRI. These engagements target firms on specific sustainability-related themes, like fracking or labor standards. If Leaders drive corporate sustainability, then collaborative engagements should affect targeted companies more when ownership by Leaders is high. We start this section by describing PRI collaborative engagements (Section 5.1) and the empirical method (Section 5.2). We present graphical evidence that engagements drive improvements in sustainability in Section 5.3 and formalize this link in a difference-in-differences estimation in Section 5.4.

### 5.1 PRI collaborative engagements

Collaborative engagements are investor initiatives that aim to improve corporate sustainability through a targeted dialogue with firms' management. These engagements differ from traditional shareholder activism (Brav, 2009) in two ways: First, collaborative engagements focus on outcomes related to sustainability instead of seeking to improve financial performance. Second, they are a coordinated action between many shareholders (Brav, Dasgupta, and Mathews, 2021).

We analyze engagements organized by the PRI Collaboration Platform, the largest global collaborative engagement forum, with 45 engagement campaigns from 2007–2020 (PRI, 2021). The PRI originates each engagement campaign and selects the theme, such as fracking or employee relations. Subsequently, PRI signatories can join the engagement as leaders or supporters, where the former entails substantially more involvement. Engagements require significant commitment and resources: Investors typically contribute with topic-specific research, letters to management, the filing of shareholder proposals, or in-person meetings with

target companies.<sup>24</sup>

Collaborative engagements are a compelling research setting for our channel test. First, they offer a clear-cut event around which we would expect to see improvements in the sustainability performance of firms. Second, since engagement themes are set by the PRI, the choice of which firms to engage does not primarily lie with institutional investors, alleviating selection concerns.<sup>25</sup> Third, our empirical setup allows us to gauge the importance of firms having a strong institutional ownership base by Leaders, conditional on being targeted. In other words, we are not interested in showing that engagements are successful in improving E&S outcomes (Dimson et al., 2015). Instead, we ask whether engagements are successful *conditional* on the presence of Leaders.

– Table 8 –

Table 8 lists the 22 PRI collaborative engagements in our analyses, including start years, the number of targeted firms, and focal E&S dimensions. The sample spans the 2011–2017 period and accounts for engagements focusing on environmental (E), social (S), or both dimensions.<sup>26</sup> The table also shows a considerable variation in the number of targeted firms. The median campaign in our sample has a duration of two years and targets 39 companies.

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<sup>24</sup>We refer to Dimson et al. (2021) for a detailed description of collaborative engagements.

<sup>25</sup>It is a possible concern that engagements might focus on firms which are already expected to improve sustainability. We argue that this is unlikely to be the case, as the PRI Stewardship Team explicitly selects engagement themes in domains where improvement without engagement is *not* expected.

<sup>26</sup>The PRI assigns campaigns to the E and S sub-dimensions. The sample period is shorter than in Section 4 (2009–2019) since our empirical setup requires at least two years of pre- and post-engagement periods.

### Figure 5: Firms targeted by PRI collaborative engagements over time

This figure illustrates the number of firms targeted by PRI collaborative engagements by year, separately by environmental (E) and social (S) dimensions. Firms targeted by several campaigns in a given year are counted only once per dimension. Targeted firms are counted in every year in which the engagement is ongoing. The shaded area marks the observations with sufficient pre and post-periods to be included in our difference-in-differences (DID) analyses. Only firms matched to FactSet are counted.

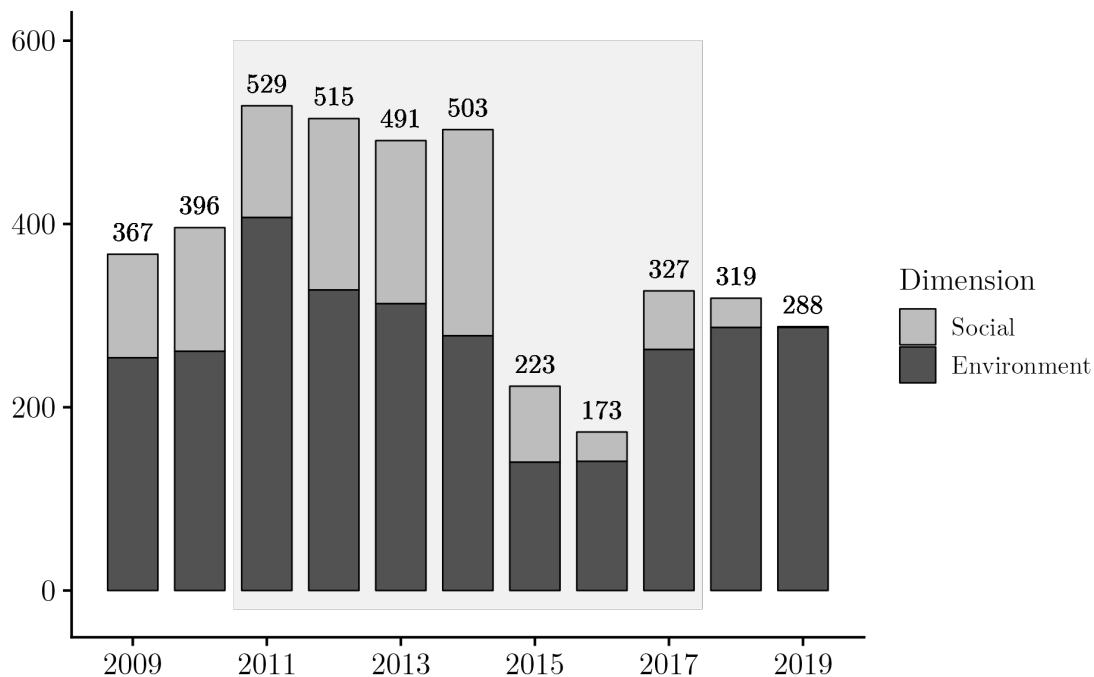


Figure 5 shows the yearly number of targeted firms by PRI collaborative engagements in our sample. We state annual numbers for the environmental and social dimensions separately, and we count a firm only once when targeted by more than one campaign of the same dimension. The yearly number of targeted firms ranges from 173 firms in 2016 to 529 firms in 2011. There are substantially more observations for environmental than for social engagements: Firms explicitly engaged on the social dimension represent only 7% of the entire population of 1,238 targeted firms. The low number of social engagements also translates into a very small social dimension sub-sample in our empirical tests. Therefore, for

the remainder of this section, we will focus exclusively on firms engaged on environmental themes.

## 5.2 Empirical setting

We are interested in measuring the incremental impact of ownership by Leaders on the efficacy of collaborative engagement campaigns. However, since being targeted by an engagement campaign is unlikely to be random, we require a control group with similar characteristics to the group of engaged companies. Treated firms are targeted by one or more collaborative engagements, have non-missing E-Scores over the entire event period, and have not been targeted by collaborative engagements in the past. Eligible control firms are never targeted by collaborative engagements and must have non-missing E-Scores for the entire event period. From the set of eligible control firms, we choose the nearest neighbor – within industry, year, and region – on Log Total Assets, Profitability, Tobin’s Q, PPE, and Leverage based on propensity score matching (Rosenbaum and Rubin, 1983).<sup>27</sup> All matching variables are measured one year before the engagement starts. We can match 105 out of 329 treated firms. The loss of observations occurs due to the limited availability of E-Scores for entire event periods and a lack of suitable matches for some treated firms.

Table A11 reports the means of matching covariates in the treatment and control samples, together with a test for differences. After matching, treatment and control firms are indistinguishable along observables.

## 5.3 Graphical evidence

Figure 6 plots environmental firm performance around collaborative engagements. The event period ranges from two years before to three years after the launch of the campaign. Engagements start in year 0, the first period we consider targeted firms as treated. Consensus

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<sup>27</sup>We define industries based on SIC Industry Sectors. We group countries into North America, Latin America, Europe, Asia, Oceania, and Africa. We apply a caliper of 0.1 to improve matching quality (Cochran and Rubin, 1973). We match without replacement.

E-Scores are expressed in differences to the first year before treatment.<sup>28</sup> The Consensus Scores used in this section require only one or more firm ratings. We use a lenient version of Consensus Scores to ensure a sufficient sample size.

In line with [Dimson et al. \(2015\)](#), we expect to find a positive effect of engagement campaigns on firms' E-Scores. Panel 6a plots average E-Scores of treated and control firms in the event period. The figure shows comparable development of environmental performance for both subgroups. Whereas treated firms exhibit a slightly stronger development of E-Scores overall, the difference to control firms is small and begins to increase only three years after the end of an engagement. On aggregate, the graph suggests PRI collaborative engagements have moderate effects on environmental firm performance, as measured in E-Scores. One reason for this could be that, to be effective, engagements require that targeted firms have substantial ownership by Leaders.

Panel 6b shows only treated companies, separated into subgroups with high and low ownership by Leaders.<sup>29</sup> The visual evidence is compelling: Targeted companies substantially improve their environmental performance in response to collaborative engagements, but only when ownership by Leaders is high. As a falsification test, Appendix Figure 7 also plots E-Scores of control firms separately for high and low ownership by Leaders. We document no meaningful divergence in either of the two sub-groups after the start of the engagement.

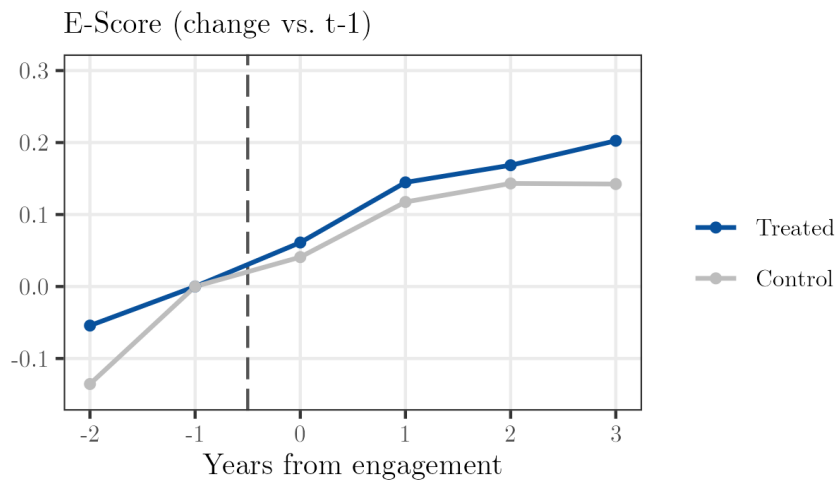
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<sup>28</sup>For instance, suppose a firm has an absolute E-Scores of 0.7 one year before treatment which increases to 1.3 two years after treatment. In  $t=-1$ , the relative score will be 0.0 ( $0.7 - 0.7$ ) and in  $t+2$  it will be 0.6 ( $1.3 - 0.7$ ).

