Analyzing Active Managers' Commitment to ESG: Evidence from United Nations Principles for Responsible Investment

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Abstract

We analyze the active mutual fund managers' commitment to ESG using the largest global ESG initiative in the asset management industry to date: United Nations Principles for Responsible Investment (PRI). We find that PRI signatories attract a large increase in fund flow after signing. However, at least on average, we find no improvements in their value-weighted average fund-level ESG scores and also no evidence that they are buying (selling) high (low) ESG performing stocks. In addition, the stocks held in their portfolio do not exhibit improvements in ESG performance and actually exhibit a small increase in the number of controversies experienced. Further, signatories increase voting in favor of the management proposals on social issues while exhibiting an overall decrease in fund return. We explore whether signatories were superior performers in ESG issues prior to joining the initiative vis-à-vis non-PRI funds, but find no such evidence. Finally, we take a battery of cross-sectional fund characteristics and find that only quant-funds exhibit small improvements in ESG performance through buying high ESG performing stocks. Overall, we conclude that most signatories use the PRI status to attract capital but do not exhibit meaningful follow through on ESG implementation. However, we note that we can only speak to observed channels with publicly available data and cannot do so for unobserved channels such as private engagements.

JEL classification codes: G20
Keywords: ESG, SRI, UN PRI, Asset Manager, Mutual Funds, Greenwashing

* Soohun Kim is an assistant professor at KAIST and Aaron Yoon is an assistant professor at Northwestern University. We thank Hans Christensen, Robert Eccles, Caroline Flammer, Paul Griffin (discussant), Ravi Jagannathan, Robert Korajczyk, Sangwook Nam, James Naughton, Andreas Neuhierl, Sugata Roychowdhury, George Serafeim, Beverly Walther, a number of anonymous asset managers, and seminar participants at Conference on Asia-Pacific Financial Markets, Chinese University of Hong Kong, 15th Annual Conference on Asia-Pacific Financial Markets Conference, Illinois Young Scholars Research Symposium, Korea Securities Association Conference, and Northwestern University for very helpful discussions. We also thank Sustainalytics and TruValue Labs for generously providing the ESG data. All errors are our sole responsibility. Corresponding author: Aaron Yoon. E-mail: aaron.yoon@kellogg.northwestern.edu.

1. Introduction

Environmental, social, and governance (ESG) has been one of the fastest growing phenomena in the recent decade and much attention has been paid by academics, firm managers and investors. For example, in August 2019, the Business Roundtable (BRT 200) that represents 200 CEOs of America's largest companies committed to shift the role of corporation from serving shareholders to stakeholders. More recently in 2020, BlackRock's CEO Larry Fink sent a letter to investors detailing the commitment to incorporate ESG as a new standard for investing. However, these promises could be illusory as it is questionable whether corporate leaders would serve the interest of stakeholders. In addition, stakeholderism could make corporate leaders less accountable, more insulated, and increase slack (Bebchuk and Tallarita 2020). Overall, while statements to incorporate ESG issues seem virtuous, very little effort has been made to assess their validity and we thus know very little about whether such commitments translate into proper follow through.

In this paper, we use the largest initiative in the asset management industry to incorporate ESG issues, the United Nations Principles for Responsible Investment (henceforth "UN PRI" or "PRI"), to analyze the active fund managers' commitment to ESG. UN PRI was initiated by institutional investors across the globe in 2006 and called for funds to incorporate ESG issues into their investment decisions and to actively engage companies. When PRI was launched in 2006, signatories' total assets under management (AUM) was just a few hundred billion dollars, but by 2020, this number grew to more than $120 trillion, which is almost four times the entire market capitalization of the US. We focus on active mutual fund managers (i.e., not ETFs or index funds), because we are interested in those managers who have the capability to adopt ESG factors without being significantly constrained to track a specific index.

According to the UN PRI Guidelines, signatories are publicly committing to incorporate ESG issues into investment analysis and decision-making and be active owners (see Appendix 1). PRI statement is signed by senior executives of the asset management firm and the affiliation with the PRI is heavily advertised in company websites, marketing materials, and/or in fund documents (see Appendix 2). As such, there may be a significant amount of scrutiny not only from the public but also from asset allocators (i.e., pension funds) who care a lot about ESG issues and whom the signatory asset managers have the fiduciary duty to (Schanzenbach and Sitkoff 2020). And, there is a high likely that asset managers would make significant efforts to incorporate ESG issues into portfolio decisions after signing the PRI.

However, we note that there are reasons to expect otherwise. First, despite the phenomenal growth in signatories' AUM, CFA Institute Survey of asset managers in 2017 documents that most asset managers perceive ESG issues to be financially irrelevant (CFA Institute, 2017). If so, it is uncertain whether signatories would prioritize ESG over fund returns. Second, the same survey suggests that asset managers do not receive any ESG-related training, and that there is little guidance from asset owners who allocate money to them on the specifics of ESG execution. Third, ESG implementation can be difficult because there are disagreements in defining and quantifying ESG (Berg et al. 2019). Hence, given the various private interests among intermediaries, investors, and firm managers, ESG metrics' ambiguity makes the prediction of ESG implementation even harder (Lys et al. 2015; Friedman and Heinle 2016, 2020; Cheng et al. 2019). And precisely because of these reasons, asset managers may engage in greenwashing (i.e., use ESG as a marketing tool to attract capital without making meaningful changes to their investment practices). Overall, it is ex-ante unclear how signatory asset managers would behave after signing UN PRI.

We first examine whether signing the PRI prompts meaningful reaction from the asset allocators. From the perspective of delegated asset managers, what good is there to sign the PRI if those who allocate capital do not care? Given that a crucial equilibrating mechanism for mutual fund market is the decision of capital allocation by investors (Berk and Green 2004), we examine whether there are visible changes to fund flows after signatories sign the PRI and view this exercise as an important step to justify our research setting and question. Specifically, we compare the fund flows during the six quarters pre- and post-signing and find that PRI signatories exhibit a surprising spike in fund flows (i.e., 4.9% increase per quarter for the subsequent six quarters). We note that this increase is well spread out and is robust to considering eight and twelve quarters ex-post. Overall, this first evidence confirms that asset allocators consider PRI status as a valuable signal, manifested by a significant allocation of new capital to the signatory asset managers.

We then move to the paper's main exercise and examine whether and how signatory asset managers incorporate ESG issues. We utilize an extensive set of firm-level ESG scores that are commonly used by asset managers. Specifically, we use the scores from MSCI, Sustainalytics, and TruValue Labs and calculate fund-level ESG scores at each quarter by value-weighting firm level ESG scores in each portfolio. We do not observe any notable improvements in fund-level ESG scores regardless of the dataset used and the result is robust to considering various ESG sub-scores (i.e., those related to environment, social, or governance separately, or to financial materiality). This result also holds when we identify a matched group of non-PRI funds and use difference-in-differences specification to address the potential selection bias.

We note that two important mechanisms that active manager can implement ESG are via 1) entry/exit (i.e., buying (selling) good (poor) ESG performers) and 2) engagement (i.e., influencing the behavior of firms in its holdings). For example, while funds can change their

ownership stake quickly, they can take much more time to first engage firms before implementing an exit strategy. We acknowledge that the value-weighted fund-level ESG scores explore the two mechanisms at the same time as there are three dials that could turn simultaneously (i.e., firm level ESG Score, underlying performance, and portfolio holdings). To address such a concern, we consider the channels that signatories can pursue. First, we examine whether signatories buy high and sell low ESG performing stocks to test whether signatories exercise entry and exit strategies. Second, we examine whether firms held in signatories' portfolio at the time of signing and held for the subsequent 8 quarters exhibit improvements in ESG performance to test whether signatories induce improvements in firm ESG performance. Third, we examine whether firms that signatories are major shareholders of exhibit improvements in ESG performance as signatories would likely have more influence on these firms. We find no evidence to support any of the above channels.

In addition, we consider signatory funds' proxy voting behavior as prior literature found voting to be an important mechanism for engagement (Dimson et al. 2015). We find that there is a small increase in signatories voting on social issues; however, at the same time, signatories increase voting for the managements' proposals. In addition, we conduct two tests to see whether funds are screening poor ESG performers. First, we examine the trend in the number of controversies in the stocks held. Second, we examine the trend in ESG scores of the firms that are in the bottom quartile of the signatories' portfolios as signatories may screen out poor ESG performers, and if so the ESG scores of the firms that are in the bottom of the distribution may improve over time. In both tests, we find no evidence that funds are engaging in screening.

We also consider alternate pre-periods. For example, signatories may already be superior performers on ESG issues at the time of signing and/or already significantly improved fund-level ESG performance much before joining. To rule out this notion, we consider the pre-periods to end

1 and 2 years before signing, but find no evidence of ESG improvements. In addition, we compare the fund-level ESG scores of signatories to non-signatory active funds as well as propensity score matched group of control funds. But, we find no evidence that signatories were superior performers in ESG at the time of signing.

We note that a potential justification for no improvements in fund-level ESG could be due to pecuniary motives because active fund managers may be prioritizing alpha generation over ESG issues (Renneboog et al. 2011; Pedersen et al. 2020). To rule out this potential concern, we examine the portfolio return and alpha post signing, but find no improvements at best. This result is robust to controlling for fund size (i.e., diseconomies of scale) and happens without a reduction in management fee. Overall, the results so far suggest that signatories enjoy higher aggregate revenue from capital inflow but exhibits no change in ESG and fund performance.

Next, we examine the characteristics that increase the likelihood to sign the PRI. As the decision to sign is made at the asset management firm level, we use the hazard model to understand which asset manager characteristics influence a non-PRI manager to sign. We find that asset management firms with higher number of funds in the family are more likely to sign the PRI initiative. This may be so because there usually is a higher number of client investors when there are more funds in the fund family and naturally there is a higher likelihood of one of the clients being an advocate on ESG issues, which may push the asset management firm to sign the PRI. In addition, we find that asset managers who charge a lower fee and those that are listed are more likely to sign the PRI, potentially to seek publicity and attract capital.

Finally, we examine the cross-sectional fund characteristics that improve the fund-level ESG scores post signing. We examine fund characteristics such as quant fund status, size, fee, team managed status, and pre-signing ESG scores, but find that only quant funds status is

associated with ESG improvements. We view this plausible as ESG analysis is easier implemented using a particular signal to create long-short portfolios rather than through traditional fundamental analysis (see Khan et al. 2016). We explore the mechanisms in which quant funds utilize and find that they improve fund-level ESG scores through buying stocks that score high on ESG issues.

We note that our paper has at least a few caveats. First, while we consider many different dimensions of ESG implementation (e.g., fund level ESG performance, entry/exit, improvements in ESG performance through engagements, and screening), we cannot capture every single channels that asset managers implement. For example, one important channel is private engagements (Grewal et al. 2016). However, we are not able to assess active managers' efforts that are made privately given the data availability. Second, recent academic literature (e.g., Serafeim and Yoon 2021a, 2021b), comments from regulators, and anecdotal evidence all suggest that ESG is still not well implemented even among the most sophisticated investors.[1,2,3] However, we acknowledge the possibility, at least in the more recent years, that at least some asset managers may have their own proprietary ESG scoring system and methodologies to evaluate firms' ESG efforts. Unfortunately, our empirical design cannot capture such efforts as they are not disclosed. Lastly, we note that UN PRI is voluntary and aspirational and there could be concerns as to what the most appropriate outcomes are to assess the follow through due to the vagueness of the principles. We consider as many observable outcome and mechanisms to alleviate this concern.

Nonetheless, we view that our paper makes the following contributions to the existing literature. First, literature has devoted most of its attention to assess firm-level ESG. For example, papers examined whether ESG is related to shareholder value and why firms engage in ESG (e.g.,

[1] Wall Street Journal. Nov 2019. A User's Guide to the ESG Confusion.
[2] Wall Street Journal. Sep 2020. How to Navigate the Fog of Sustainable Investing.
[3] Financial Times. May 2020. SEC chair warns of risks tied to ESG ratings.

Khan et al. 2016; Welch and Yoon 2020). In addition, recent papers such as Bebchuk and Tallarita (2020) caution agency issues among firm managers (i.e., BRT 200 CEOs) who make illusory promises and an unpublished working paper by Raghunandan and Rajgopal (2021) show that BRT 200 signatories exhibit higher labor violations. We on the other hand shift our focus to fund-level ESG, which has been largely ignored most likely because ESG investing is a recent phenomenon. We believe that our findings call the regulators for more scrutiny on asset managers' ESG execution, asset owners for more awareness in capital allocation, and asset managers for clearer communications on their ESG incorporation.

We note there are at least three *concurrent unpublished* working papers on fund-level ESG. Liang et al. (2020) assess hedge funds' ESG execution. They classify funds with low value-weighted ESG scores and returns as those that are engaging in greenwashing. We view that their work complements ours because they show that greenwashing is not limited to active funds. We note that our work is different from theirs as we explore specific channels that funds can engage in (i.e., exercise entry/exit strategies, induce firms to make improvements, engage companies through voting, and screen poor ESG performers), which are not considered in their paper.

Also, Raghunandan and Rajgopal (2021) find that firms that are held by funds that Morningstar classify as ESG funds exhibit more labor violations. We view that our findings convey different implications because we assess active asset manager's *voluntary* commitment on all ESG issues whereas they are examining the funds that Morningstar classify as ESG funds.[4] In addition, Gibson et al. (2020) describe the ESG footprint of the funds around the world. In particular, hinging on a survey data on various ESG implementation strategies, they examine whether a specific ESG implementation strategy yields to good ESG performance. We view that our research

[4] See Morningstar's Quintessential List of Sustainable Funds. Morningstar. April 2020.

question is fundamentally different from theirs as we are interested in assessing whether the funds with the discretion to exercise stock picks and engage companies actually walk the talk, and more importantly as we document why certain asset managers sign the PRI and what characteristics drive improvements in ESG performance.

Finally, our paper is related to work that examines fund flows and ESG. Hartzmark and Sussman (2019) use a well identified setting to show that Morningstar ratings cause an increase in fund flows. They find that a fund with the highest rating experiences 4% greater inflow than the lowest over the subsequent 11 months (i.e., 1.1% greater inflow per quarter). We acknowledge that the larger increase documented in our paper (i.e., 4.9% per quarter post signing) may be so because our setting is not as well identified as theirs. Nonetheless, we view that our paper compliments their work and is consistent with UN PRI being the largest global initiative on ESG rather than a rating provided by a single data vendor.

The rest of the paper is as follows. Section 2 explains the institutional background and how we define greenwashing. Section 3 describes the data. Section 4 sets forth the research design and results. Section 5 concludes.

2. Institutional Setting and Conceptual Underpinnings

2.1 Institutional Setting

PRI was initiated in 2005 by then United Nations Secretary-General Kofi Annan who invited an international group of institutional investors to develop initiatives to reflect the increasing relevance of ESG issues into investment practices. At the launch in 2006, 20 professionals in the asset management industry were drawn from 12 countries and were supported by a 70-person group of experts from the investment industry and intergovernmental organizations.

Since the initial launch, the number of signatories has grown consistently from 100 to over 2,300 globally, and the total AUM has grown from a few hundred billion to more than $120 trillion.

PRI classifies its signatories into three types: 1) investment management firms (e.g., Blackrock), 2) asset owners (e.g., California Public Employees' Retirement System), and 3) data service providers (e.g., MSCI). According to the UN, PRI's mission is to promote an economically efficient, sustainable global financial system which is necessary for long-term value creation. As presented in Appendix 1 Panel B, PRI's goal is to encourage the voluntary adoption of the following six principles: 1) incorporate ESG issues into investment analysis and decision-making processes, 2) be active owners and incorporate ESG issues into ownership policies and practices, 3) seek appropriate disclosure on ESG issues by the entities in which they invest, 4) promote acceptance and implementation of the Principles within the investment industry, 5) work together to enhance the effectiveness in implementing the Principles, and 6) report on activities and progress towards implementing the Principles.

The signing of the actual commitment is made by the CEO or a senior executive of the investment management firm by signing the declaration form, paying a nominal annual membership fee, and publicly reporting on their responsible investment activity through a reporting framework provided by the UN. In Appendix 2, we highlight how PRI affiliation is advertised using the examples from active mutual fund signatories that are in our dataset. In Panel A, we provide an example from Trillium Asset Management that advertise its affiliation on the first page of its website. In Panel B, we provide an example from Eaton Vance that dedicates an entire page on its website on its affiliation and commitment to UN PRI and ESG. In Panel C, we provide an example from Nuveen that dedicates an entire page on UN PRI and its commitment to ESG in the marketing material. In Panel D, we provide an example from LSV Asset Management

that provides a Statement of Responsible Investment Initiatives in its fund document where there is a separate section noting its affiliation with PRI. Overall, these examples highlight that UN PRI is a serious public commitment and the affiliation with the PRI is heavily advertised in different outlets.

As in Appendix 1 Panel C, UN PRI implemented the following minimum requirements starting 2018: 1) an investment policy for more than 50% of their AUM that covers the firm's responsible investment approach, 2) staffs responsible for implementing responsible investing policy, and 3) senior-level commitment and accountability mechanisms for implementation. Failure to meet these minimum requirements over a two-year grace period, following extensive engagement with the PRI, would result in delisting. However, we note that UN PRI never delisted a single signatory during the time periods examined in this paper. PRI first disclosed in its website in September 2020 that it initiated the first delisting which covers the filing year 2018.[5] We note with importance that the filing year 2018 should not be confused with delisting year 2018, because PRI granted its signatories a two-year grace period before the actual delisting. In essence, the earliest possible filing year that PRI could cover in 2020 was the 2018 filing year. Our conclusion is that PRI's actual move to delist signatories started not too much before the actual delisting date.

To support this notion, we highlight two news articles that feature this paper in the first half of 2020.[6,7] One of the articles in Institutional Investors Magazine interviewed UN PRI's CEO Fiona Reynolds where she stated that *"the PRI would consider Yoon's research to inform the PRI's work with signatories…the group has been consulting with its signatories since 2019 on revising its reporting requirements."* This along with the grace period provision suggests that the

[5] UN PRI Website. Sep 2020. Signatories delisted for not meeting the minimum requirements.
[6] Institutional Investor. Jun 2020. UN PRI Revamps Reporting Rules to Focus on 'Real-World' Outcomes.
[7] Barron's. May 2020. Signing PRI Doesn't Mean Better Sustainability or Returns.

monitoring from PRI was insufficient during most years examined in our paper, and that actual delisting of signatories (September 2020) occurred certainly after the media highlighted (May and June 2020) our academic study that shows greenwashing of PRI signatories. In sum, we view that these institutional features show that it was ex-ante unclear to the signatories when and whether the PRI would monitor and therefore a pertinent setting to study greenwashing.

While there is little doubt that PRI is a channel for investment firms to communicate to the public that they care about ESG, we also acknowledge that the commitment is both voluntary and aspirational in nature. In addition, the six guiding principles do not explicitly mandate that institutional investors should make changes to their portfolio holdings and as such it may not be as clear to what extent signing the PRI is a commitment to improving fund-level ESG performance and what observable actions we should consider. To partially alleviate this concern, we first conceptually outline what we view as greenwashing and explain why UN PRI is a pertinent setting.

2.2 Model: A Tale of Two Motivations

We propose a stylized economy where fund managers voluntarily join UN PRI. The purpose of this section is to provide a theoretical motivation for our empirical exercise. A fund manager joining UN PRI can have two motivations: 1) monetary motivation (MM) and 2) ESG motivation (EM). We assume that a fund manager can be either High (H) or Low (L) in each motivation. Hence, there are four possible types of (H,H), (H,L), (L,H), (L,L) for (MM, EM). We consider the UN PRI members of the (H,L) type, which are high in monetary motivation and low in ESG motivation, as those that engage in greenwashing (i.e., greenwashers). Assume that the probability of joining UN PRI given a type of (H,H), (H,L), (L,H), (L,L) is known as $\lambda_{HH}, \lambda_{HL}, \lambda_{LH}, \lambda_{LL}$, respectively. Also, we set $\lambda_{HH} \geq \lambda_{HL} \geq \lambda_{LL}$ and $\lambda_{HH} \geq \lambda_{LH} \geq \lambda_{LL}$, meaning

that the higher motivation does not decrease the probability of joining UN PRI. We formally define greenwashing in our setting as follows:

Definition 2.1. A UN PRI member with high monetary motivation and low ESG motivation is a greenwasher.

Given that we do not directly observe the underlying motivations of fund managers, we need to use other observed variables to infer the type of UN PRI members. The first variable that we can exploit is monetary rewards (MR) from joining UN PRI, which is assumed to be either existence (MR=1) or non-existence (MR=0) with equal probabilities. We assume that the probability of joining UN PRI conditional on MM and MR are as follows:

	MR=1	MR=0
MM=H	$\lambda_{\mathrm{H}\cdot} + c_0$	$\lambda_{\mathrm{H}\cdot} - c_0$
MM=L	$\lambda_{\mathrm{L}\cdot}$	$\lambda_{\mathrm{L}\cdot}$

where H(L) is either HH or HL (LH or LL) depending on the EM type and $c_0 > 0$. Note that for the low monetary motivation type, the probability of joining UN PRI does not depend on the existence of monetary rewards. However, for the high monetary motivation type, the probability increases as monetary rewards moves from 0 to 1.

Next, we consider ESG performance (EP) from which we can learn about fund manager's ESG motivation. Similar to monetary rewards, we assume that ESG Performance is either improvement (EP=1) or non-improvement (EP=0) with equal probability. Furthermore, after a fund joins UN PRI, the probability distribution over EP conditional on EM is given as follows:

	EP=1	EP=0
EM=H	$\gamma + c_1$	$1 - (\gamma + c_1)$
EM=L	γ	$1 - \gamma$

where $c_1 > 0$. The above conditional probability distribution reflects that the high ESG motivation type is more likely to improve ESG performance than the low ESG motivation type after joining UN PRI, which is parameterized by a strictly positive number of c_1.

The above setup suggests that we can infer whether UN PRI members are greenwashers (i.e., high monetary motivation and low ESG motivation) once we observe monetary rewards from joining UN PRI and the ESG performance of UN PRI members. The following proposition summarizes this intuition:

Proposition 2.1. Among UN PRI members, the following inequality holds:

$$\boldsymbol{E}[Greenwasher|MR=1, EP=0] > \boldsymbol{E}[Greenwasher].$$

The inequality shows that if we observe some monetary rewards from joining UN PRI but no improvement in ESG performance, it is reasonable to expect that a UN PRI member is a greenwasher relative to the case without such evidence (see Appendix 4 for proof of Proposition 2.1). Resorting to this finding, we design our empirical exercise to find the evidence of (i) monetary rewards, which will be measured by capital inflow, and (ii) ESG performance, which will be investigated via various ESG metrics explained in Section 4.