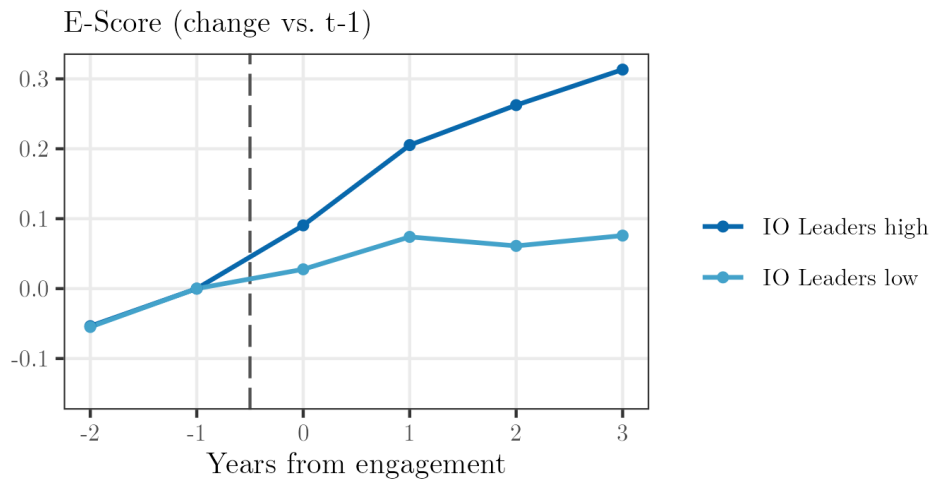
<sup>29</sup>Indicators for high and low Leader ownership are computed as follows: First, we calculate average *IO Leaders* for each calendar year across all sample firms. Second, we compute demeaned ownership values for engaged firms and average this over our DID sample. In the third and final step, we split the firms in the DID sample into two groups along the median *IO Leaders*.

### Figure 6: Environmental performance around PRI collaborative engagements

This figure summarizes environmental firm performance around collaborative environmental engagements. The plots report average Consensus E-Scores, expressed in differences to the first year before the engagement starts (year -1). The sample period involves the periods from two years before to three years after the beginning of the engagement. In Panel (a), treated firms are companies targeted by a collaborative engagement, while control firms are never targeted but have similar firm characteristics. Panel (b) only shows firms that are targeted, separately for those with below- and above-median ownership by Leaders (“IO Leaders low” and “IO Leaders high”). The sample consists of 205 individual firms in the 2009–2017 period.



(a) E-Scores around engagements for treatment/control firms



(b) E-Scores around engagements for treated firms with high/low IO Leaders

## 5.4 Empirical tests

To empirically test if firms targeted by PRI collaborative engagements improve their environmental performance when ownership by Leaders is high, we run the following interacted DID regression:

$$\begin{aligned}
 E\text{-Score}_{i,\tau} = & \alpha + \beta_1 Treated_i \times Post_\tau \times IO Leaders_{i,\tau-1} + \\
 & \beta_2 Treated_i \times Post_\tau + \beta_3 Treated_i \times IO Leaders_{i,\tau-1} + \\
 & \beta_4 Post_\tau \times IO Leaders_{i,\tau-1} + \beta_5 IO Leaders_{i,\tau-1} + \beta_6 Post_\tau + \\
 & \gamma' X_{i,\tau-1} + \zeta_i + \delta_t + \varepsilon_{i,\tau}
 \end{aligned} \tag{2}$$

$E\text{-Score}_{i,\tau}$  is the environmental score of firm  $i$ ,  $\tau$  years from the start of the engagement.  $\beta_1$  is the main coefficient of interest. It captures the effect of *IO Leaders* on E-Scores for engaged firms in periods following the launch of engagements. To ease interpretation, we demean *IO Leaders*. If Leaders drive the success of engagement campaigns, we expect  $\beta_1$  to be positive and significant. This coefficient captures the efficacy boost in engagements of having higher ownership by Leaders.  $\beta_2$ , on the other hand, captures the average effect of being targeted in the post-treatment period for firms with average ownership by Leaders. We expect this to be insignificant or weakly positive.  $Treated_i$  is an indicator variable equal to one when firm  $i$  is targeted by a collaborative engagement, and zero otherwise.  $Post_\tau$  is an indicator variable equal to one for the years after the engagement starts ( $\tau \geq 0$ ) and zero for all prior periods.  $IO Leaders_{i,\tau-1}$  denotes institutional ownership by Leaders, and  $X_{i,\tau-1}$  are the same time-varying firm controls used in our main specification in Section 4.1.  $\zeta_i$  represents firm fixed effects while  $\delta_t$  denotes time fixed effects for calendar year  $t$ .  $\varepsilon_{i,\tau}$  is the error term clustered at the firm level. We include firm fixed effects in this specification since we are interested in the firm-level *change* that the engagement event causes in a firms' environmental performance.

Table 9 shows the estimation results for different event windows around the year when engagements start: [-1,+2], [-1,+3], and [-2,+3]. The coefficient of the DID interaction term is positive and significant in each of the three models. Treated firms have significantly higher environmental scores in the years following the engagement, conditional on institutional ownership by Leaders being high. The association is economically meaningful: For engaged firms, a one standard deviation increase in ownership by Leaders is associated with 0.097 higher E-Scores, 11.6% of a standard deviation.<sup>30</sup> The association is more than twice as pronounced compared to the baseline regressions in Section 4.1. Economic magnitudes are similar for models 2 and 3.

While ownership by Leaders has a strong positive impact on the efficacy of engagements, this is not the case for the other types of institutional investors. None of the other interactions with institutional ownership by Non-Leaders and conventional investors are significant. This highlights the importance of treating institutional ownership in a differentiated manner.

One concern of our empirical setup is that Leaders might hold firms they expect to improve when targeted. While we cannot control for expectations, we include ownership by Leaders in our set of matching covariates in Table A12. A second concern might be that the engagement itself is changing the relationship between the set of firm-level controls and the environmental scores. We account for this in Table A13 by running a fully interacted model. A third concern is that we are not explicitly accounting for institutional ownership by other investors (*IO Non-Leaders* and *IO Conventional*). Table A14 includes the other two types of institutional ownership variables and their interactions with the Post and Treated dummies. In all cases, our results remain virtually unchanged.

Overall, these results confirm the observations in the graphical representations of Section 5.3: Firm-level environmental improvements in response to PRI collaborative engagements are contingent on ownership by Leaders.

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<sup>30</sup>The calculation of the economic magnitude also accounts for the other coefficients involving the IO Leaders variable:  $0.097 = 0.029 \text{ (SD IO Leaders)} \times (6.11 + 1.04 - 0.55 - 3.25)$ . The calculation relies on model 1.



## 6 Leaders and incidents prevention

In this section, we test the relationship between ownership by Leaders and the likelihood of portfolio firms experiencing adverse incidents. Several papers argue that firms' exposure to reputation-damaging events in the E&S dimensions constitutes an outcome-driven and perhaps more direct indicator of corporate sustainability.<sup>31</sup> In the following, we show that firms with higher ownership by Leaders experience fewer environmental incidents and that Leaders stay invested in firms that experience such events.

### 6.1 Empirical setting

We use incident data from RepRisk, a data provider that leverages machine learning techniques to identify and measure ESG risks from public news sources.<sup>32</sup> Unlike traditional ESG rating agencies, RepRisk does not rely on self-reported company data. Essential to our study, the data is available in a format that measures risks separately in the environmental and social dimensions.

To identify incident exposure in our sample firms, we define separate E&S indicator variables that take a value of one in firm-years with one or more incidents.<sup>33</sup> RepRisk coverage starts in 2007 and thereby spans our entire 2009–2019 sample period. RepRisk covers every firm for which it identified at least one incident. For sample firms not covered in the data, we assume they never experienced an incident.

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<sup>31</sup>Some examples include [Derrien et al. \(2021\)](#), [Gantchev et al. \(2021\)](#), [Glossner \(2021\)](#), and [Yang \(2021\)](#).

<sup>32</sup>As of 2021, an algorithm screens more than 100,000 public sources in 23 languages daily. RepRisk reviews a wide array of channels, among others, from local and international print- and online media, government agencies, and social media. RepRisk maintains to operate the world's largest and most comprehensive database of ESG risks ([RepRisk, 2021](#)). Each incident identified by the screening algorithm undergoes a three-step process before it is added to the sample: First, an analyst reviews the incident to ensure it is ESG-related, meets a severity threshold, and does not duplicate an older incident. A second analyst performs quality assurance and approves the incident. In a third step, the risk of the incident is quantified according to RepRisk's methodology ([RepRisk, 2021](#)).

<sup>33</sup>More specifically, RepRisk data allows computing the RepRisk Index (RRI), a firm-specific index measuring exposure to E&S risks. We calculate this measure separately for the E and S sub-dimensions. The RRI increases in response to incidents and otherwise gradually decays to a value of zero. We register a company incident when the RRI experienced an increase during a given firm-year.

## 6.2 Likelihood of incidents

To test the empirical relationship between ownership by Leaders and the probability of firms experiencing E&S incidents, we estimate the following regression model:

$$\text{Incident } E/S_{i,t} = \alpha + \beta' IO_{i,t-1}^\theta + \gamma' X_{i,t-1} + \delta_t + \phi_i + \varepsilon_{i,t} \quad (3)$$

*Incident E/S<sub>i,t</sub>* is an indicator variable set to one if firm *i* experiences an incident in year *t*. Environmental and social incidents are measured separately. The remainder of the specification is consistent with the baseline regression model in Equation 1. We estimate the risk of E&S incidents for two sub-samples, once for all firm-years and once for observations by companies already experienced one or more incidents in the past three years. We explicitly account for the latter sub-sample to gauge the role of Leaders in firms that are known to be problematic and in need of monitoring by shareholders. Given investors' limited attention (Kempf, Manconi, and Spalt, 2017), it is for such firms where ownership by Leaders should matter the most.

– Table 10 –

Table 10 presents the results. Models 1 and 2 present regression estimates for all firm-years. For the environmental dimension, we find a negative relationship between ownership by Leaders and the probability of firms experiencing an incident: A one standard deviation increase in *IO Leaders* reduces the probability of experiencing an incident by 0.6 percentage points. A similar relationship exists for *IO Conventional*. For social incidents, ownership by none of the ownership groups is related to adverse incidents at conventional significance levels.

In models 3 and 4, we focus only on firms that have already had an incident during the past three years. The results show that in this sub-sample, the mitigating role of *IO Leaders* on the risk of experiencing environmental incidents is almost three times larger than in the full sample. The finding is in line with committed investors monitoring firms more thoroughly

when they experienced incidents in the past. We continue to find no significant coefficients for social incidents (model 4). In untabulated tests, we document almost unchanged results when we account for previous incidents in the last one, two, or four years instead of three years.

### 6.3 Post-incident response by institutional investors

It is a possible concern regarding our results that Leaders might avoid owning companies at risk of experiencing adverse environmental incidents and, in the case an incident materializes, divest from such firms.