2.3 Causal Diagram

We also follow Gow, Larcker and Reiss (2016) to present a causal diagram that articulates our empirical strategy, as well as the limitations of using observational data in addressing our research question. Note that we are interested in whether funds engage in greenwashing as shown in Figure 1 Panel A. Recall that we define greenwashing as the following: if a fund joins UNPRI (i) for monetary rewards (existence of strong relation in the left solid line in Figure 1 Panel A) but is (ii) without the conscious to perform on ESG issues (very weak relation in the right solid line in

the same figure). We acknowledge that we can neither directly verify whether funds join UN PRI for monetary reasons nor can observe the funds' actual intention on ESG issues. As such, both Monetary Motivation and ESG Motivation in Figure 1 Panel A are in dotted boxes.

Hence, we exploit observable data to make an assessment on whether asset managers engage in greenwashing or not. As presented in the left half of Figure 1 Panel B, we examine whether joining the PRI leads to an increase in fund flows (i.e., funds are rewarded monetarily). Although, this does not prove that the funds join UN PRI for monetary rewards, it provides circumstantial evidence that it is not implausible that funds join UN PRI for momentary rewards, as described in the previous section. The dotted line between fund flow and monetary motivation represents that inflow indirectly justifies the monetary incentives, which is also expressed by the probability of joining UN PRI conditional on MM and MR in the previous section.

Next, we examine whether funds that join UN PRI has an intention to perform on ESG issues. Similar to monetary motivation, we cannot observe the funds' intention on ESG issues directly and provide the causal diagram in the right half of Figure 1 Panel B, which is used to motivate our empirical execution. The solid line between ESG motivation and ESG performance reflects our assumption that if a fund has an intention to perform on ESG issues, it will manifest via fund-level ESG performance. We note that there is no direct connection between joining UN PRI and ESG performance, which is consistent with our assumption in the model: mere joining of UN PRI does not directly cause an improvement in ESG performance but the improvement would be caused by the underlying ESG motivation. The probability of EP conditional on EM in Section 2.2 also has this feature. With these assumptions, we assess the funds' intention to perform on ESG issues through their ESG performance. Broadly, we examine ESG performance via considering

two dimensions: (a) changes in portfolio holdings and their respective ESG scores and (b) engagements that asset managers make to improve firm level ESG issues.

3. Data and Sample

3.1 ESG Scores

We use three sources for ESG scores that are not only of the most used by asset managers but also yield the most coverage when we match the individual firm ESG scores to the portfolio holdings. The first source is MSCI, which are based on 37 key issues corresponding to one of ten macro themes. The key issues are selected annually for each of the 156 GICS subindustries and weighted according to MSCI's materiality-mapping framework. MSCI uses sources such as annual reports, investor presentations, and financial and regulatory filings, and NGO databases. Similarly, risk-management and opportunity related data come from corporate documents, government data, news media, relevant organizations and professionals, and an assortment of popular, trade, and academic journals. It also engages in direct communication with companies and invites them to participate in a data-review process, which includes commenting on the accuracy of company data. MSCI aggregates the data to an overall score, in which each issue is weighted according to assessed materiality in each industry. The final score ranges from 0 to 10.

The second source is Sustainalytics. It analyzes and rates the performance of companies across 42 comparable sub-industries. They identify key ESG issues based on analysis of a company's peer group and its broader value chain, review of the business model, and the key activities associated with environmental and/or social impacts. Performance related to ESG issues is analyzed by looking at a comprehensive set of core and sector-specific metrics, which are weighted to determine a company's overall ESG performance. Sustainalytics' ESG scores range

from 0 (most negative) to 100 (most positive). Sustainalytics also assesses companies for their level of involvement in major controversies or incidents. Each controversy is categorized from Category 1 (low impact, posing negligible risks to the company) to Category 5 (severe impact, posing serious risks to the company) and covers an area such as business ethics, society and community, environmental operations, environmental supply chain, product and service, employee, social supply chain, customer, governance, and public policy. In our paper, we classify a firm as having an ESG controversy if the firm is in Sustainalytics' Category 4 (highly controversial) or Category 5 (severely controversial).

The last source is TruValue Labs (TVL). It tracks ESG-related information across thousands of companies every day. Specifically, it sources news from outside the organization (i.e., not from the company) including a wide variety of sources such as analyst reports, various media, advocacy groups, and government regulators. To increase transparency and validate the data, it allows users to track the original source of the articles and events that inform the sentiment analysis for each specific issue. It aggregates such unstructured data from over 100,000 sources into a continuous stream of ESG data and uses natural language processing to interpret semantic content to generate analytics scoring data points that range from 0 (most negative) to 100 (most positive). In addition, it uses Sustainability Accounting Standards Board (SASB) classification to determine materiality of ESG news and separately reports the material ESG score.

In addition to the comprehensiveness of coverage, we use all of the three data vendors because they are updated in different manners. For example, MSCI and Sustainalytics are updated at least on an annual basis and also at the vendors' discretion when there are material events to the firm. On the other hand, TVL data is a dataset that is constructed at the firm-day level and gets

updated when there is new ESG news about the firm. As such, we view that using three scores would mitigate any potential issues with how the scores are updated.

3.2 Fund and Voting Data

We follow the procedures suggested in Doshi et al. (2015) to obtain and match mutual fund data from CRSP Survivor Bias-Free Mutual Fund Database and Thomson Financial. We use various fund-level variables (e.g., Lipper fund category, returns, number of funds in family, fund size, management fee, and fund age). We also use Fama French Database to obtain factors to construct portfolio alpha. CAPM Alpha is the market-risk adjusted quarterly excess return where the market beta is computed using the previous 60-month returns. Return is the quarterly return net of fees. We focus on active mutual fund managers in the US and our data range from 2008 to 2018. We obtain mutual fund voting data from Institutional Shareholder Services (ISS). The data contains each mutual funds' voting record in shareholder meetings and classifies whether the agenda is related to environmental, social, or governance issues (see Appendix 3 for details).

3.3 Descriptive Statistics

We obtain the list of UN PRI members from the PRI website (www.unpri.org) and hand-map the list to our CRSP Mutual Fund and ESG Scores dataset. As shown in Table 1, 246 investment management firms, 36 asset owners, and 39 data providers in the US are PRI signatories. We start from these 246 investment management firms, exclude private equity only and passive only investment management firms. For our final sample, we have 448 active funds that represent 86 unique investment management firms.

Table 2 presents the summary statistics. Our main unit of observation is at the fund-quarter level and the sample is constructed around the six quarters pre- and post-signing. Panel A provides information on fund-level ESG scores which are computed as follows:

$$ESG_{iq} = \sum_s w_{isq} ESG_{sq}^{(stock)} \qquad (1)$$

where w_{isq} is the portfolio weight of stock s for fund i in quarter q and $ESG_{sq}^{(stock)}$ is the ESG score for stock s in quarter q.

Fund-level MSCI Score ranges from 0 to 10 and has a mean of 4.7 and a standard deviation of 0.7. Sustainalytics Score ranges from 0 to 100 and has a mean of 58.5 and a standard deviation of 5.0. TVL Score (TVL Material Score) ranges from 0 to 100 and has a mean of 52.0 (52.2) and a standard deviation of 6.2 (7.5). Total Controversies, which is the raw aggregate number (i.e., not value-weighted) of highly and severely controversial issues, has a mean of 4.1 and a standard deviation of 6.4. Did Not Vote, which is the proportion of agenda items that a fund did not vote on, has a mean of 0.015 and a standard deviation of 0.074. Dissent Management Recommendation, which is the proportion of agenda items that a fund did not vote with the management recommendation, has a mean of 0.031 and a standard deviation of 0.138.[8]

We discuss the summary statistics of other fund level characteristics. Fee (in annual percentage) has a mean of 1.04 and a standard deviation of 0.42. Fund flow is defined as follows:

$$Flow_{iq} = \frac{AUM_{iq} - AUM_{iq-1}\,(1+R_{iq})}{AUM_{iq-1}} \qquad (2)$$

[8] Voting variables are yearly variables as most voting behavior should be concentrated in a single quarter when firms have annual meetings. Accordingly, the panel that uses these variables as dependent variables is at the fund-year level.

where AUM is the AUM of the fund, and R_{iq} is the net return of fund i in quarter q.[9] Flow is winsorized at the 0.5% level and has a mean of -0.01 and a standard deviation of 0.16. Return (net of fees) has a mean of 0.02 and a standard deviation of 0.09 and CAPM Alpha has a mean of -0.004 and standard deviation of 0.028. On average, the log of fund size is 4.85, the age of a fund is 9.38 years, and a fund holds roughly 90 stocks. There are dummy variables indicating whether a fund is quant driven (holding more than 100 stocks)[10] and team-managed. In our sample, 23% of our sample are quant-driven and 66% are team-managed.

Panel B reports the correlation table. As suggested in Berg et al. (2019), the correlation between ESG scores from different vendors is low. For example, the correlation between MSCI ESG Score and Sustainalytics ESG Score is only 0.07 and that between MSCI ESG Score and TVL ESG Score is 0.18. The correlation between # of Stocks Held and Total Controversies is 0.47 suggesting that the holdings in the portfolio are subject to more issues if more stocks are held. The correlation between Quant Fund and # of Stocks Held is 0.57 suggesting that quantitatively driven funds hold more stocks. The correlation between log(Fund Size) and Fee (%) is -0.38 suggesting that bigger funds charge less in fees.

4. Research Design and Results

4.1 Change in Flows Post PRI

We start by verifying the saliency of PRI. Specifically, we examine whether there are visible changes to fund flows after signing PRI. Given that fund investors' ultimate decision is

[9] Flow is a function of return and as discussed in section 3.2, we require previous 60 months returns for alpha and return calculation. This leads to lower sample size in results that examine flows, returns, and alpha (e.g., Table 3).
[10] To the best of knowledge, we do not find a well-received convention to account for quant funds. Among various methods, Beggs et al. (2019) suggest an identification strategy by performing textual analysis of mutual fund prospectuses. Although applying other methods is beyond the scope of this paper, we find robust findings to different thresholds of 50 or 200 stocks for Quant dummy.

manifested through their capital allocation, this exercise would show how asset allocators would respond to fund managers' commitment to ESG. We estimate the following specifications:

$$Dep\ Var_{iq} = \beta_1 Post_{iq} + time\ f.e. + fund\ f.e. + e_{iq} \quad (3)$$

$$Dep\ Var_{iq'} = \sum_{j=1}^{6} \beta_j * 1(q' = q+j) + time\ f.e. + fund\ f.e. + e_{iq'} \quad (4)$$

where the dependent variable is Flow, which is computed as in equation (2). Post equals to one for the six quarters after signing PRI and to zero for the prior seven quarters. 1 (·) is an indicator function, and q is the quarter during which fund i joins UN PRI for fund-quarter panel. We control for quarter fixed effect to mitigate the effect of any quarter specific, and fund invariant omitted variables. We also control for fund (Wharton Financial Institution Center Number (WFICN)) fixed effect to mitigate the effect of any fund specific, and time invariant omitted variables.

Table 3 presents the results. Column 1 presents the results from equation (3). The coefficient estimate on Post is 0.049 (t-stat: 3.129), which suggests a 4.9% increase in fund flows per quarter post signing the PRI vis-a-vis the pre period. Column 2 presents the results from equation (4) that breaks down the post variable. The coefficient estimates on q + 1, q + 2, · · ·, q + 6 are 0.039 (t-stat: 1.714), 0.055 (t-stat: 2.782), 0.062 (t-stat: 1.927), 0.058 (t-stat: 2.667), 0.061 (t-stat: 2.500), and 0.049 (t-stat: 1.792), respectively. This shows that the fund inflow persists across all quarters of the considered post period.[11] To put the magnitude in context, we compare our result to that documented in Hartzmark and Sussman (2019). They use the initiation of Morningstar globe-rating and find that funds with the highest rating experience a 4% greater inflow than those with the lowest rating over the following 11 months (i.e., 1.1% greater inflow per quarter). We acknowledge that the larger increase in fund flows in our paper (i.e., 4.9% per quarter) may be because our setting is not as well identified as that of Hartzmark and Sussman (2019).

[11] One concern with the above results is that whether six quarters post is pertinent. To address this concern, we try 4, 8, and 12 quarters. Our results are nearly the identical, so we omit reporting them for brevity.

Nonetheless, we view that our paper compliments their work and is consistent with UN PRI being the largest global initiative on ESG rather than a rating provided by a single data vendor.

4.2 Value-Weighted Fund-level ESG Score

Next, we examine whether signatories change their portfolio holdings to incorporate ESG. Because a fund is a basket of individual assets, we naturally start by measuring whether a fund incorporates ESG factors by observing ESG factors of individual assets. Specifically, we create the fund-level ESG score as in equation (1) and present the results in Table 4 Panel A. Columns 1 and 2 present the results using MSCI ESG Score as the dependent variable. In column 1, the coefficient estimate on Post is -0.039 (t-stat: -1.284) and in column 2, the coefficient estimates on $q + 1$, $q + 2$, $\cdots$, $q + 6$ are -0.022 (t-stat: -0.657), -0.022 (t-stat: -0.467), -0.009 (t-stat: -0.153), 0.006 (t-stat: 0.087), 0.024 (t-stat: 0.308), and 0.030 (t-stat: 0.357), respectively. This suggests that there is no meaningful change in fund-level ESG score post signing PRI. Our findings are similar when we consider Sustainalytics (columns 3 and 4) and TVL ESG Scores (columns 5 and 6). We do not find any meaningful improvements in fund-level ESG score vis-a-vis the pre period.

While the above results can be an initial assessment of ESG implementation, we note that ESG score may not reflect an asset managers specific focus on a focal ESG topic (e.g., a fund manager may be focused on CO2 emission rather than gender inequality issue). To address this particular issue, we use sub-ESG scores and present the results in Table 4 Panel B. Columns 1 and 2 present results using MSCI Environmental Score as the dependent variable. In column 1, the coefficient estimate on Post is -0.075 (t-stat: -1.602) and in column 2, the coefficient estimates on $q + 1$, $q + 2$, $\cdots$, $q + 6$ are -0.059 (t-stat: - 1.024), -0.051 (t-stat: -0.720), -0.035 (t-stat: -0.402), 0.004 (t-stat: 0.038), -0.010 (t-stat: -0.076), and 0.019 (t-stat: 0.129), respectively, which suggests

that there are no meaningful changes in fund-level ESG performance. We also consider MSCI Social and Governance Scores, Sustainalytics Environmental, Social, and Governance Scores, and TVL Materiality Score but do not find any meaningful improvements (see columns 3-14).

4.3 Exploring the Mechanisms

We note that two important mechanisms in which an active manager can implement ESG are via 1) entry/exit (i.e., selling poor ESG performers and buying good ESG performers) and 2) engagement (i.e., influencing the behavior of firms in its holdings). For example, while funds can change their ownership stake quickly (i.e., within one quarter), influencing firms to change their ESG behavior can take much longer. Funds may first engage firms (e.g., via letter, phone call) before implementing an exit strategy. If so, it may take time for the changes to be reflected in ESG scores. In addition, funds may consider exiting the firm if such efforts are unsuccessful or the improvements are not realized. We acknowledge that the value-weighted fund-level ESG score in Section 4.2 explore the two mechanisms at the same time and that it has three dials that could turn simultaneously (i.e., firm level ESG Score, underlying performance, and portfolio holdings). So, we perform the following tests in the subsequent subsections to disentangle the two mechanisms.

4.3.1 Entry and Exit

We first examine whether UN PRI signatories exercise entry and exit strategies. Specifically, we examine whether signatories buy (sell) firms that are high (low) ESG performers. To test for this, we estimate equation (3) using the following dependent variables: 1) *# of Stocks > 75th Pct ESG Score/Total # of Stocks in Portfolio* which is the number of stocks that are above 75th percentile in ESG score during the specific quarter divided by the total number of stocks in

portfolio, 2) *$ Amt of Stocks > 75th Pct ESG Score/Total $ Amt of Stocks in Portfolio* which is the dollar amount of stocks that are above 75th percentile in ESG score during the specific quarter divided by the total dollar amount of stocks in portfolio, 3) *# of Stocks < 25th Pct ESG Score/Total # of Stocks in Portfolio* which is the number of stocks that are below 25th percentile in ESG score during the specific quarter divided by the total number of stocks in portfolio, and 4) *$ Amt of Stocks < 25th Pct ESG Score/Total $ Amt of Stocks in Portfolio* which is the dollar amount of stocks that are below 25th percentile in ESG score during the specific quarter divided by the total dollar amount of stocks in portfolio. The results are presented in Table 5 Panel A. The coefficient estimates on Post are insignificant across all dependent variables and this result is robust to different ESG Scores to make the cutoff for 75th and 25th percentile. This suggests that entry and exit may not be a mechanism used by an average signatory.

4.3.2 Engagement

In this subsection, we examine whether UN PRI signatories use engagement as a mechanism. First, we test whether the firms in signatories' portfolio exhibit improvements in ESG scores. We do this to account for the possibility that PRI signatories engage companies and induce ESG improvements. To do so, we restrict our sample to the firms that are held at the time of signing the UN PRI and held for the subsequent 8 quarters. We keep the weight at the time of signing constant and use equations (3) and (4) to capture how value-weighted fund-level ESG Scores (i.e., as in Table 4) change over time. The results are presented in Table 5 Panel B. We find no meaningful changes in ESG performance of the firms that are held by signatories for a reasonable period after signing. This result is robust to considering the stocks that are held for the subsequent 6 and 12 quarters, which as a result are omitted for brevity.

Second, we focus on the firms in signatory portfolios where the signatories are large shareholders. This is to test for the changes in ESG score in firms that signatories can exert an influence. The 25th, 50th, and 75th percentile of a signatory's holdings as a percentage of the total shares outstanding are 0.035%, 0.175%, and 0.616%, respectively (unablated for brevity). Thus, we consider the following thresholds when a signatory holds more than 1) 0.616% (75th percentile), 2) 1%, and 3) 5% of the total shares outstanding, and present the results in Table 5 Panel C. We find no evidence of ESG score improvements. In fact, when using the score from Sustainalytics, we find the companies above 75th pct and 5% thresholds exhibit a statistically significant decrease in ESG performance. Overall, we are not able to detect any notable improvements in ESG performance among the firms that signatories have a greater potential to exert influence.[12]

4.3.3 Fund-level Voting Pattern

We dedicate a separate section to voting, because it is another very important mechanism for active engagement (Dimson et al. 2015, 2020). For example, a Catholic fund purchased shares of Sturm Ruger, a firearm manufacturing company, and demanded substantial changes in its business model through shareholder proposals.[13] As such, PRI signatories may hold stocks with low ESG scores to induce real changes and engage the company to actively make material changes to the firms' ESG policy. To test for this, we construct a fund-year panel as most voting behavior is going to be concentrated in a single quarter when firms have annual meetings and evaluate whether PRI signatories voice their opinion using the following specifications:

$$Dep\ Var_{iy} = \beta_1 Post_{iy} + time\ f.e. + fund\ f.e. + e_{iy} \qquad (5)$$

[12] Passive funds can be large block holders. We test whether firms held by passive funds exhibit ESG improvements (i.e., replicate Table 5 Panel B and C on passive funds). We note that the 25th, 50th, and 75th percentile of holdings are 0.075%, 0.375%, and 1.651%, respectively, and use the three thresholds. We find results similar to those in Table 5 Panels B and C (see Table 12 Panels B and C) and omit discussion for brevity.

[13] NY Times. May 2018. Sturm Ruger Shareholders Adopt Measure Backed by Gun Safety Activists.

$$Dep\ Var_{iy'} = \sum_{j=1}^{2} \beta_j * 1(y' = y+j) + time\ f.e. + fund\ f.e. + e_{iy'} \quad (6)$$

The dependent variables are the two voting related variables: 1) Did Not Vote, which represents the proportion of agenda items that a fund did not vote during the year, and 2) Dissent Management Recommendations, which represents the proportion of agenda items that a fund did not support management recommendations. Post indicates the two years post signing the PRI. 1(·) is an indicator function, and y is the year during which fund i joins UN PRI for fund-year panel. We control for year fixed effect to mitigate the effect of any year specific, and fund invariant omitted variables and also include fund fixed effect as in equations (3) and (4).

Table 6 Panel A reports the estimation results from equations (5) and (6) using Did Note Vote as the dependent variable. In columns 1 and 2 where we consider all voting agendas, we do not observe a meaningful change. This pattern is the same for environment related agendas (columns 3 and 4) and those agendas related to governance (columns 7 and 8). However, we note a small trend in agendas that relate to social issues (columns 5 and 6). The coefficient estimate on Post is insignificant (-0.015, t-stat: -1.489), but the estimates on y+1 and y+2 are -0.022 (t-stat: -2.330) and -0.036 (t-stat: -2.608), respectively.

One potential concern with the above result is however that PRI signatories on average are already voting 98.5% of the time (see Table 2). So, we consider Did Note Vote with Management as the second dependent variable and present the results in Table 6 Panel B. As in Panel A, we do not find meaningful change in voting pattern except in the agenda items that relate to social issues. Specifically, when considering social agendas, the coefficient estimate on Post is -0.026 (t-stat: -1.744) and the estimates on y+1 and y+2 are -0.042 (t-stat: -2.090) and -0.075 (t-stat: -2.100), respectively. This suggests that funds tend to agree with management on social related agenda item after signing the PRI. This is significant in economic magnitude given that the average of Did Not

Vote with Management is 0.031 (see Table 2). Taken together with the results in Panel A, the results imply that while signatories exercise more voice on social issues, they tend to vote significantly more with the management recommendation.

4.4 Changes in CAPM Alpha and Return

In this section, we examine whether there are meaningful changes to portfolio return and present the results in Table 7. We revert back to the fund-quarter panel and examine equations (3) and (4) using fund return variables as dependent variables. In columns 1 and 2, we use CAPM Alpha as the dependent variable. Interestingly, we find a general decrease in fund-level alpha after signing UN PRI. For example, the coefficient estimate on Post is -0.003 (t-stat: -1.017) and the estimates on $q + 1$, $q + 2$, $\cdots$, $q + 6$ are -0.003 (t-stat: -1.026), -0.007 (t- stat: -1.829), -0.004 (t-stat: -0.960), -0.009 (t-stat: -2.017), -0.011 (t-stat: -2.307), and -0.013 (t-stat: -2.804), respectively. This suggests that signatory funds experience a notable decrease in alpha post signing while enjoying an increase in fund flow (Table 3). Our results remain unchanged when we add log(Fund Size) to control for a diseconomies of scale (Berk and Green 2004) and when we use Return as an alternative dependent variable. Furthermore, our results are robust to using alpha from the three-factor model by Fama and French (1993), the four-factor model by Carhart (1997) and the five-factor model (2015) as dependent variables. We omit them for brevity.