To test if this is the case, we examine the ownership changes across investor groups after firms experience an environmental incident. If Leaders use their voice in affected companies to mitigate the risk of repeated incidents, we expect them to stay also invested after the incident occurred. First, we construct a panel of firm-years within a  $[-2,+2]$  years event window around the moments of environmental incidents. Next, we use this sample to estimate the following OLS regression:

$$IO_{i,\tau}^{\theta} = \alpha + \beta Post_{i,\tau} + \gamma_i + \delta_t + \varepsilon_{i,\tau} \quad (4)$$

$IO_{i,\tau}^{\theta}$  is the institutional ownership variable of the respective regression for firm  $i$ ,  $\tau$  years from the environmental incident.  $Post_{i,\tau}$ , is an indicator variable equal to one for years after the company incident (i.e,  $\tau \geq 0$ ) and zero for all prior periods.  $\gamma_i$  represents firm-fixed effects for company  $i$  and  $\delta_t$  represents year-fixed effects for calendar year  $t$ .  $\varepsilon_{i,\tau}$  is the error term clustered at the firm level.  $\beta$  is the coefficient of interest and captures the average change in institutional ownership in the years after the incident occurs. If Leaders remain invested in firms affected by adverse incidents, we expect  $\beta$  to be insignificant in regressions where the dependent variable is *IO Leaders*. We estimate our regressions for two sub-samples: *All incidents* (models 1–3) contains all environmental incidents in our sample,

while *Large incidents* (models 4–6) only uses the most severe 50% of incidents as quantified by RepRisk.<sup>34</sup>

– Table 11 –

Table 11 presents the results. The *Post* coefficients in the regressions involving *IO Leaders* are insignificant, both for all and large incidents only (models 1 and 4). The finding indicates that Leaders do not significantly divest from firms affected by environmental incidents. We document similar results for the remaining PRI investors (*IO Non-Leaders*) in models 2 and 5. However, the results are different for conventional institutional investors: The *Post* coefficient is significantly negative in models 3 and 6, indicating that these investors divest from portfolio firms after reputation-damaging events.<sup>35</sup>

To conclude, our results show that ownership by Leaders correlates with a lower likelihood of corporate environmental incidents. Leaders appears to be particularly meaningful for firms with a previous history of adverse incidents and they stay invested in firms after an incident occurs. Overall, this profile sets Leaders apart from other institutional investors, and it is consistent with the expectation that Leaders use their voice in incident-affected companies to reduce the risk of recurring incidents in the future.

## 7 Selection vs. voice

The previous sections established two ways through which Leaders drive environmental and social outcomes: collaborative engagements and incident prevention. However, the extent to which these channels explain our baseline results is less clear.

Table 12 shows regression estimates of our baseline specification but explicitly accounting for companies affected by PRI collaborative engagements (models 1 and 2) and reputation-damaging incidents (models 3 and 4). Depending on the model, we include an indicator

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<sup>34</sup>The number of observations is not proportional to the percentile threshold, as one firm can experience more than one incident in a given year.

<sup>35</sup>This finding is in line with (Gantchev et al., 2021), who show that institutional investors exit firms after they experience incidents. We show that mainly conventional investors behave in this manner.

variable with a value of one for firms affected by collaborative E/S engagements or adverse E/S incidents and zero otherwise. We interact the indicator variable of each regression with *IO Leaders* to examine how our baseline results in Section 4.1 are driven by the subsets of firms affected by engagements or incidents. Suppose the positive relationship between *IO Leaders* and firms' E&S Scores is caused entirely by PRI collaborative engagements. In that case, we expect significantly positive coefficients for the *IO Leaders* x *Ever Engaged E/S* interaction terms but not for the *IO Leaders* variables alone. Equivalent reasoning applies to the E&S incidents in models 3 and 4.

– Table 12 –

Table 12 documents that the significant effect of *IO Leaders* does not stem from collaborative engagements and incidents alone. While the coefficients of all interaction terms are positive – consistent with firms affected by engagements/incidents benefiting from ownership by Leaders – the stand-alone coefficients of IO Leaders remain significant in all specifications. We also document that the coefficients of the other IO variables, *IO Non-Leaders* and *IO Conventional*, stay almost unchanged compared to our baseline regressions.

A possible concern regarding our findings is that Leaders may exhibit stricter screening practices. If Leaders invested in firms with high E&S Scores ex-ante, this would reinforce the relationship between *IO Leaders* and corporate sustainability. While we cannot completely rule out this conjecture, we still argue that the role of screening in our results is presumably limited. First, as outlined in Section 4.3, Table A4 shows that firm-level increases in E&S Scores are not followed by subsequent increases in *IO Leaders*, which questions a decisive role of screening. Second, Figure 8 presents yearly portfolio E&S Scores for all IO groups across the main regions in our sample. The figure documents that the mean E&S Scores of firms owned by Leaders are similar to those of the other institutional investors, particularly Non-Leaders. In Europe, the portfolio scores are almost identical. In North America, Leaders are invested in firms with moderately higher E&S Scores than Non-Leaders, while this relationship reverses in Asia. Although the regional E&S portfolio tilts are similar across

investors, Table A5 documented that in the same regions, a strong link between institutional ownership and E&S performance only exists for Leaders.

As engagements, incidents, and screening do not explain our baseline results alone, we argue that parts of our findings relate to factors unobservable to our study. One plausible factor is the channel of private engagements. McCahery et al. (2016) document that institutional investors exert substantial parts of their influence in behind-the-scenes intervention. It appears persuasive that this could also hold for the Leaders in this study.

While we emphasize the essential role of Leaders in explaining firm-level E&S performance, we refrain from denoting our baseline effects as causal. Previous studies commonly exploited exogenous variation in institutional ownership variables to sharpen identification, mainly using stock index membership as an instrumental variable (e.g., Bena et al. (2017); Dyck et al. (2019); Chen et al. (2020)). The setting of our study poses challenges to these approaches: Since average ownership by Leaders is only 2.2%, the exogenous variation that, for instance, the addition to a stock index causes on the *IO Leaders* variable is very small. Whether changes of this magnitude can plausibly influence individual firms' E&S performance is questionable.<sup>36</sup>

## 8 Conclusion

Today, more than half of all institutional investors by AUM publicly commit to responsible investing (Brandon et al., 2021). Our paper focuses on the subset of institutional investors, denoted as “Leaders,” with an exceptionally strong commitment to sustainability and examines their influence on corporate environmental and social performance.

The positive link between institutional ownership and corporate sustainability is driven by the small group of Leaders alone. This finding is notable, as Leaders only own 2.2% of

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<sup>36</sup>In unreported tests, we use company membership to the MSCI All Country World Index (ACWI) as an instrument for ownership by Leaders. While we find a strong and significantly positive relationship between *IO Leaders* and firms' E&S-Scores, the coefficients appear implausibly inflated. See Glossner (2019) for a discussion of these issues in the similar context of the Russell 1000/2000 reconstitutions.

the average firm in our sample, a twentieth of the average total institutional ownership. We identify two channels through which the presence of Leaders aids in improving firms' environmental and social performance: direct engagement and incident prevention. Only firms with high ownership by Leaders respond positively to collaborative engagements. Moreover, ownership by Leaders is associated with a lower risk of reputation-damaging company incidents, particularly for firms with an existing history of such incidents.

Our study advocates a differentiated view on institutional investment and corporate sustainability. Not all institutional investors are equally committed to sustainability, which has practical implications for organizations and individuals who intend to improve sustainability through their asset allocation: The choice of the financial intermediary is instrumental for the efficacy of their investment.

The interpretation of our results is subject to at least two limitations. First, while suggestive, our evidence is not yet enough to claim a causal effect of ownership by Leaders on corporate sustainability. The channels outlined in this paper substantiate parts of, but not the entire, Leaders effect. More research is needed to examine the underlying mechanisms, such as individual behind-the-scenes engagement. Second, our results make no statement about the motives of Leaders. A high commitment to corporate sustainability can be driven by pecuniary, non-pecuniary, or clientele-related reasons ([Hartzmark and Sussman, 2019](#); [Riedl and Smeets, 2017](#); [Ceccarelli et al., 2021b](#)). Differentiating between these motivations constitutes a promising avenue for future academic work.

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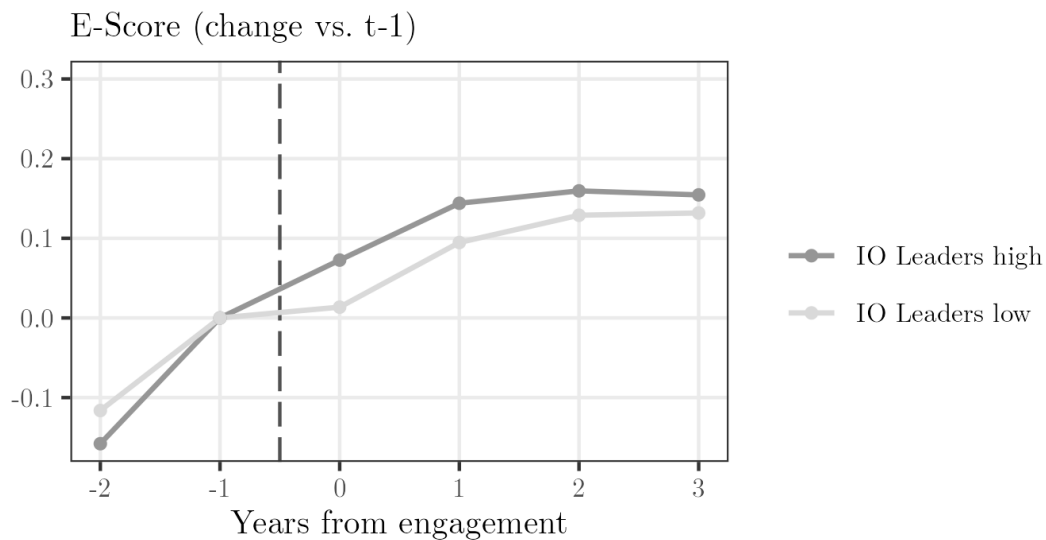
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## Figures

**Figure 7: Environmental performance around PRI collaborative engagements – Control firms with high/low IO Leaders**

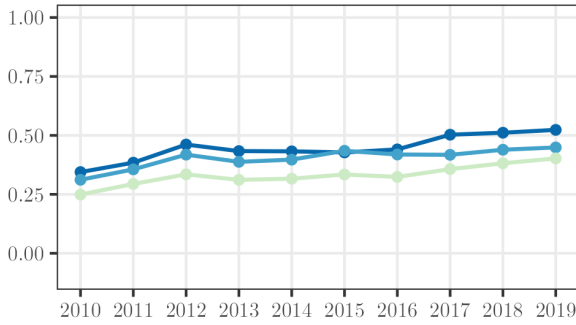
This figure shows the environmental performance of control firms in figure 6, separately for those with below- and above-median ownership by Leaders (“IO Leaders low” and “IO Leaders high”). The plot reports average consensus E-Scores relative to the first year before the engagement starts (year -1). The event period spans from two years before to three years after the start of the engagement. Year 0 is the year in which the respective engagement starts.