4.5 Determinants of Signing UN PRI

Next, we examine the characteristics that increase the likelihood to sign the PRI. As the decision to sign the PRI is made at the asset manager level, we build an asset manager-quarter

panel and use the hazard model to understand what influences a non-PRI asset manager to sign. We separate non-PRI asset managers until quarter q-1 and then estimate the following model:

$$Pr(Sign\ PRI_{jq} = 1) = h\ (a + b * Asset\ Management\ Firm\ Characteristics_{jq} + time\ f.e.) \quad (7)$$

where h (·) is the Cox proportional hazard function and $SignPRI_{jq}$ equals to one if an asset management firm j signs UN PRI in quarter q.

We use the following asset management firm characteristics as covariates. # Funds in Family is the number of funds in the fund family. We control for this because asset management firm with higher number of funds in the fund family may be more likely to sign the PRI as the firm would have a more diversified set of clients. Under such a situation, there is a higher likelihood for one of the clients being an advocate on ESG issues (e.g., large pension money like the Japanese Government Pension Fund or Norwegian Sovereign Wealth Fund who care a lot about ESG), which may push the asset management firm to sign the PRI. Similarly, asset management firm with a low number of funds in the family may be less likely to sign the PRI as there is a higher likelihood of it being influenced by one client (or a small number of clients) and if that client does not care about ESG issues. We also control for the Listed status, which indicates whether the asset management firm is publicly listed or not, as listed asset managers may be sensitive to public attention and often have larger size client investors (i.e., who are often pension funds that care about ESG).

In addition, we control for ESG Score of the Fund Family, which is the value-weighted scores of respective fund-level ESG scores according to their market capitalization at quarter end, as signatories could be superior performers in ESG before signing PRI. We control for CAPM Alpha of the Fund Family, which is the value-weighted CAPM Alpha of the fund family, as managers that believe in their expertise to generate higher returns may sign PRI (Bansal et al.

2018). We control for Fee (%) of Fund Family, which is the value-weighted average annual management fee of the fund family, as managers with cheaper management fee may face more competition and are likely to sign PRI to attract more capital (Roussanov et al. 2018). We control for All Quant Only, which indicates when all funds in the fund family are quant funds (i.e., have more than 100 stocks in the portfolio). Finally, we control for Age of the Family, which is the age of oldest fund in the family, as older asset management firms may be more slower in embracing ESG as it is a new phenomenon.

Table 8 presents the results. In columns 1-3, we use ESG Scores from MSCI, Sustainalytics, and TruValue Labs, respectively. Across the three columns, we find that asset management firms with more funds in the family are more likely to sign the PRI. This supports the notion that for asset management firms with a greater number of funds, there is a higher likelihood of one of the clients being an advocate on ESG issues, which may push the asset management firm to sign the PRI. In addition, we find that asset managers who charge a lower fee and those that are listed are more likely to sign the PRI, potentially to seek publicity and capital.[14]

4.6 Cross-sectional Characteristics that Influence Fund-level Outcomes

So far, our main message is that funds experience significant inflow but generally do not improve their ESG performance post signing PRI. In this subsection, we examine whether certain fund characteristics influence fund-level outcomes. We consider the following specification:

$$Dep\ Var_{iq} = \beta_1\, Post_{iq} * Fund\ Dummy_i + \beta_2\, Post_{iq} + \beta_3\, Fund\ Dummy_i + time\ f.e. + e_{iq} \quad (8)$$

We consider two dependent variables: Fund Flow and Fund-level ESG Performance. For Fund Dummy, we use indicators on whether a fund is a quant-fund, small fund, high-fee fund, team-

[14]

managed fund, and a fund with high ESG score during the six quarters prior to signing UN PRI. Quant-fund and team-managed fund are defined as previously and other variables are equal to one if the fund is above the average fund in the characteristics considered. We consider the above variables for the following reasons. For example, quant funds may have an advantage on implementing ESG issues, because ESG investing has mainly been done using ESG signals to create long/short portfolios rather than through fundamental analysis (Khan et al. 2016). Similarly, funds with higher fee and size may improve ESG performance as they have more resources to devote on ESG issues. We do not use asset manager fixed effect to explore the variation in asset management firm level characteristics that explain why they sign the UN PRI.

We report the results from this specification in Table 9. In Panel A, we find that quant funds improve fund-level MSCI and TVL ESG scores post signing PRI. We view this as reflective of quant funds' willingness and capability to analyze and incorporate ESG into their investment decisions. However, we note with interest that quant funds do not attract more flows post signing vis-a-vis the control group. In subsequent panels, we consider fund size, fee, team-managed, and ESG score as the cross-sectional covariate. We find that small funds and high fee funds are more likely to attract more fund flows but do not find these characteristics to positively influence fund-level ESG performance post signing. Lastly, we do not find team-managed status and prior level ESG scores to positively influence fund flow nor fund-level ESG performance.

4.7 Additional Tests

4.7.1. Penalizing the firms with Missing ESG Scores

We have thus far assigned the average score of the portfolio to these stocks with missing firm-level ESG scores. However, as Giglio and Shue (2014) argue, information disclosure is

endogenously determined, and no news may signal bad news. To address this issue, we assign the lowest possible score to observations with missing ESG scores and recreate our fund-level ESG score. We find no evidence of ESG improvement and present the results in Table 10 Panel A.

4.7.2. Difference-in-differences Specification

In our main specification, we use fund and time fixed effects and conduct a within fund and time design to show that PRI signatories do not make significant improvements to ESG. One may think that it would be helpful to find a group of funds that are similar to PRI signatory funds and show that the documented effect holds vis-à-vis the non-PRI funds. As such, we conduct propensity score matching to identify non-PRI signatories that are similar in fund size and in the same Morningstar fund category as the signatories at their time of signing using a caliper of 0.01. Specifically, we estimate the following difference-in-differences specification:

$$ESG_{iq} = \beta_1 Treat_i * Post_{iq} + \beta_2 Post_{iq} + time\ f.e. + fund\ f.e. + e_{iq} \qquad (9)$$

where all variables are defined as in previous specifications and $Treat_i$ equals 1 for PRI signatory funds and 0 for propensity score matched non-PRI funds.

In Table 10 Panel B, we first show the covariate balance. Interestingly, we find that signatories are worse performers in ESG issues prior to joining the UN PRI. This is robust considering ESG scores from all of the vendors. We want to highlight that this is a direct contradiction to a potential concern that PRI signatories are better performers and therefore them not improving ESG cannot be justified. Next, we note that matching leads to substantially lower fund-level ESG score when compared to the entire sample. Specifically, both PRI and non-PRI funds exhibit an average MSCI ESG Score around 3 after we conduct matching, but unmatched PRI funds in Table 2A exhibits an average MSCI ESG Score of 4.7.

We note that the two concurrent unpublished working papers (Gibson et al. 2020 and Liang et al. 2020) compare PRI and non-PRI funds, but both use *all* non-PRI signatories as a control group and do *not conduct any matching*. This could be a concern if there are obvious covariates that may drive fund-level ESG performance. In our paper, we use the specification without a control group (e.g., equation 3) as our main specification, because there is substantial amount of discretion involved in the matching process (e.g., as we have no theoretical guidance on which covariates to include as assessing fund-level ESG performance is a nascent area) and potential debates may involve as to what the correct control group should be. Regardless, we present the results from difference-in-differences model in Panel C where we confirm our main results.[15]

4.7.3. Anticipatory Actions

Thus far, we test whether firms change behavior after signing PRI. However, a fund may only want to sign the PRI when it is already in compliance with PRI. For example, a fund might have ESG policies in place to sell problematic investment before joining. To address this concern, we conduct two tests. First, we consider pre windows that end earlier (e.g., ending 1 year and 2 years before signing) to exclude any anticipatory actions from signatories. If signatories improved ESG performance in anticipation of joining PRI, we would observe a meaningful increase in ESG performance when we use these alternate pre-periods. The results are presented in Table 11 Panel A. Across all columns, we find no evidence consistent with anticipatory actions.

Second, we compare the initial fund-level ESG scores of signatories to other funds. For example, PRI signatories, especially those that joined early, may be true believers in ESG while

[15] The inferences are identical even when we add other covariates such as fund fee, fund age, return to conduct matching. We choose to match just on fund size and fund category as it gives us the greatest number of observations and is also the cleanest specification.

others might just join for marketing purposes. In Figure 2 Panels A, B, and C, we use fund-level ESG scores from MSCI, Sustainalytics, and TVL, respectively, and compare across time the ESG scores at the time of signing to the following funds: 1) propensity matched set of control funds as in difference-in-differences test, and 2) all other active funds. We find no evidence that PRI signatories are superior performers in ESG issues to both groups 1) and 2). In addition, early joiners do not exhibit a higher fund-level ESG score than late-joiners.

4.7.4. Screening

According to the UN PRI, another prominent way to incorporate ESG would be through screening.[16] To test for whether funds use this strategy, we first aggregate the total number of controversies among stocks held in a portfolio to use it as the dependent variable in equations (3) and (4). This measure could be informative not only because it aggregates negative ESG events instead of presenting a value-weighted average as in Table 4, but also because it may potentially reflect an asset manager's efforts to identify and divest stocks with serious ESG issues.

We present the results in Table 11 Panel B where we consider all ESG controversies (columns 1-2), environment related controversies (columns 3-4), social related controversies (columns 5-6), and governance related controversies (columns 7-8), respectively. Across all columns, we do not observe any meaningful decrease in controversies experienced in signatories' portfolio holdings. In fact, we find that signatory funds experience more environment related controversies starting the third quarter post signing PRI.

Second, we consider the trend in bottom quartile of firms that are in the signatories' portfolio. This is because of the following reason. If signatory funds are concerned about the firms

[16] Slide 6 of https://www.unpri.org/listed-equity/listed-equity-snapshot-2017-2020/6541.article

that are poor performers and if these firms are screened, the group of firms that are in the bottom of the portfolio's distribution would exhibit an improvement in ESG scores. To examine for this potential, we take the firms that are in the bottom quartile of signatories' portfolio and examine the trend in their value weighted ESG score. We present the results in Table 11 Panel C. Across all columns, we do not observe any change in fund-level ESG scores. This result is robust to considering quintile and tercile as an alternative cutoff, which are omitted for the sake of brevity.

4.7.5 Analyzing Quant Funds

In Section 4.6, we present evidence that quant funds make small but statistically significant improvements to fund-level ESG scores. To this end, we explore what mechanisms are used by quant funds to improve the fund-level ESG scores. We explore the mechanisms explored so far and find that quant funds improve fund-level ESG scores. Specifically, we estimate equation (3) using the following dependent variables: 1) *# of Stocks > 75th Pct ESG Score/Total # of Stocks in Portfolio*, 2) *$ Amt of Stocks > 75th Pct ESG Score/Total $ Amt of Stocks in Portfolio*, 3) *# of Stocks < 25th Pct ESG Score/Total # of Stocks in Portfolio*, and 4) *$ Amt of Stocks < 25th Pct ESG Score/Total $ Amt of Stocks in Portfolio* as in Table 5 Panel A.

Table 12 Panel A presents the results. We find that quant funds buy firms that are high ESG performers. The results hold for both # of stocks and $ amount of stocks and is robust to using MSCI and TVL scores. This is also consistent with the results in Table 9 where quant funds exhibit improvements in fund-level MSCI and TVL scores, but not the scores from Sustainalytics. We omit presenting other tests that explore other mechanisms (e.g., testing for ESG improvements) as we do not find statistically significant results.