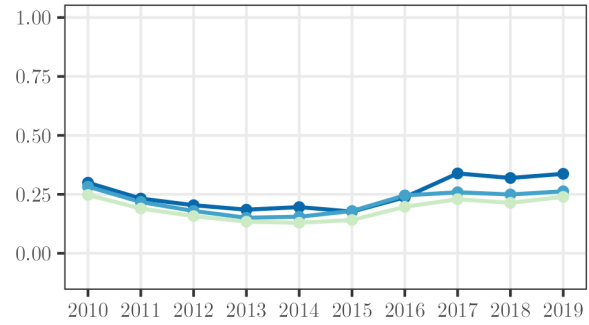
**Figure 8: Value-weighted portfolio E&S Consensus Scores by investor group**

This figure shows value-weighted portfolio E&S Consensus Scores for Leaders, Non-Leaders, and conventional investors, based on the firm-year observations in our sample. We calculate E&S Scores by fiscal year and separately for the three largest regions by observations in our sample (North America, Asia, and Europe). All variables are defined in Appendix A1.

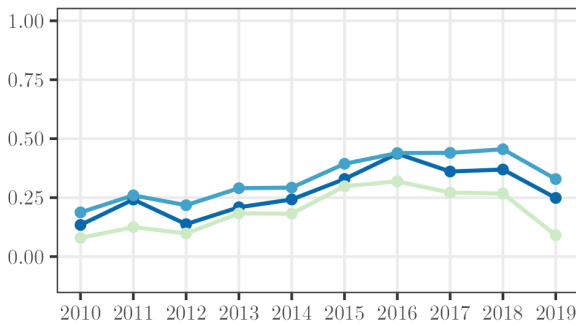
**A** Consensus E-Scores - North America  
Average value-weighted portfolio scores



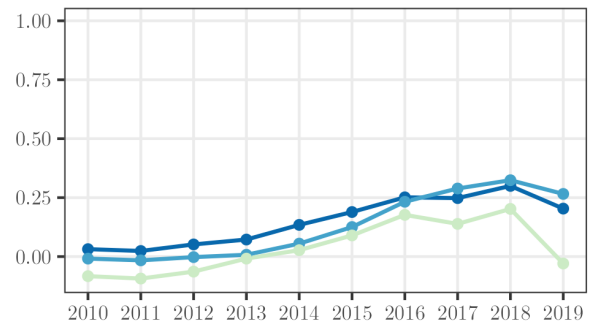
**B** Consensus S-Scores - North America  
Average value-weighted portfolio scores



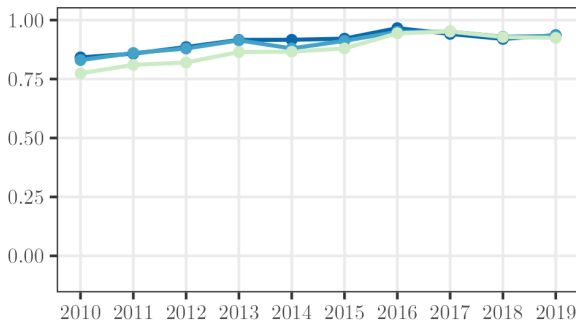
**C** Consensus E-Scores - Asia  
Average value-weighted portfolio scores



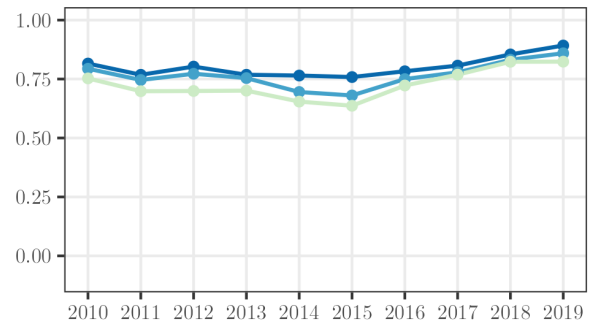
**D** Consensus S-Scores - Asia  
Average value-weighted portfolio scores



**E** Consensus E-Scores - Europe  
Average value-weighted portfolio scores



**F** Consensus S-Scores - Europe  
Average value-weighted portfolio scores



—●— Leaders —●— Non-Leaders —●— Conventional

## Tables

**Table 1: Summary statistics – Institutional investor level**

This table shows descriptive statistics of the size, geographical distribution, and type of PRI signatories, separately for Leaders and Non-Leaders. The sample covers signatories with available ownership data in FactSet Ownership. AUM statistics account for listed positions held by investors directly or through subsidiaries. Investors without listed equity holdings in a given year are excluded from the AUM calculations. The list of signatories, including regions and categories, is provided by the PRI. The sample is at the institution-year level and covers the 2009–2019 period.

Variable	Leaders	PRI Non-Leaders
<b>Signatory characteristics</b>		
Average equity AUM (\$ billion)	28.38	37.97
Median equity AUM (\$ billion)	10.03	2.12
Average year joined	2009	2011
Included investor years	637	3,792
<b>Signatory regions</b>		
Africa	0%	5%
Asia	5%	6%
Europe	67%	51%
Latin America	0%	3%
North America	24%	28%
Oceania	3%	7%
<b>Signatory categories</b>		
Asset owner	18%	14%
Investment manager	82%	86%

**Table 2: Summary statistics – Firm level**

This table shows summary statistics of institutional ownership, environmental & social (E&S) performance, and firm fundamentals. Consensus Scores are computed as the average across all available E&S ratings per firm-year, which have been normalized to ensure comparability. *# Scores/Consensus* denotes the number of individual E/S scores used to compute Consensus Scores. All continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. The sample is at the firm-year level and covers the years 2009–2019. We include only public firms for which both ownership information and at least one ESG rating are available. All variables are defined in Appendix A1.

Variable	Obs.	Min	p25	Median	Mean	p75	Max	SD
<b>Inst. Ownership</b>								
IO Total	66,471	0.2%	11.2%	26.4%	38.8%	68.7%	100.0%	32.7%
IO PRI	66,471	0.0%	5.2%	12.9%	18.0%	27.1%	62.5%	16.1%
IO Leaders	66,471	0.0%	0.3%	1.0%	2.2%	2.9%	14.4%	2.9%
IO Non-Leaders	66,471	0.0%	4.4%	10.9%	15.8%	23.3%	56.9%	14.6%
IO Conventional	66,471	0.0%	4.0%	11.6%	20.7%	34.0%	90.7%	21.3%
<b>E&amp;S Performance</b>								
Consensus E-Score	67,043	-1.68	-0.78	-0.19	-0.11	0.51	2.00	0.84
Consensus S-Score	67,043	-1.85	-0.66	-0.11	-0.07	0.49	2.03	0.83
# Scores/Consensus	67,043	1.00	1.00	2.00	2.03	3.00	3.00	0.87
Sustain. E-Score	38,338	32.00	43.00	52.00	53.96	64.00	88.00	13.74
Sustain. S-Score	38,338	34.00	48.00	56.00	56.59	64.00	85.00	11.20
MSCI E-Score	53,160	0.30	3.20	4.60	4.74	6.20	10.00	2.13
MSCI S-Score	53,169	0.20	3.40	4.50	4.49	5.60	8.80	1.69
Refinitiv E-Score	44,859	0.00	4.89	30.07	34.16	58.84	92.38	29.14
Refinitiv S-Score	44,859	2.01	23.78	40.66	43.01	61.23	92.70	23.81
Incident E	67,043	0.00	0.00	0.00	0.14	0.00	1.00	0.35
Incident S	67,043	0.00	0.00	0.00	0.19	0.00	1.00	0.40
<b>Fundamentals</b>								
Log Assets	67,023	4.00	6.88	8.05	8.14	9.28	13.27	1.85
PPE	66,376	0.00	0.05	0.18	0.26	0.41	0.89	0.24
Leverage	67,007	0.00	0.08	0.22	0.24	0.36	0.85	0.19
Tobin's Q	64,814	0.62	1.02	1.28	1.75	1.92	8.25	1.30
Profitability	59,703	-0.49	0.06	0.10	0.10	0.15	0.42	0.12

**Table 3: Sample composition by country**

This table shows the geographical distribution of our sample. The first three columns summarize the number of firms per country, while the last three columns show average institutional ownership, separately by Leaders, other PRI signatories (Non-Leaders), and conventional investors. The sample is at the firm-year level and covers the years 2009–2019. We include only public firms for which both ownership information and at least one ESG rating is available. All variables are defined in Appendix A1.

Country	Firms by country			Average Inst. Ownership		
	Obs.	% of total	Unique firms	Leaders	Non-Leaders	Conventional
United States of America	21,553	32.1%	3,684	2.4%	29.9%	43.9%
Japan	5,576	8.3%	870	1.2%	9.2%	5.4%
United Kingdom	4,014	6.0%	626	5.8%	17.7%	17.1%
Canada	3,392	5.1%	509	2.0%	13.1%	24.5%
China	3,223	4.8%	859	0.8%	3.1%	5.3%
Australia	2,922	4.4%	453	1.0%	6.1%	6.1%
Hong Kong	1,772	2.6%	341	1.4%	5.6%	5.6%
Germany	1,757	2.6%	266	2.4%	9.6%	11.2%
France	1,498	2.2%	207	2.5%	9.9%	10.6%
Taiwan	1,479	2.2%	192	1.4%	7.6%	5.7%
India	1,472	2.2%	310	1.3%	5.1%	9.3%
South Korea	1,459	2.2%	214	1.1%	5.7%	5.0%
Sweden	1,255	1.9%	250	7.9%	16.4%	10.3%
Switzerland	1,202	1.8%	170	1.9%	11.9%	13.6%
Brazil	1,056	1.6%	186	1.9%	9.8%	8.7%
South Africa	980	1.5%	141	1.4%	9.3%	8.7%
Italy	866	1.3%	143	1.5%	7.7%	7.0%
Malaysia	797	1.2%	157	0.9%	3.5%	3.0%
Netherlands	696	1.0%	100	3.3%	14.2%	18.0%
Spain	661	1.0%	97	1.5%	8.5%	8.0%
Indonesia	638	1.0%	116	1.2%	4.0%	3.3%
Singapore	570	0.9%	97	1.9%	5.7%	7.5%
Thailand	553	0.8%	127	1.3%	4.8%	4.1%
Norway	545	0.8%	103	4.8%	9.4%	10.1%
Russian Federation	502	0.7%	68	1.1%	4.5%	4.5%
Others	6,605	9.9%	1,066	1.7%	8.2%	9.1%
Total	67,043	100.0%	11,352	2.2%	15.8%	20.7%