5. Conclusion

In this paper, we use the United Nations Principles for Responsible Investment, which is one of the largest efforts in the world by asset managers to incorporate ESG, to empirically assess whether there is a proper follow through. Our findings can be broadly summarized as follows. First, we find that signatory funds experience a large fund inflow, and note that this increase in fund flow happens regardless of prior ESG performance. Second, PRI funds on average do not exhibit improvements in fund-level ESG scores after signing, and this result is robust to considering many different facets of ESG implementation and execution. Third, PRI funds exhibit no improvements in portfolio return and alpha. Last, only quant-driven funds improve fund-level ESG performance post signing and this is done by buying high performing ESG stocks. Overall, our conclusion is that only select signatories make visible changes to ESG while most are using PRI as a mechanism to attract capital. However, we also caveat that we are not able to consider every single dimension of ESG execution (e.g., private engagement) used by the active funds and these funds could be using channels that are not explored in this paper.

Environmental, social, and governance (ESG) has been a controversial topic, but also been one of the fastest growing phenomena in recent times. Much effort has been paid (e.g., EU Taxonomy of Harmonizing ESG taxonomy and UN Global Compact signed by more than 9,500 listed companies to be more ESG focused) not only to better understand ESG but also to increase comparability and transparency. We believe that our paper has implications to some of these efforts because we document little follow through from the asset manager signatories. Overall, we hope that our findings will not only inform regulators but also suggest the asset managers to clearly communicate their ESG execution or execute ESG as promised.

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Table 1 Sample Selection

Panel A. By Signatory Type

Signatory Type	No. of Unique Entities
Investment Management Firms	246
Asset Owners	36
Data Service Providers	39

Panel B. By Unique Funds

Signatory Type	No. of Unique Entities	No. of Unique Funds
Total UN PRI Investment Management Firms	246	
(Less: Private Equity)	-83	
(Less: Passive Managers)	-68	
(Less: Active Funds without ESG data)	-9	
Active Funds	86	448

Panel C. By Year

Year	No. of Unique Entities	No. of Unique Funds
2008	6	24
2009	6	33
2010	5	17
2011	4	25
2012	11	40
2013	8	92
2014	7	50
2015	18	78
2016	9	50
2017	11	38
2018	1	1
Total	86	448

Table 2 Descriptive Statistics

Panel A. Summary Statistics

	N	Mean	S.D.	25%	50%	75%
Fund Level ESG Performance						
MSCI ESG Score	3,617	4.684	0.690	4.377	4.621	5.008
Sustainalytics ESG Score	3,451	58.518	4.953	55.000	58.834	62.106
TVL ESG Score	4,041	51.964	6.233	50.153	52.146	54.072
TVL Material ESG Score	4,015	52.154	7.491	49.928	52.225	54.890
Total Controversies	3,451	4.127	6.380	0.000	2.000	5.000
Did not Vote*	1,521	0.015	0.074	0.000	0.000	0.000
Dissent Management Recommendations*	1,521	0.031	0.138	0.000	0.000	0.000
Other Variables						
Fee (%)	1,906	1.044	0.421	0.780	1.000	1.307
Flow	1,476	-0.009	0.164	-0.050	-0.024	0.005
Return	1,476	0.021	0.090	-0.012	0.033	0.081
CAPM Alpha	1,476	-0.004	0.028	-0.018	-0.004	0.010
log(Fund Size)	2,058	4.850	1.701	3.732	4.775	5.998
Age	5,245	9.386	9.773	2.000	6.000	14.000
# of Stocks Held	5,245	91.081	174.385	18.000	47.000	94.000
Quant	5,245	0.233	0.423	0.000	0.000	0.000
Team-Managed	5,245	0.663	0.473	0.000	1.000	1.000

This table presents summary statistics of the key variables used. The following variables are at the fund-quarter level. MSCI ESG Score, Sustainalytics ESG Score, TVL ESG Score, and TVL Material ESG Score are derived via value-weighting the respective firm-level ESG scores according to their market capitalization at quarter end. Total Controversies is the number of total controversies experienced by stocks held in a portfolio. Fee (%) is the annual management fee in percentage. Flow is the total AUM at the end of quarter minus last quarter's AUM times this quarter's return divided by last quarter's AUM. Return is the quarterly return net of fees. CAPM Alpha is the market-risk-adjusted quarterly excess return where the market beta is computed using the previous 60 month returns. log(Fund Size) is logarithm of fund size. Age is the fund age. # of Stocks Held is the number of stocks held in the portfolio. Quant indicates funds that have more than 100 stocks in the portfolio. Team-Managed indicates funds that are managed by a team of portfolio managers. The variables marked with asterisks (*) are at the fund-year level. Did Not Vote represents the proportion of agenda items that a fund did not vote during the year. Dissent Management Recommendations represents the proportion of agenda items that a fund did not support management recommendations during the year.

Panel B. Correlation Table

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 MSCI ESG Score	1.00															
2 Sustainalytics ESG Score	0.07	1.00														
3 TVL ESG Score	0.18	0.08	1.00													
4 TVL Material ESG Score	0.14	0.18	0.67	1.00												
5 Total Controversies	0.19	0.06	-0.01	-0.04	1.00											
6 Did not Vote	0.04	-0.01	0.02	0.01	0.01	1.00										
7 Dissent Mgmt Recommendations	0.06	-0.02	0.02	0.01	0.03	0.84	1.00									
8 Fee (%)	-0.02	-0.19	0.07	0.11	-0.21	-0.02	0.00	1.00								
9 Flow	-0.04	0.00	0.04	0.03	-0.05	0.00	-0.01	-0.02	1.00							
10 Return	0.01	0.01	0.05	0.05	0.08	0.00	0.01	-0.12	0.04	1.00						
11 CAPM Alpha	0.07	0.03	0.03	-0.02	0.06	0.03	0.02	-0.02	0.00	0.26	1.00					
12 log(Fund Size)	0.00	0.02	-0.08	-0.09	0.23	0.00	0.01	-0.38	-0.06	0.09	-0.02	1.00				
13 Age	0.09	-0.10	0.04	0.02	0.00	0.01	0.02	-0.14	-0.15	0.04	-0.02	0.35	1.00			
14 # of Stocks Held	0.00	-0.04	0.05	0.05	0.47	0.01	0.01	-0.24	0.02	0.06	0.02	0.19	-0.04	1.00		
15 Quant	0.00	-0.04	0.06	0.06	0.46	0.02	0.02	-0.18	0.03	0.04	0.02	0.22	-0.03	0.57	1.00	
16 Team-Managed	-0.02	0.03	-0.01	-0.02	0.07	0.03	0.03	0.08	0.05	-0.04	0.04	-0.09	-0.26	0.03	0.09	1.00

This table presents the correlation of the key variables used. All variables are at the fund-quarter level. MSCI ESG Score, Sustainalytics ESG Score, TVL ESG Score, and TVL Material ESG Score are derived via value-weighting the respective firm-level ESG scores according to their market capitalization at quarter end. Total Controversies is the number of total controversies experienced by stocks held in a portfolio. Did Not Vote represents the proportion of agenda items that a fund did not vote during the quarter. Dissent Management Recommendations represents the proportion of agenda items that a fund did not support management recommendations during the quarter. Fee (%) is the annual management fee in percentage. Flow is the total AUM at the end of quarter minus last quarter's AUM times this quarter's return divided by last quarter's AUM. Return is the quarterly return net of fees. CAPM Alpha is the market-risk-adjusted quarterly excess return where the market beta is computed using the previous 60 month returns. log(Fund Size) is logarithm of fund size. Age is the fund age. # of Stocks Held is the number of stocks held in the portfolio. Quant indicates funds that have more than 100 stocks in the portfolio. Team-Managed indicates funds that are managed by a team of portfolio managers.

Table 3 Trend in Fund Flow

	Flow	
Post	0.049***	
	[3.129]	
$q + 1$		0.039*
		[1.714]
$q + 2$		0.055***
		[2.782]
$q + 3$		0.062*
		[1.927]
$q + 4$		0.058***
		[2.667]
$q + 5$		0.061**
		[2.500]
$q + 6$		0.049*
		[1.792]
FE	Time and Fund	
Observations	1,476	1,476
R^2	0.242	0.241

This table presents the results examining the change in fund flows. Flow is the total AUM at the end of quarter minus last quarter's AUM times this quarter's return divided by last quarter's AUM. Post indicates the six quarters post signing the PRI. q+j indicates the j-th quarter after signing the PRI. Time (fund) fixed effect indicates quarter (WFICN) fixed effect. Standard errors are robust to heteroskedasticity and clustered at the fund level. ***, **, * are statistically significant at the 1, 5, and 10% levels, respectively.

Table 4 Trend in Fund-level ESG Performance

Panel A. Trend in Fund-level Value-Weighted ESG Score

	MSCI		Sustainalytics		TVL	
Post	-0.039		0.031		0.086	
	[-1.284]		[0.128]		[0.188]	
$q + 1$		-0.022		0.048		-0.363
		[-0.657]		[0.184]		[-0.768]
$q + 2$		-0.022		-0.118		0.418
		[-0.467]		[-0.334]		[0.755]
$q + 3$		-0.009		-0.182		0.029
		[-0.153]		[-0.402]		[0.043]
$q + 4$		0.006		-0.122		-0.305
		[0.087]		[-0.235]		[-0.408]
$q + 5$		0.024		-0.128		-0.125
		[0.308]		[-0.228]		[-0.150]
$q + 6$		0.03		-0.311		-0.484
		[0.357]		[-0.490]		[-0.541]
FE			Time and Fund			
Observations	3,786	3,786	3,662	3,662	4,041	4,041
R^2	0.795	0.796	0.877	0.877	0.536	0.538

This table presents the results from examining the trend in fund-level ESG performance. MSCI ESG Score, Sustainalytics ESG Score, and TVL ESG Score are value-weighted scores of respective firm-level scores according to their market capitalization at quarter end. Post indicates the six quarters post signing the PRI. q+j indicates the j-th quarter after signing the PRI. Time (fund) fixed effect indicates quarter (WFICN) fixed effect. Standard errors are robust to heteroskedasticity and clustered at the fund level. ***, **, * are statistically significant at the 1, 5, and 10% levels, respectively.

Panel B. Trend in Fund-level E, S, G Sub-score

	MSCI						Sustainalytics						TVL	
	Environmental		Social		Governance		Environmental		Social		Governance		Materiality	
Post	-0.075		-0.072		0.051		0.027		0.174		-0.256		-0.593	
	[-1.602]		[-1.416]		[0.822]		[0.082]		[0.600]		[-1.336]		[-1.344]	
q + 1		-0.059		-0.066		0.024		0.035		0.272		-0.273		-0.590
		[-1.024]		[-1.043]		[0.388]		[0.098]		[0.869]		[-1.300]		[-1.184]
q + 2		-0.051		-0.088		0.037		-0.124		-0.011		-0.302		-0.234
		[-0.720]		[-1.117]		[0.488]		[-0.257]		[-0.027]		[-1.113]		[-0.413]
q + 3		-0.035		-0.097		0.030		-0.194		-0.141		-0.225		0.199
		[-0.402]		[-0.962]		[0.309]		[-0.317]		[-0.266]		[-0.626]		[0.289]
q + 4		0.004		-0.096		-0.035		-0.013		-0.074		-0.224		0.283
		[0.038]		[-0.762]		[-0.306]		[-0.019]		[-0.122]		[-0.535]		[0.339]
q + 5		-0.010		-0.089		-0.016		-0.029		-0.035		-0.247		0.452
		[-0.076]		[-0.624]		[-0.133]		[-0.038]		[-0.053]		[-0.511]		[0.451]
q + 6		0.019		-0.100		-0.033		-0.373		-0.126		-0.343		0.497
		[0.129]		[-0.626]		[-0.239]		[-0.428]		[-0.168]		[-0.627]		[0.435]
FE	Time and Fund													
Observations	3,786	3,786	3,786	3,786	3,786	3,786	3,662	3,662	3,662	3,662	3,662	3,662	4,015	4,015
R^2	0.792	0.792	0.713	0.713	0.735	0.736	0.89	0.891	0.852	0.852	0.837	0.837	0.579	0.580

This table presents the results from examining the trend in fund-level ESG performance. MSCI Environmental Score, Social Score, Governance Score, Sustainalytics Environmental Score, Social Score, Governance Score, TVL Materiality Score are value-weighted scores of respective firm-level scores according to their market capitalization at quarter end. Post indicates the six quarters post signing the PRI. q+j indicates the j-th quarter after signing the PRI. Time (fund) fixed effect indicates quarter (WFICN) fixed effect. Standard errors are robust to heteroskedasticity and clustered at the fund level. ***, **, * are statistically significant at the 1, 5, and 10% levels, respectively.

Table 5 Exploring the Mechanisms

Panel A. Entry and Exit

	(# of Stocks>75th Pct ESG Score)/ Total # of Stocks in Portfolio			($ Amt of Stocks>75th Pct ESG Score)/ Total $ Amt of Portfolio			(# of Stocks<25th Pct ESG Score)/ Total # of Stocks in Portfolio			($ Amt of Stocks<25th Pct ESG Score)/ Total $ Amt of Portfolio		
	MSCI	Sustainalytics	TVL	MSCI	Sustainalytics	TVL	MSCI	Sustainalytics	TVL	MSCI	Sustainalytics	TVL
Post	-0.004	0.002	-0.002	-0.006	-0.001	-0.003	0.002	0.009	-0.007	0.003	0.007	-0.004
	[-0.502]	[0.226]	[-0.371]	[-0.712]	[-0.149]	[-0.537]	[0.356]	[1.003]	[-0.395]	[0.471]	[0.783]	[-0.202]
FE	Time and Fund											
Observations	3,786	3,662	4,041	3,786	3,662	4,041	3,786	3,662	4,041	3,786	3,662	4,041
R-squared	0.766	0.826	0.517	0.728	0.830	0.551	0.642	0.730	0.510	0.619	0.736	0.518

This table presents the results examining whether signatories buy high and sell low ESG performers. # of Stocks > 75th Pct ESG Score/Total # of Stocks in Portfolio is the number of stocks that are above 75th percentile in ESG score during the specific quarter divided by the total number of stocks in portfolio. $ Amt of Stocks > 75th Pct ESG Score/Total $ Amt of Stocks in Portfolio is the dollar amount of stocks that are above 75th percentile in ESG score during the specific quarter divided by the total dollar amount of stocks in portfolio. # of Stocks < 25th Pct ESG Score/Total # of Stocks in Portfolio is the number of stocks that are below 25th percentile in ESG score during the specific quarter divided by the total number of stocks in portfolio. $ Amt of Stocks < 25th Pct ESG Score/Total $ Amt of Stocks in Portfolio is the dollar amount of stocks that are below 25th percentile in ESG score during the specific quarter divided by the total dollar amount of stocks in portfolio. Post indicates the six quarters post signing the PRI. q+j indicates the j-th quarter after signing the PRI. Time (fund) fixed effect indicates quarter (WFICN) fixed effect. Standard errors are robust to heteroskedasticity and clustered at the fund level. ***, **, * are statistically significant at the 1, 5, and 10% levels, respectively.

Panel B. Testing for ESG Improvements

	MSCI		Sustainalytics		TVL	
Post	0.040		0.161		-0.507	
	[1.141]		[0.806]		[-1.159]	
$q + 1$		0.057		0.153		-0.781*
		[1.381]		[0.762]		[-1.749]
$q + 2$		0.071		0.158		-0.302
		[1.385]		[0.556]		[-0.574]
$q + 3$		0.118		0.182		-0.516
		[1.591]		[0.467]		[-0.764]
$q + 4$		0.171*		0.152		-0.371
		[1.742]		[0.325]		[-0.439]
$q + 5$		0.217*		0.145		-0.423
		[1.899]		[0.275]		[-0.465]
$q + 6$		0.208*		0.163		-0.847
		[1.674]		[0.271]		[-0.897]
FE			Time and Fund			
Observations	2,102	2,102	2,013	2,013	2,326	2,326
R^2	0.791	0.792	0.929	0.929	0.572	0.573

This table presents the results from examining the improvements in fund-level ESG performance by restricting the sample to the firms that are held at signing the UN PRI and held for subsequent 8 quarters. MSCI ESG Score, Sustainalytics ESG Score, and TVL ESG Score are value-weighted scores of respective firm-level scores according to their market capitalization at quarter end. Post indicates the six quarters post signing the PRI. q+j indicates the j-th quarter after signing the PRI. Time (fund) fixed effect indicates quarter (WFICN) fixed effect. Standard errors are robust to heteroskedasticity and clustered at the fund level. ***, **, * are statistically significant at the 1, 5, and 10% levels, respectively.

Panel C. Above Thresholds

	MSCI			Sustainalytics			TVL		
	>75th Pct (0.616%)	> 1%	> 5%	>75th Pct (0.616%)	> 1%	> 5%	>75th Pct (0.616%)	> 1%	> 5%
Post	0.047	-0.005	-0.340	-1.000**	-1.276	-0.875***	-1.570	0.066	-1.660
	[0.523]	[-0.046]	[-0.890]	[-2.151]	[-1.439]	[-2.928]	[-1.057]	[0.035]	[-0.327]
Observations	1,067	787	306	933	711	201	1,389	1,092	476
R^2	0.770	0.763	0.756	0.865	0.869	0.876	0.528	0.530	0.518

This table presents the results from examining the trend in fund-level ESG performance by restricting the sample to firms that PRI signatories hold above the following thresholds: 75th percentile (0.616%), 1%, and 5%. For example, >1% contains a group of firms that a signatory owns more than 1% of the total outstanding shares. MSCI ESG Score, Sustainalytics ESG Score, and TVL ESG Score are value-weighted scores of respective firm-level scores according to their market capitalization at quarter end. Post indicates the six quarters post signing the PRI. q+j indicates the j-th quarter after signing the PRI. Time (fund) fixed effect indicates quarter (WFICN) fixed effect. Standard errors are robust to heteroskedasticity and clustered at the fund level. ***, **, * are statistically significant at the 1, 5, and 10% levels, respectively.

Table 6 Trend in Fund-level Voting

Panel A. Voting Participation Behavior Post Signing UN PRI

	Did Not Vote on							
	All Issues		Environmental Issues		Social Issues		Governance Issues	
Post	0.001		0.004		-0.015		0.001	
	[0.186]		[0.859]		[-1.489]		[0.196]	
y + 1		0.001		0.003		-0.022**		0.002
		[0.377]		[0.967]		[-2.330]		[0.423]
y + 2		0.002		0.003		-0.036**		0.003
		[0.412]		[0.204]		[-2.608]		[0.470]
FE	Time and Fund							
Observations	1,521	1,521	1,521	1,521	1,521	1,521	1,521	1,521
R^2	0.653	0.653	0.682	0.682	0.801	0.801	0.645	0.645

This table presents the results from examining the trend in fund-level ESG performance. Did Not Vote on All Issues represents the proportion of all agenda items that a fund did not vote. Did Not Vote on Environmental Issues represents the proportion of environmental agenda items that a fund did not vote. Did Not Vote on Social Issues represents the proportion of social agenda items that a fund did not vote. Did Not Vote on Governance Issues represents the proportion of governance agenda items that a fund did not vote. Post indicates the two years post signing the PRI. y+j indicates the y-th year after signing the PRI. Time (fund) fixed effect indicates year (WFICN) fixed effect. Standard errors are robust to heteroskedasticity and clustered at the fund level. ***, **, * are statistically significant at the 1, 5, and 10% levels, respectively.

Panel B. Voting Behavior with respect to Management's Suggestion Post Signing UN PRI

	Dissent Management Recommendations							
	All Issues		Environmental Issues		Social Issues		Governance Issues	
Post	-0.010		-0.008		-0.026*		-0.008	
	[-1.080]		[-0.389]		[-1.744]		[-0.910]	
$y + 1$		-0.010		-0.006		-0.042**		-0.008
		[-1.076]		[-0.255]		[-2.090]		[-0.920]
$y + 2$		-0.009		-0.002		-0.075**		-0.008
		[-0.794]		[-0.059]		[-2.100]		[-0.721]
FE	Time and Fund							
Observations	1,521	1,521	1,521	1,521	1,521	1,521	1,521	1,521
R^2	0.699	0.699	0.572	0.572	0.772	0.772	0.689	0.689

This table presents the results from examining the trend in fund-level ESG performance. Dissent Management Recommendations on All Issues represents the proportion of all agenda items that a fund did not support management recommendations. Dissent Management Recommendations on Environmental Issues represents the proportion of environmental agenda items that a fund did not support management recommendations. Dissent Management Recommendations on Social Issues represents the proportion of social agenda items that a fund did not support management recommendations. Dissent Management Recommendations on Governance Issues represents the proportion of governance agenda items that a fund did not support management recommendations. Post indicates the two years post signing the PRI. y+j indicates the y-th year after signing the PRI. Time (fund) fixed effect indicates year (WFICN) fixed effect. Standard errors are robust to heteroskedasticity and clustered at the fund level. ***, **, * are statistically significant at the 1, 5, and 10% levels, respectively.

Table 7 Trend CAPM Alpha, and Return

	CAPM Alpha				Return			
Post	-0.003		-0.003		-0.001		-0.001	
	[-1.017]		[-1.023]		[-0.263]		[-0.270]	
$q+1$		-0.003		-0.003		-0.001		-0.001
		[-1.026]		[-1.039]		[-0.300]		[-0.312]
$q+2$		-0.007*		-0.007*		-0.005		-0.005
		[-1.829]		[-1.834]		[-0.998]		[-1.005]
$q+3$		-0.004		-0.004		-0.002		-0.002
		[-0.960]		[-0.987]		[-0.432]		[-0.457]
$q+4$		-0.009**		-0.010**		-0.007		-0.007
		[-2.017]		[-2.050]		[-1.307]		[-1.338]
$q+5$		-0.011**		-0.012**		-0.009		-0.009
		[-2.307]		[-2.345]		[-1.520]		[-1.550]
$q+6$		-0.013***		-0.013***		-0.011*		-0.011*
		[-2.804]		[-2.830]		[-1.893]		[-1.915]
log(Fund Size)			0.002	0.003			0.002	0.003
			[1.250]	[1.403]			[0.948]	[1.053]
FE				Time and Fund				
Observations	1,476	1,476	1,476	1,476	1,476	1,476	1,476	1,476
R^2	0.209	0.214	0.210	0.214	0.906	0.906	0.906	0.906

This table presents the results examining the trend of fund return and alpha. CAPM Alpha is the market-risk-adjusted quarterly excess return where the market beta is computed using the previous 60 month returns. Return is the quarterly return net of fees. Post indicates the six quarters post signing the PRI. q+j indicates the j-th quarter after signing the PRI. Time (fund) fixed effect indicates quarter (WFICN) fixed effect. Standard errors are robust to heteroskedasticity and clustered at the fund level. ***, **, * are statistically significant at the 1, 5, and 10% levels, respectively.