**Table 4: Institutional ownership and E&S performance**

This table reports OLS regression estimates of environmental and social Consensus Scores on institutional ownership and control variables. Consensus Scores are defined as average normalized environmental (E) and social (S) scores by the rating agencies MSCI IVA, Sustainalytics, and Refinitiv. Models 1 and 2 use total institutional ownership (IO Total) as independent IO variable. Models 3 and 4 differentiate between ownership by PRI signatories and conventional investors. Models 5 and 6 break down PRI ownership further to differentiate between Leaders and Non-Leaders. Leaders are institutions that lead and support a collaborative engagement during a given year. All regressions control for industry, year, and country fixed effects and lag independent variables by one year. Continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. The sample consists of firm-years for which ratings by at least two agencies are available and covers the years 2010–2019. All variables are defined in Appendix A1. Robust standard errors are clustered at the country level and reported in parentheses. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	IO overall		IO PRI		IO Leaders	
	E-Score	S-Score	E-Score	S-Score	E-Score	S-Score
	(1)	(2)	(3)	(4)	(5)	(6)
IO Total	0.08 (0.08)	0.20** (0.09)				
IO PRI			0.27*** (0.10)	0.34*** (0.10)		
IO Leaders					1.62*** (0.34)	1.42*** (0.23)
IO Non-Leaders					0.08 (0.08)	0.18* (0.10)
IO Conventional			-0.06 (0.09)	0.09 (0.09)	-0.07 (0.10)	0.09 (0.10)
Log Assets	0.25*** (0.01)	0.18*** (0.02)	0.25*** (0.01)	0.18*** (0.02)	0.25*** (0.01)	0.18*** (0.02)
PPE	-0.11 (0.07)	0.16*** (0.04)	-0.12 (0.07)	0.16*** (0.04)	-0.12 (0.07)	0.16*** (0.04)
Leverage	-0.22*** (0.05)	-0.26*** (0.06)	-0.22*** (0.05)	-0.26*** (0.06)	-0.21*** (0.05)	-0.26*** (0.06)
Tobin's Q	0.03*** (0.01)	0.02*** (0.01)	0.03*** (0.01)	0.02*** (0.01)	0.03*** (0.01)	0.02*** (0.01)
Profitability	0.28** (0.13)	0.06 (0.18)	0.26* (0.13)	0.04 (0.18)	0.23* (0.13)	0.02 (0.18)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Min. # of ratings	2	2	2	2	2	2
Observations	35,026	35,026	35,026	35,026	35,026	35,026
Adjusted R <sup>2</sup>	0.36	0.28	0.37	0.28	0.37	0.28



**Table 5: Institutional ownership and E&S performance – Climate Action 100+**

This table reports OLS regression estimates of environmental/social Consensus Scores on institutional ownership and control variables with a focus on the collaborative engagement Climate Action 100+ (CA100+). Models 1 and 2 interact the institutional ownership variables with a dummy indicator for the periods after 2017, when CA100+ was active. Models 3 and 4 decompose IO Leaders into the variables “IO CA100+ Leaders” and “IO Leaders ex. IO CA100+ Leaders.” The former denotes ownership by investors that would not be Leaders without participation in CA100+; the latter denotes ownership by the remaining Leaders. Consensus Scores are defined as average normalized environmental (E) and social (S) scores by the rating agencies MSCI IVA, Sustainalytics, and Refinitiv. The regression sample consists of firm-years for which ratings by at least two agencies are available. All models differentiate between ownership by Leaders, other PRI signatories, and conventional investors. All regressions control for industry, year, and country fixed effects and lag independent variables by one year. Continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. All variables are defined in Appendix A1. Robust standard errors are clustered at the country level and reported in parentheses. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Post-2017 Indicator		IO Leaders Distinction	
	E-Score	S-Score	E-Score	S-Score
	(1)	(2)	(3)	(4)
IO Leaders	2.22*** (0.47)	2.00*** (0.35)		
Post 2017 × IO Leaders	-1.04*** (0.35)	-1.07** (0.43)		
IO Leaders ex. IO CA100+ Leaders			1.80*** (0.35)	1.57*** (0.26)
IO CA100+ Leaders			-1.88 (1.67)	-1.32 (1.53)
IO Non-Leaders	0.23** (0.09)	0.25** (0.11)	0.09 (0.08)	0.19* (0.10)
Post 2017 × IO Non-Leaders	-0.32*** (0.08)	-0.10 (0.08)		
IO Non-PRI	-0.11 (0.10)	0.09 (0.09)	-0.07 (0.10)	0.09 (0.10)
Post 2017 × IO Non-PRI	0.05 (0.08)	-0.11 (0.09)		
Firm Controls	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Min. # of ratings	2	2	2	2
Observations	35,026	35,026	35,026	35,026
Adjusted R <sup>2</sup>	0.37	0.28	0.37	0.28

**Table 6: Changes in institutional ownership and changes in E&S performance**

This table reports OLS regression estimates of changes in environmental and social Consensus Scores on changes in institutional ownership and control variables in the 2010–2019 period.  $s$  is the number of years upon which the changes are computed. For example, in model 1,  $\Delta E\text{-Score} = E\text{-Score}_t - E\text{-Score}_{t-1}$  and  $\Delta IO \text{ Leaders} = IO \text{ Leaders}_{t-1} - IO \text{ Leaders}_{t-2}$ . Consensus Scores are defined as average normalized environmental (E) and social (S) scores by the rating agencies MSCI IVA, Sustainalytics, and Refinitiv. The regression sample consists of firm-years for which ratings by at least two agencies are available. All regressions account for industry, year, and country fixed effects and control variables as outlined in Section 3.1. Continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. All variables are defined in Appendix A1. Robust standard errors are clustered at the country level and reported in parentheses. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	$\Delta E\text{-Score (t-s,t)}$				$\Delta S\text{-Score (t-s,t)}$			
	(1) s=1	(2) s=2	(3) s=3	(4) s=4	(5) s=1	(6) s=2	(7) s=3	(8) s=4
$\Delta IO \text{ Leaders (t-s-1,t-1)}$	0.34*** (0.07)	0.41*** (0.14)	0.46*** (0.15)	0.55*** (0.20)	-0.11 (0.09)	0.18 (0.17)	0.36** (0.16)	0.40** (0.18)
$\Delta IO \text{ Non-Leaders (t-s-1,t-1)}$	-0.01 (0.04)	-0.01 (0.05)	0.06 (0.11)	0.12 (0.12)	-0.00 (0.05)	0.08 (0.09)	0.07 (0.11)	0.06 (0.13)
$\Delta IO \text{ Conventional (t-s-1,t-1)}$	-0.00 (0.04)	-0.03 (0.07)	0.03 (0.11)	0.01 (0.13)	-0.01 (0.04)	0.07 (0.07)	0.11* (0.07)	0.17** (0.07)
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Min. # ratings	2	2	2	2	2	2	2	2
Observations	30,178	24,784	20,189	16,074	30,178	24,784	20,189	16,074
Adjusted R <sup>2</sup>	0.01	0.03	0.06	0.08	0.01	0.02	0.03	0.04

**Table 7: Institutional ownership and E&S performance – Results for firms in countries with high/low E&S values**

This table reports OLS regression estimates of environmental and social Consensus Scores on institutional ownership and control variables. Consensus Scores are defined as average normalized environmental (E) and social (S) scores by the rating agencies MSCI IVA, Sustainalytics, and Refinitiv. Institutional ownership is divided between holdings by Leaders, i.e., institutions that lead and support collaborative engagements, Non-Leaders, i.e., PRI signatories that are not involved in collaborative engagements, and other institutions. Country E&S values are measured with World Values Survey data as used in [Dyck et al. \(2019\)](#). Regression models 1 and 2 account for firms headquartered in countries with below-median E&S values, while models 3 and 4 account for firms with above-median E&S values. All regressions control for industry, year, and country fixed effects and lag independent variables by one year. Control variables are as outlined in Section 3.1. Continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. The sample consists of firm-years for which ratings from two or more agencies are available and covers the years 2010–2019. All variables are defined in Appendix A1. Robust standard errors are clustered at the country level and reported in parentheses. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Low E&S values		High E&S values	
	E-Score	S-Score	E-Score	S-Score
	(1)	(2)	(3)	(4)
IO Leaders	2.87*** (0.74)	2.13** (0.84)	1.38*** (0.32)	1.20*** (0.19)
IO Non-Leaders	0.36 (0.37)	0.81 (0.52)	0.20** (0.07)	0.22** (0.09)
IO Conventional	0.16 (0.21)	0.17 (0.26)	-0.18* (0.09)	0.001 (0.11)
Firm Controls	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Min. # of ratings	2	2	2	2
Observations	9,153	9,153	24,271	24,271
Adjusted R <sup>2</sup>	0.38	0.36	0.39	0.25

**Table 8: Overview of included collaborative engagements**

This table lists the environmental (E) and social (S) collaborative engagements used in our sample. Collaborative engagements are thematic engagement campaigns organized by the PRI and led by signatories. Based on the theme, engagements are assigned to the environmental or social dimension, or both. Engagement data and E/S assignments come directly from the PRI. Targeted firms denotes the number of affected companies which could be matched to FactSet. As the analyses of this study require several pre- and post periods relative to the start of the engagement, campaigns starting prior to 2011 or after 2017 are excluded from the sample.

Campaign	Year started	Dimension		Targeted firms
		E	S	
CDP Water Disclosure 2011	2011	x		118
COP4 - Fourth annual engagement with UNGC Companies	2011	x	x	91
Carbon Disclosure Leadership Index (CDLI 2011)	2011	x		84
Forest Footprint Disclosure 2011	2011	x		27
Sustainable fisheries	2011	x		40
CDP Carbon Action	2012	x		24
CDP Water Disclosure 2012	2012	x		39
COP5 - Fifth annual engagement with UNGC Companies	2012	x	x	106
Carbon Disclosure Leadership Index (CDLI 2012)	2012	x		60
Employee relations	2012		x	26
Forest Footprint Disclosure 2012	2012	x		9
Fracking	2012	x		36
Labour standards in the agricultural supply chain (phase 1)	2012		x	34
Water risks in agricultural SC (Phase 1)	2012	x		49
PRI Investor Working Group on Sustainable Palm Oil (buyers)	2013	x		51
COP6 - Sixth annual engagement on UN Global Compact companies	2014	x	x	153
Human rights in extractives	2014		x	32
PRI Investor Working Group on Sustainable Palm Oil (producers)	2014	x		14
Corporate climate lobbying	2015	x		21
Climate Action 100+	2017	x		161
PRI-coord. collab. engagem. on labour practices in ag SC (Phase 2)	2017		x	32
PRI-coord. collab. engagem. on methane risk	2017	x		31

**Table 9: Difference-in-differences (DID) regressions of environmental performance during PRI collaborative engagements**

This table reports DID regression estimates for the effect of collaborative engagements on environmental performance and the mediating role of ownership by Leaders. Consensus Scores require ratings by at least one rating agency. Each regression sample is restricted to firm-year observations in the time window indicated in the column titles. *Treated* is a dummy set to one for firms targeted by a collaborative engagement and zero otherwise. Control firms have similar characteristics but are never targeted by a PRI collaborative engagement on the respective dimension. *Post* is set to one for firm-years after the start of the engagement. Control variables include the natural logarithm of total assets (in USD), PPE, Leverage, Tobin’s Q, and Profitability. Independent variables are lagged by one year. Continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. All variables are defined in Appendix A1. Robust standard errors are clustered at the firm level and reported in parentheses. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dependent variable: E-Score		
	[-1, +2]	[-1, +3]	[-2, +3]
	(1)	(2)	(3)
<b>IO Leaders x Treated x Post</b>	<b>6.11***</b>	<b>6.43***</b>	<b>5.29**</b>
	<b>(2.21)</b>	<b>(2.18)</b>	<b>(2.08)</b>
Treated x Post	0.03	0.04	0.05
	(0.06)	(0.06)	(0.06)
Post	-0.10*	-0.07	-0.05
	(0.05)	(0.05)	(0.05)
IO Leaders	1.04	1.54	-1.75
	(1.88)	(1.80)	(1.92)
Post x IO Leaders	-0.55	-1.04	-0.57
	(1.40)	(1.44)	(1.39)
Treated x IO Leaders	-3.25	-4.36*	-0.12
	(2.70)	(2.53)	(2.44)
Firm Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	835	1,044	761
Adjusted R <sup>2</sup>	0.88	0.87	0.90

**Table 10: Institutional ownership and likelihood of E&S incidents**

This table reports regression estimates of an incident indicator variable on institutional ownership and controls. *Incident E* and *Incident S* are dummy variables set to one for firms experiencing an environmental (E) or social (S) incident during a given fiscal year. Incidents are reputation-damaging news events according to the methodology of the data provider RepRisk. Models 1 and 2 include all firm-years in our sample, while models 3 and 4 include only observations of firms that experienced an E or S incident at least once during the previous three years. All regressions account for industry, country, and year-fixed effects. Control variables include the natural logarithm of total assets (in million U.S. dollars), PPE, Leverage, Tobin's Q, and Profitability. Independent variables are lagged by one year. Continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. Incidents data is obtained from RepRisk. The sample spans the 2010–2019 period. All variables are defined in Appendix A1. Robust standard errors are clustered at the country level and reported in parentheses. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	All firm-years		Prior incident	
	Incident E (1)	Incident S (2)	Incident E (3)	Incident S (4)
IO Leaders	-0.21** (0.08)	0.06 (0.09)	-0.58** (0.29)	-0.23 (0.24)
IO Non-Leaders	-0.04 (0.03)	-0.00 (0.02)	-0.08 (0.07)	-0.01 (0.04)
IO Conventional	-0.09*** (0.03)	-0.09* (0.05)	0.00 (0.05)	0.05 (0.08)
Firm Controls	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	55,054	55,054	10,581	13,867
Adjusted R <sup>2</sup>	0.20	0.21	0.17	0.18

**Table 11: Institutional ownership response to E&S incidents**

This table reports OLS regression estimates for the effect of environmental and social incidents on institutional ownership. For each incident in the 2009–2019 sample period, we include observations from two years before to two years after the incident. *Post* is set to one for firm-years after the incident (starting in  $t_0$ , the year of the incident) and captures the change in institutional ownership following the event. Regression models 1 and 4, 2 and 5, and 3 and 6 measure the effect on *IO Leaders*, *IO Non-Leaders*, and *IO Conventional*, respectively. The models under *All incidents* include all incidents in the sample period, while models under *Large incidents* include only the most severe 50% of incidents. All regression models account for firm and year-fixed effects. Institutional ownership variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. Incident data is obtained from RepRisk. All variables are defined in Appendix A1. Robust standard errors are clustered at the firm level and reported in parentheses. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	All incidents			Large incidents		
	IO Leaders	IO Non-Leaders	IO Conventional	IO Leaders	IO Non-Leaders	IO Conventional
	(1)	(2)	(3)	(4)	(5)	(6)
Post	-0.0002 (0.0001)	0.0008 (0.0006)	-0.0017** (0.0007)	-0.0000 (0.0002)	0.0013 (0.0008)	-0.0024*** (0.0009)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	30,605	30,605	30,605	23,388	23,388	23,388
Adjusted R <sup>2</sup>	0.6914	0.8941	0.9204	0.6975	0.8934	0.9215

**Table 12: Institutional ownership and E&S performance – Results for firms affected/not affected by PRI collaborative engagements and E&S incidents**

This table reports OLS regression estimates of environmental and social Consensus Scores on institutional ownership and control variables. Models 1 and 2 revisit our baseline results contingent on firms targeted by PRI collaborative engagements. Models 3 and 4 account for firms affected by E/S incidents. “Ever Engaged E/S” and “Ever Incident E/S” are indicator variables with a value of one for firms that were targeted by PRI collaborative E/S engagements or experienced E/S incidents in any year of our sample. The regression specifications are consistent with the baseline models in Table 4 (columns 5 and 6). \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	PRI Engagements		E&S Incidents	
	E-Score (1)	S-Score (2)	E-Score (3)	S-Score (4)
IO Leaders	1.52*** (0.34)	1.35*** (0.21)	1.31*** (0.49)	1.15*** (0.36)
IO Leaders x Ever Engaged E	0.65 (0.59)			
Ever Targeted E	0.14*** (0.03)			
IO Leaders x Ever Engaged S		0.08 (1.05)		
Ever Targeted S		0.36*** (0.05)		
IO Leaders x Ever Incident E			0.94 (0.64)	
Ever Incident E			0.09*** (0.03)	
IO Leaders x Ever Incident S				0.54 (0.54)
Ever Incident S				0.08*** (0.02)
IO Non-Leaders	0.09 (0.07)	0.21** (0.09)	0.07 (0.08)	0.17* (0.10)
IO Conventional	-0.05 (0.09)	0.11 (0.09)	-0.06 (0.09)	0.09 (0.09)
Firm Controls	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Min. # ratings	2	2	2	2
Observations	35,026	35,026	35,026	35,026
Adjusted R <sup>2</sup>	0.37	0.29	0.37	0.28



# Appendix

**Table A1: Variable definitions**

Variable	Description
<i>Institutional ownership</i>	
IO Total	Holdings (end of fiscal year) by all institutional investors as a fraction of market capitalization. Source: FactSet Ownership
IO PRI	Holdings (end of fiscal year) by all institutional investors that are PRI signatories as a fraction of market capitalization. Source: FactSet Ownership and PRI
IO Leaders	Holdings (end of fiscal year) by all institutional investors that are PRI signatories and qualify as “Leaders” as a fraction of market capitalization. Leaders are institutions that lead and support a collaborative engagement during a given year. Source: FactSet Ownership and PRI
IO Non-Leaders	Holdings (end of fiscal year) by all institutional investors that are PRI signatories but do <i>not</i> qualify as “Leaders” as a fraction of market capitalization. Source: FactSet Ownership and PRI
IO Conventional	Holdings (end of fiscal year) by all institutional investors which are not PRI signatories as a fraction of market capitalization. Source: FactSet Ownership and PRI
<i>E &amp; S Scores</i>	
Consensus E-Score	Average of the normalized environmental scores from the rating agencies MSCI IVA, Sustainalytics, and Refinitiv, using all available scores per firm-year. Scores are normalized – each year and separately for every rating agency – to have a mean of zero and unit variance. Source: MSCI IVA, Sustainalytics, Refinitiv
Consensus S-Score	Average of the normalized social scores from the rating agencies MSCI IVA, Sustainalytics, and Refinitiv, using all available scores per firm-year. Scores are normalized – each year and separately for every rating agency – to have a mean of zero and unit variance. Source: MSCI IVA, Sustainalytics, Refinitiv
#Scores/Consensus	Number of environmental or social scores that are available to compute the Consensus Score in a given year. Source: MSCI IVA, Sustainalytics, Refinitiv
Sustainalytics E-Score	Environmental score from the rating agency Sustainalytics. Source: Sustainalytics
Sustainalytics S-Score	Social score from the rating agency Sustainalytics. Source: Sustainalytics
MSCI E-Score	Environmental score from the rating agency MSCI IVA. Source: MSCI
MSCI S-Score	Social score from the rating agency MSCI IVA. Source: MSCI
Refinitiv E-Score	Environmental score from the rating agency Refinitiv (formerly Asset4). Source: Refinitiv
Refinitiv S-Score	Social score from the rating agency Refinitiv (formerly Asset4). Source: Refinitiv
Incident E	Indicator variable with a value of one in firm-years with one or more reputation-damaging environmental incidents, and zero otherwise. Source: RepRisk
Incident S	Indicator variable with a value of one in firm-years with one or more reputation-damaging social incidents, and zero otherwise. Source: RepRisk

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<i>Firm fundamentals</i>	
Log Assets	Natural logarithm of total assets in million of U.S. dollars (FactSet item FF_ASSETS). Source: FactSet Fundamentals
PPE	Property, plant, and equipment (FactSet item PPE_NET) divided by total assets (FactSet item FF_ASSETS). Source: FactSet Fundamentals
Leverage	Total debt (FactSet item FF_DEBT) divided by total assets (FactSet item FF_ASSETS). Source: FactSet Fundamentals
Tobin's Q	Total assets (FactSet item FF_ASSETS) plus market value of equity (FactSet item FF_MKT_VAL) minus book value of equity (FactSet item FF_COM_EQ) divided by total assets. Source: FactSet Fundamentals
Profitability	Earnings before interest, taxes, depreciation, and amortization (FactSet item FF_EBITDA_OPER) divided by total assets (FactSet item FF_ASSETS). Source: FactSet Fundamentals

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**Table A2: Correlation between variables**

This table shows the correlations between variables for the sample period from 2010 through 2019. \* indicates that the parameter estimate is significantly different from zero at the 1% level.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Consensus E-Score	1.00											
(2) Consensus S-Score	0.51*	1.00										
(3) IO Total	-0.02*	0.04*	1.00									
(4) IO PRI	0.06*	0.10*	0.81*	1.00								
(5) IO Leaders	0.15*	0.16*	0.28*	0.54*	1.00							
(6) IO Non-Leaders	0.03*	0.08*	0.83*	0.98*	0.38*	1.00						
(7) IO Conventional	-0.07*	-0.02*	0.91*	0.50*	0.04*	0.54*	1.00					
(8) Log Assets	0.26*	0.24*	-0.03*	0.04*	0.04*	0.04*	-0.08*	1.00				
(9) PPE	0.02*	0.00	-0.08*	-0.09*	-0.09*	-0.08*	-0.05*	-0.01	1.00			
(10) Leverage	0.06*	0.04*	-0.00	0.00	-0.02*	0.01	-0.00	0.19*	0.26*	1.00		
(11) Tobin's Q	-0.03*	-0.05*	0.14*	0.11*	0.08*	0.10*	0.13*	-0.38*	-0.13*	-0.23*	1.00	
(12) Profitability	0.09*	0.07*	0.07*	0.11*	0.13*	0.09*	0.03*	0.16*	0.14*	-0.02*	0.13*	1.00

**Table A3: Consistency of Leaders subgroup across years**

This table shows how the group of institutional investors defined as Leaders evolves over time. *#Leaders* shows the number of institutions that lead and support a collaborative engagement during a given year. *#Additions* and *#Deletions* show the number of institutions that join or leave the Leaders group in a given year. *Retention probability* is the likelihood of Leaders from the previous period to retain their Leader status also in the current year. The sample is at the institutional investor-year level and covers the years 2009–2019.

Year	# Leaders	# Additions	# Deletions	Retention probability
2009	9	-	-	-
2010	26	17	0	100%
2011	27	1	0	100%
2012	46	23	4	85%
2013	48	6	4	91%
2014	55	12	5	90%
2015	56	2	1	98%
2016	49	0	7	88%
2017	105	57	1	98%
2018	107	8	6	94%
2019	109	4	2	98%

**Table A4: Changes in E&S performance and changes in IO Leaders**

This table reports OLS regression estimates of changes in institutional ownership by Leaders on changes in E&S Consensus Scores and control variables in the 2010–2019 period.  $s$  is the number of years upon which the changes are computed. For example, in model 1,  $\Delta\text{IO Leaders} = \text{IO Leaders}_t - \text{IO Leaders}_{t-1}$  and  $\Delta\text{E-Score} = \text{E-Score}_{t-1} - \text{E-Score}_{t-2}$ . The table repeats regressions Table 6, but with the adjustment that the  $\Delta\text{IO Leaders}$  variable and the dependent variables ( $\Delta\text{E-Score}$ ,  $\Delta\text{S-Score}$ ) are reversed. All regressions also include  $\Delta\text{IO Non-Leaders}$  and  $\Delta\text{IO Conventional}$  (from  $t-s-1$  to  $t-1$ ) as independent variables (unreported for brevity). Consensus Scores are defined as average normalized environmental (E) and social (S) scores by the rating agencies MSCI IVA, Sustainalytics, and Refinitiv. The regression sample consists of firm-years for which ratings by at least two agencies are available. All regressions account for industry, year, and country fixed effects and control variables as outlined in Section 3.1. Continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. All variables are defined in Appendix A1. Robust standard errors are clustered at the country level and reported in parentheses. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	$\Delta\text{IO Leaders (t-s,t)}$							
	(1) s=1	(2) s=2	(3) s=3	(4) s=4	(5) s=1	(6) s=2	(7) s=3	(8) s=4
$\Delta\text{E-Score (t-s-1,t-1)}$	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)				
$\Delta\text{S-Score (t-s-1,t-1)}$					0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Other $\Delta\text{IO Variables}$	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Min. # ratings	2	2	2	2	2	2	2	2
Observations	26,227	21,488	17,338	13,792	26,227	21,488	17,338	13,792
Adjusted $R^2$	0.13	0.14	0.17	0.17	0.13	0.14	0.17	0.17

**Table A5: Institutional ownership and E&S performance – Results by geography**

This table reports OLS regression estimates of environmental and social Consensus Scores on institutional ownership and control variables. Consensus Scores are defined as average normalized environmental (E) and social (S) scores by the rating agencies MSCI IVA, Sustainalytics, and Refinitiv. Institutional ownership is divided between holdings by Leaders, i.e., institutions that lead and support collaborative engagements, Non-Leaders, i.e., PRI signatories that are not involved in collaborative engagements, and other institutions. All regressions control for industry, year, and country fixed effects and lag independent variables by one year. Control variables are as outlined in Section 3.1. Regressions are carried out separately by geographical region, where “North America” includes only firms from the USA or Canada and “Rest of world” includes firms from Oceania, Africa, and Latin America. Continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. The sample consists of firm-years for which ratings from two or more agencies are available and covers the years 2010–2019. All variables are defined in Appendix A1. Robust standard errors are clustered at the country level and reported in parentheses. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	North America		Europe		Asia		Rest of world	
	E-Score	S-Score	E-Score	S-Score	E-Score	S-Score	E-Score	S-Score
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
IO Leaders	1.91** (0.10)	1.55* (0.22)	1.48** (0.55)	1.76*** (0.32)	2.31** (1.02)	2.39** (0.95)	2.06** (0.65)	2.03 (1.24)
IO Non-Leaders	0.19 (0.07)	0.33 (0.11)	0.13 (0.23)	-0.08 (0.28)	0.98*** (0.32)	1.61*** (0.47)	0.24 (0.37)	0.33 (0.19)
IO Convent.	-0.23 (0.17)	-0.02 (0.24)	-0.26 (0.20)	-0.17 (0.15)	0.03 (0.28)	0.07 (0.30)	0.22 (0.30)	0.05 (0.29)
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Min. # ratings	2	2	2	2	2	2	2	2
Observations	12,572	12,572	8,796	8,796	10,014	10,014	3,644	3,644
Adjusted R <sup>2</sup>	0.29	0.13	0.36	0.27	0.33	0.24	0.31	0.23

**Table A6: Institutional ownership and E&S performance – Different numbers of ratings**

This table reports OLS regression estimates of environmental and social Consensus Scores on institutional ownership and control variables. Consensus Scores are defined as average normalized environmental (E) and social (S) scores by the rating agencies MSCI IVA, Sustainalytics, and Refinitiv. Models 1 and 2 account for firm-years for which ratings by all three agencies are available. Models 3 and 4 include firm years with one or more available ratings. All regressions differentiate between ownership by Leaders, Non-Leaders, and conventional investors. Leaders are institutions that lead and support a collaborative engagement during a given year. All regressions control for industry, year, and country fixed effects and lag independent variables by one year. Control variables are as described in Section 3.1. Continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. The sample covers the 2010–2019 period. All variables are defined in Appendix A1. Robust standard errors are clustered at the country level and reported in parentheses. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	3 Ratings		1+ Ratings	
	E-Score (1)	S-Score (2)	E-Score (3)	S-Score (4)
IO Leaders	2.28*** (0.57)	1.73*** (0.35)	1.29*** (0.27)	0.94*** (0.25)
IO Non-Leaders	0.10 (0.13)	0.20 (0.14)	-0.02 (0.05)	-0.001 (0.07)
IO Conventional	-0.09 (0.15)	0.10 (0.12)	0.03 (0.08)	0.14** (0.07)
Firm Controls	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Observations	21,940	21,940	55,054	55,054
Adjusted R <sup>2</sup>	0.39	0.32	0.26	0.18

**Table A7: Institutional ownership and E&S performance – Results per rating agency**

This table reports OLS regression estimates of environmental (E) and social (S) scores on institutional ownership and control variables. The regressions are run separately by rating agency, i.e., Sustainalytics, MSCI IVA and, Refinitiv. Institutional ownership is divided between holdings by Leaders, i.e., institutions that lead and support collaborative engagements, Non-Leaders, i.e., PRI signatories that are not involved in collaborative engagements, and other institutions. All regressions control for industry, year, and country fixed effects and lag independent variables by one year. Continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. *Full sample* covers all firm-years where the respective E&S rating is available. *Common sample* is restricted to observations where ratings from all three agencies are available. For both panels, the sample covers the years 2010–2019. All variables are defined in Appendix A1. Robust standard errors are clustered at the country level and reported in parentheses. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Sustainalytics		MSCI IVA		Refinitiv	
	E-Score	S-Score	E-Score	S-Score	E-Score	S-Score
	(1)	(2)	(3)	(4)	(5)	(6)
<b>Full sample</b>						
IO Leaders	34.93*** (5.61)	22.25*** (3.59)	2.64*** (0.86)	1.82*** (0.65)	59.98*** (12.31)	42.53*** (8.71)
IO Non-Leaders	2.03 (1.87)	0.81 (1.56)	0.41*** (0.09)	0.18 (0.16)	-3.53 (3.88)	4.15 (3.74)
IO Conventional	0.73 (1.67)	0.99 (1.24)	-0.02 (0.12)	0.02 (0.13)	-6.36* (3.31)	6.07** (2.33)
Observations	31,824	31,824	43,859	43,862	36,337	36,337
Adjusted R <sup>2</sup>	0.34	0.26	0.19	0.11	0.46	0.40
<b>Common sample</b>						
IO Leaders	41.91*** (6.58)	22.97*** (4.62)	3.47** (1.66)	2.25** (1.00)	69.36*** (17.52)	45.01*** (11.89)
IO Non-Leaders	0.38 (2.19)	0.78 (1.65)	0.41 (0.27)	0.15 (0.35)	0.23 (4.61)	9.79** (4.21)
IO Conventional	1.10 (2.28)	0.41 (1.68)	-0.02 (0.33)	0.08 (0.22)	-7.55 (5.83)	5.55* (3.19)
Observations	21,940	21,940	21,940	21,940	21,940	21,940
Adjusted R <sup>2</sup>	0.35	0.28	0.23	0.15	0.39	0.37
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes



**Table A8: Institutional ownership and E&S performance – Excluding financial firms**

This table reports OLS regression estimates of environmental and social Consensus Scores on institutional ownership and control variables in the 2010–2019 period. Consensus Scores are defined as average normalized environmental (E) and social (S) scores by the rating agencies MSCI IVA, Sustainalytics, and Refinitiv. The regression sample consists of firm-years of non-financial firms (excluding SIC codes 6000–6999) for which ratings by at least two agencies are available. Models 1 and 2 use total institutional ownership as independent variable. Models 3 and 4 differentiate between ownership by PRI signatories, and conventional investors. Models 5 and 6 differentiate between ownership by Leaders, other PRI signatories (Non-Leaders), and conventional investors. All regressions control for industry, year, and country fixed effects and lag independent variables by one year. Continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. All variables are defined in Appendix A1. Robust standard errors are clustered at the country level and reported in parentheses. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	IO overall		IO PRI		IO Leaders	
	E-Score	S-Score	E-Score	S-Score	E-Score	S-Score
	(1)	(2)	(3)	(4)	(5)	(6)
IO Total	0.07 (0.07)	0.20** (0.09)				
IO PRI			0.25*** (0.08)	0.33*** (0.10)		
IO Leaders					1.44*** (0.32)	1.24*** (0.23)
IO Non-Leaders					0.09 (0.08)	0.21* (0.11)
IO Conventional			-0.07 (0.09)	0.10 (0.10)	-0.07 (0.10)	0.09 (0.10)
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Min. # of ratings	2	2	2	2	2	2
Observations	31,983	31,983	31,983	31,983	31,983	31,983
Adjusted R <sup>2</sup>	0.38	0.28	0.38	0.28	0.38	0.29

**Table A9: Institutional ownership and E&S performance – Industry-by-year fixed effects**

This table reports OLS regression estimates of environmental and social Consensus Scores on institutional ownership and control variables in the 2010–2019 period. Consensus Scores are defined as average normalized environmental (E) and social (S) scores by the rating agencies MSCI IVA, Sustainalytics, and Refinitiv. All regressions account for industry-by-year fixed effects, where models 1–4 use SIC Industry Divisions and models 5–8 use SIC2 industries. All regressions account for country fixed effects and control variables as outlined in Section 3.1. Independent variables are lagged by one year. Continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. All variables are defined in Appendix A1. Robust standard errors are clustered at the country level and reported in parentheses. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	SIC Industry Divisions				SIC2 Industries			
	E-Score	S-Score	E-Score	S-Score	E-Score	S-Score	E-Score	S-Score
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
IO Leaders	1.65*** (0.35)	1.44*** (0.23)	2.33*** (0.59)	1.78*** (0.36)	1.43*** (0.31)	1.23*** (0.23)	2.02*** (0.55)	1.56*** (0.29)
IO Non-Leaders	0.12 (0.08)	0.18* (0.10)	0.13 (0.12)	0.21 (0.14)	-0.01 (0.06)	0.13 (0.09)	-0.07 (0.10)	0.13 (0.13)
IO Conventional	-0.08 (0.10)	0.08 (0.10)	-0.10 (0.16)	0.09 (0.12)	-0.14* (0.08)	0.06 (0.09)	-0.17 (0.15)	0.07 (0.11)
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry x Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Min. # of ratings	2	2	3	3	2	2	3	3
Observations	35,026	35,026	21,940	21,940	35,026	35,026	21,940	21,940
Adjusted R <sup>2</sup>	0.37	0.28	0.39	0.33	0.41	0.31	0.43	0.36

**Table A10: Institutional ownership and E&S performance – Alternative standard error clusterings**

This table reports OLS regression estimates of environmental and social Consensus Scores on institutional ownership and control variables in the 2010–2019 period. Consensus Scores are defined as average normalized environmental (E) and social (S) scores by the rating agencies MSCI IVA, Sustainalytics, and Refinitiv. Robust standard errors are clustered at the firm level in models 1 and 2, at the industry level (SIC2 industries) in models 3 and 4, and two-dimensionally at the country and year level in models 5 and 6. All regressions account for country fixed effects and control variables as outlined in Section 3.1. Independent variables are lagged by one year. Continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. All variables are defined in Appendix A1. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Firm level		Industry level		Country and year level	
	E-Score (1)	S-Score (2)	E-Score (3)	S-Score (4)	E-Score (5)	S-Score (6)
IO Leaders	2.28*** (0.37)	1.73*** (0.37)	2.28*** (0.50)	1.73*** (0.48)	2.28*** (0.52)	1.73*** (0.34)
IO Non-Leaders	0.10 (0.11)	0.20* (0.11)	0.10 (0.13)	0.20 (0.14)	0.10 (0.13)	0.20 (0.14)
IO Conventional	-0.09 (0.09)	0.10 (0.09)	-0.09 (0.10)	0.10 (0.10)	-0.09 (0.15)	0.10 (0.12)
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Min. # ratings	2	2	2	2	2	2
Observations	21,940	21,940	21,940	21,940	21,940	21,940
Adjusted R <sup>2</sup>	0.39	0.32	0.39	0.32	0.39	0.32

**Table A11: Pre-engagement characteristics of treatment and control firms**

This table provides mean comparisons of treated and control firms in our difference-in-differences (DID) tests. Mean values of the covariates used for matching are computed one year before the engagement starts. The control group is identified based on exact matching on region, industry, and year and then using nearest neighbor propensity score matching (PSM). Firms are matched based on the natural logarithm of total assets (million U.S. dollars), Profitability, Tobin’s Q, PPE, and Leverage. Eligible matches require E-Score coverage throughout the respective event window and a propensity score no larger than 0.1 standard deviations. The sample spans the 2009–2019 period. All variables are defined in Appendix A1.

Variable	Treated firms	Control firms	T statistic
Log Assets	8.82	8.83	-0.06
Profitability	0.14	0.12	1.59
Tobin’s Q	1.71	1.63	0.65
PPE	0.35	0.34	0.20
Leverage	0.25	0.25	0.29
N firms	105	104	
Industry FE	Yes	Yes	
Region FE	Yes	Yes	
Year FE	Yes	Yes	

**Table A12: DID regressions of environmental performance during collaborative engagements – Matching incl. IO Leaders as covariate**

This table reports DiD regression estimates for the effect of collaborative engagements on environmental performance and the mediating role of ownership by Leaders. Consensus Scores require ratings by at least one rating agency. Each regression sample is restricted to firm-year observations in the time window indicated in the column titles. *Treated* is a dummy set to one for firms targeted by a collaborative engagement and zero otherwise. Control firms have similar characteristics but are never targeted by a PRI collaborative engagement on the respective dimension. Different from Table 9, the matching covariates include *IO Leaders*. *Post* is set to one for firm-years after the engagement started. Control variables include the natural logarithm of total assets (in USD), PPE, Leverage, Tobin’s Q, and Profitability. Independent variables are lagged by one year. Continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. All variables are defined in Appendix A1. Robust standard errors are clustered at the firm level and reported in parentheses. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dependent variable: E-Score		
	[-1, +2]	[-1, +3]	[-2, +3]
	(1)	(2)	(3)
<b>IO Leaders x Treated x Post</b>	<b>4.12*</b>	<b>4.45*</b>	<b>5.33**</b>
	<b>(2.22)</b>	<b>(2.31)</b>	<b>(2.48)</b>
Treated x Post	0.06	0.07	0.06
	(0.05)	(0.06)	(0.06)
Post	-0.08	-0.07	-0.06
	(0.05)	(0.05)	(0.06)
IO Leaders	1.36	0.83	-0.50
	(1.54)	(1.42)	(1.88)
Post x IO Leaders	-0.14	-0.27	-0.14
	(1.03)	(1.08)	(1.39)
Treated x IO Leaders	-2.22	-2.78	-1.24
	(2.65)	(2.64)	(2.77)
Firm Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	820	1,025	752
Adjusted R <sup>2</sup>	0.88	0.88	0.90

**Table A13: DID regressions of environmental performance during collaborative engagements – Fully interacted model**

This table reports DID regression estimates for the effect of collaborative engagements on environmental performance and the mediating role of ownership by Leaders. Consensus Scores require ratings by at least one rating agency. Each regression sample is restricted to firm-year observations in the time window indicated in the column titles. *Treated* is a dummy set to one for firms targeted by a collaborative engagement and zero otherwise. Control firms have similar characteristics but are never targeted by a PRI collaborative engagement on the respective dimension. *Post* is set to one for firm-years after the engagement started. Different from Table 9, also all control variables are interacted with the *Post* dummy. Control variables are as outlined in Section 3.1. Independent variables are lagged by one year. Continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. All variables are defined in Appendix A1. Robust standard errors are clustered at the firm level and reported in parentheses. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dependent variable: E-Score		
	[-1, +2]	[-1, +3]	[-2, +3]
	(1)	(2)	(3)
<b>IO Leaders x Treated x Post</b>	<b>5.67***</b>	<b>5.85***</b>	<b>4.89**</b>
	<b>(2.14)</b>	<b>(2.16)</b>	<b>(2.15)</b>
Treated x Post	0.04	0.05	0.05
	(0.05)	(0.06)	(0.06)
Post	0.55*	0.50*	0.16
	(0.29)	(0.30)	(0.34)
IO Leaders	0.65	1.23	-2.03
	(1.87)	(1.91)	(2.01)
Post x IO Leaders	-0.55	-1.03	-0.47
	(1.54)	(1.60)	(1.47)
Treated x IO Leaders	-3.29	-4.15	-0.04
	(2.63)	(2.52)	(2.57)
Log Assets	0.03	0.10	0.19**
	(0.08)	(0.08)	(0.09)
Profitability	0.68	0.75	-0.28
	(0.58)	(0.64)	(0.46)
Tobin's Q	-0.02	-0.04	0.04
	(0.05)	(0.05)	(0.04)
PPE	-0.15	-0.22	0.17
	(0.34)	(0.30)	(0.28)
Leverage	0.50	0.22	0.06
	(0.35)	(0.33)	(0.32)
Log Assets x Post	-0.06**	-0.05*	-0.02
	(0.03)	(0.03)	(0.03)
Profitability x Post	-0.83	-0.68	0.33
	(0.54)	(0.56)	(0.54)
Tobin's Q x Post	0.05	0.05	-0.01
	(0.04)	(0.05)	(0.04)
PPE x Post	-0.09	-0.10	-0.09
	(0.12)	(0.12)	(0.12)
Leverage x Post	-0.30	-0.33	-0.08
	(0.20)	(0.21)	(0.21)
Firm Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	835	1,044	761
Adjusted R <sup>2</sup>	0.88	0.88	0.90

**Table A14: DID regressions of environmental performance during collaborative engagements – Inclusion of all interacted IO variables**

This table reports DID regression estimates for the effect of collaborative engagements on environmental performance and the mediating role of ownership by Leaders. Consensus Scores require ratings by at least one rating agency. Each regression sample is restricted to firm-year observations in the time window indicated in the column titles. *Treated* is a dummy set to one for firms targeted by a collaborative engagement and zero otherwise. Control firms have similar characteristics but are never targeted by a PRI collaborative engagement on the respective dimension. *Post* is set to one for firm-years after the engagement started. Different from Table 9, also the ownership variables *IO Non-Leader* and *IO Conventional* are interacted with the *Treated* and *Post* dummies. Control variables are as outlined in Section 3.1. Independent variables are lagged by one year. Continuous variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles. All variables are defined in Appendix A1. Robust standard errors are clustered at the firm level and reported in parentheses. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dependent variable: E-Score		
	[-1, +2]	[-1, +3]	[-2, +3]
	(1)	(2)	(3)
<b>IO Leaders x Treated x Post</b>	<b>5.12**</b> <b>(2.18)</b>	<b>5.28**</b> <b>(2.13)</b>	<b>4.27**</b> <b>(2.01)</b>
IO Non-Leaders x Treated x Post	1.22 (1.05)	1.41 (1.05)	0.35 (1.08)
IO Conventional x Treated x Post	0.08 (0.34)	-0.08 (0.33)	0.06 (0.33)
IO Leaders x Treated	-2.54 (2.75)	-3.83 (2.57)	-0.55 (2.48)
IO Non-Leaders x Treated	-1.48 (1.29)	-1.44 (1.25)	-0.08 (1.12)
IO Conventional x Treated	0.14 (0.87)	-0.16 (0.68)	0.23 (0.80)
IO Leaders x Post	-0.19 (1.34)	-0.55 (1.38)	0.15 (1.48)
IO Non-Leaders x Post	-0.50 (0.65)	-0.67 (0.67)	-0.57 (0.58)
IO Conventional x Post	-0.08 (0.25)	0.04 (0.24)	0.10 (0.20)
IO Leaders	0.81 (1.82)	1.30 (1.79)	-1.56 (1.99)
IO Non-Leaders	0.18 (0.84)	0.08 (0.87)	-0.89 (0.69)
IO Conventional	-0.22 (0.60)	-0.10 (0.49)	-1.11** (0.54)
Treated x Post	0.09 (0.06)	0.09 (0.06)	0.07 (0.07)
Post	-0.12** (0.05)	-0.09* (0.05)	-0.08 (0.06)
Firm Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	835	1,044	761
Adjusted R <sup>2</sup>	0.88	0.87	0.90