Table 8 Determinants of Signing UN PRI

	Dep Var = Sign PRI		
ESG Scores	MSCI	Sustainalytics	TVL
# Funds in Family	0.014***	0.015***	0.015***
	[4.865]	[4.806]	[5.326]
log(Fund Size)_Family	0.002	-0.007	-0.008
	[0.019]	[-0.065]	[-0.070]
CAPM Alpha_Family	0.124	0.109	0.092
	[1.177]	[1.071]	[0.942]
Fee (%)_Family	-1.427*	-1.374*	-1.391*
	[-1.904]	[-1.832]	[-1.930]
ESG Score_Family	0.191	0.049	0.036
	[0.615]	[1.018]	[0.881]
Listed	2.660***	2.712***	2.403***
	[8.582]	[8.622]	[7.459]
All Quant Only	0.558	0.608	0.448
	[1.393]	[1.436]	[1.115]
Age_Family	-0.017	-0.017	-0.008
	[-1.060]	[-1.065]	[-0.584]
FE		Time	
Observations	8,321	7,869	9,611

This table presents the results from examining the determinants of signing the UN PRI. Sign PRI indicates the asset manager-quarters after signing the PRI. # Funds in Family is the number of funds in the fund family. log(Fund Size) Family is logarithm of the value-weighted fund size of the fund family. CAPM Alpha Family is the value-weighted CAPM Alpha of the fund family. Fee (%) Family is the value-weighted average annual management fee of the fund family in percentage. ESG Score Family is the value-weighted scores of respective fund-level ESG scores according to their market capitalization at quarter end. Listed Status indicates whether asset manager is a public listed company. All Quant Only indicates when all funds in the fund family are quant funds (i.e., have more than 100 stocks in the portfolio). Age is the age of the oldest fund in the family. Time fixed effect indicates quarter fixed effect. Standard errors are robust to heteroskedasticity and clustered at the asset management firm level. ***, **, * are statistically significant at the 1, 5, and 10% levels, respectively.

Table 9 Cross-sectional Tests using pre-PRI characteristics

Panel A. Quant Fund

	Flow	MSCI	Sustainalytics	TVL
Post*Quant Fund	0.016	0.079**	0.238	0.579*
	[0.981]	[2.256]	[0.810]	[1.773]
Post	0.045***	-0.057**	-0.051	-0.338
	[2.949]	[-2.045]	[-0.305]	[-1.073]
Quant Fund	0.007	0.028	0.388	-0.037
	[0.264]	[0.553]	[0.932]	[-0.106]
FE		Time and Fund		
Observations	1,476	1,316	1,271	1,476
R^2	0.237	0.896	0.939	0.553

This table examines whether fund characteristics prior to signing PRI impact fund flows and ESG performance. Flow is the total AUM at the end of quarter minus last quarter's AUM times this quarter's return divided by last quarter's AUM. MSCI ESG Score, Sustainalytics ESG Score, and TVL ESG Score are value-weighted scores of respective firm-level scores according to their market capitalization at quarter end. Quant Fund indicates funds that have more than 100 stocks in the portfolio during the prior six quarters. Post indicates the six quarters post signing the PRI. Time (fund) fixed effect indicates quarter (WFICN) fixed effect. Standard errors are robust to heteroskedasticity and clustered at the fund level. ***, **, * are statistically significant at the 1, 5, and 10% levels, respectively.

Panel B. Fund Size

	Flow	MSCI	Sustainalytics	TVL
Post*Small Fund	0.032***	0.046	0.179	-0.230
	[2.626]	[0.958]	[0.568]	[-0.669]
Post	0.027	-0.061	-0.098	0.059
	[1.564]	[-1.469]	[-0.361]	[0.174]
Small Fund	0.03	0.035	0.198	1.693***
	[1.309]	[0.400]	[0.606]	[4.582]
FE		Time and Fund		
Observations	1,476	1,316	1,271	1,476
R^2	0.239	0.895	0.939	0.556

This table examines whether fund characteristics prior to signing PRI impact fund flows and ESG performance. Flow is the total AUM at the end of quarter minus last quarter's AUM times this quarter's return divided by last quarter's AUM. MSCI ESG Score, Sustainalytics ESG Score, and TVL ESG Score are value-weighted scores of respective firm-level scores according to their market capitalization at quarter end. Small Fund indicates funds that are below average size during the prior six quarters. Post indicates the six quarters post signing the PRI. Time (fund) fixed effect indicates quarter (WFICN) fixed effect. Standard errors are robust to heteroskedasticity and clustered at the fund level. ***, **, * are statistically significant at the 1, 5, and 10% levels, respectively.

Panel C. Fee

	Flow	MSCI	Sustainalytics	TVL
Post*Hi Fee Fund	0.049**	0.051	-0.236	0.343
	[2.121]	[1.202]	[-0.769]	[0.796]
Post	0.030**	-0.045	0.135	-0.270
	[2.147]	[-1.460]	[0.766]	[-0.737]
Hi Fee Fund	-0.014	0.064	0.551	-0.864
	[-0.562]	[1.243]	[1.406]	[-1.322]
FE		Time and Fund		
Observations	1,476	1,316	1,271	1,476
R^2	0.240	0.895	0.939	0.553

This table examines whether fund characteristics prior to signing PRI impact fund flows and ESG performance. Flow is the total AUM at the end of quarter minus last quarter's AUM times this quarter's return divided by last quarter's AUM. MSCI ESG Score, Sustainalytics ESG Score, and TVL ESG Score are value-weighted scores of respective firm-level scores according to their market capitalization at quarter end. Hi Fee Fund indicates funds that are above average in fee during the prior six quarters. Post indicates the six quarters post signing the PRI. Time (fund) fixed effect indicates quarter (WFICN) fixed effect. Standard errors are robust to heteroskedasticity and clustered at the fund level. ***, **, * are statistically significant at the 1, 5, and 10% levels, respectively.

Panel D. Team-Managed Status

	Flow	MSCI	Sustainalytics	TVL
Post*Team-Managed Fund	0.017	0.052	0.012	-0.193
	[0.925]	[1.448]	[0.041]	[-0.542]
Post	0.039**	-0.060*	0.031	-0.002
	[2.080]	[-1.915]	[0.123]	[-0.006]
Team-Managed Fund	0.003	0.011	0.142	0.241
	[0.142]	[0.190]	[0.371]	[0.678]
FE		Time and Fund		
Observations	1,476	1,316	1,271	1,476
R^2	0.237	0.895	0.939	0.551

This table examines whether fund characteristics prior to signing PRI impact fund flows and ESG performance. Flow is the total AUM at the end of quarter minus last quarter's AUM times this quarter's return divided by last quarter's AUM. MSCI ESG Score, Sustainalytics ESG Score, and TVL ESG Score are value-weighted scores of respective firm-level scores according to their market capitalization at quarter end. Team-Managed indicates funds that are managed by a team of portfolio managers during the prior six quarters. Post indicates the six quarters post signing the PRI. Time (fund) fixed effect indicates quarter (WFICN) fixed effect. Standard errors are robust to heteroskedasticity and clustered at the fund level. ***, **, * are statistically significant at the 1, 5, and 10% levels, respectively.

Panel E. Pre-Signing Fund-Level ESG Scores

	Flow			MSCI	Sustainalytics	TVL
	Using Pre-signing ESG Scores from					
	MSCI	Sustainalytics	TVL	MSCI	Sustainalytics	TVL
Post*Hi ESG Fund	0.009	-0.045	0.014	0.015	-0.092	0.756
	[0.416]	[-1.612]	[0.561]	[0.206]	[-0.278]	[0.647]
Post	0.044**	0.085***	0.039*	-0.039	0.122	-0.799
	[2.315]	[3.160]	[1.740]	[-0.506]	[0.340]	[-0.659]
Hi ESG Fund	-0.015	0.051	-0.036	-0.018	0.161	0.609
	[-0.681]	[0.822]	[-1.163]	[-0.400]	[0.401]	[0.992]
FE	Time and Fund					
Observations	1,316	1,271	1,476	1,316	1,271	1,476
Adj R^2	0.236	0.238	0.237	0.894	0.939	0.553

This table examines whether fund characteristics prior to signing PRI impact fund flows and ESG performance. Flow is the total AUM at the end of quarter minus last quarter's AUM times this quarter's return divided by last quarter's AUM. MSCI ESG Score, Sustainalytics ESG Score, and TVL ESG Score are value-weighted scores of respective firm-level scores according to their market capitalization at quarter end. Hi ESG Fund indicates funds that are above average in ESG scores during the prior six quarters. Post indicates the six quarters post signing the PRI. Time (fund) fixed effect indicates quarter (WFICN) fixed effect. Standard errors are robust to heteroskedasticity and clustered at the fund level. ***, **, * are statistically significant at the 1, 5, and 10% levels, respectively.

Table 10 Robustness Tests - Ensuring the Phenomenon

Panel A. Treating Missing ESG Scores as Zeros

	Treating Missing as zeros		
	MSCI ESG Score	Sustainalytics ESG Score	TVL ESG Score
Post	-0.044	-0.098	0.211
	[-0.678]	[-0.142]	[0.334]
FE		Fund and Time	
Observations	4,543	4,543	4,935
R^2	0.821	0.864	0.855

This table presents the results from examining the trend in fund-level ESG performance. MSCI ESG Score, Sustainalytics ESG Score, and TVL ESG Score are value-weighted scores of respective firm-level scores according to their market capitalization at quarter end. Post indicates the six quarters post signing the PRI. Time (fund) fixed effect indicates quarter (WFICN) fixed effect. Standard errors are robust to heteroskedasticity and clustered at the fund level. ***, **, * are statistically significant at the 1, 5, and 10% levels, respectively.

Panel B. Covariate Balance from Propensity Score Matching

	Treat		Control			
	N	Mean	N	Mean	Difference	
MSCI ESG Score	1,248	2.8816	1,042	3.0127	-0.1311	***
Sustainalytics ESG Score	1,248	30.519	1,042	32.035	-1.5165	**
TVL ESG Score	1,248	37.136	1,042	37.959	-0.8224	***
Flow	1,248	0.1073	1,042	0.2254	-0.1181	
Return	1,158	0.0353	985	0.0334	0.0019	
Log(Fund Size)	1,248	4.9023	1,042	4.8342	0.0681	

All variables are at the fund-quarter level. MSCI ESG Score, Sustainalytics ESG Score, TVL ESG Score, and TVL Material ESG Score are derived via value-weighting the respective firm-level ESG scores according to their market capitalization at quarter end. Flow is the total AUM at the end of quarter minus last quarter's AUM times this quarter's return divided by last quarter's AUM. Return is the quarterly return net of fees. log(Fund Size) is logarithm of fund size.

Panel C. Difference-in-Differences Specification

	MSCI ESG Score	Sustainalytics ESG Score	TVL ESG Score
Treat * Post	0.053	0.434	0.170
	[0.490]	[0.738]	[0.388]
Post	-0.100	-0.711	-0.386
	[-1.464]	[-1.534]	[-1.250]
	[156.540]	[156.809]	[351.769]
FE		Fund and Time	
Observations	2,290	2,290	2,290
R^2	0.807	0.939	0.752

This table presents the results from examining the trend in fund-level ESG performance. MSCI ESG Score, Sustainalytics ESG Score, and TVL ESG Score are value-weighted scores of respective firm-level scores according to their market capitalization at quarter end. Treat equals 1 for PRI signatory funds and 0 for propensity score matched non-PRI funds. Post indicates the six quarters post a PRI fund signing the PRI. Time (fund) fixed effect indicates quarter (WFICN) fixed effect. Standard errors are robust to heteroskedasticity and clustered at the fund level. ***, **, * are statistically significant at the 1, 5, and 10% levels, respectively.

Table 11 Robustness Test– Additional Tests

Panel A. Using Alternative Pre-Periods

	MSCI		Sustainalytics		TVL		MSCI		Sustainalytics		TVL	
	Pre-period (6 quarters) ending 1 year prior to signing						Pre-period (6 quarters) ending 2 year prior to signing					
Post	-0.066		-0.215		0.512		-0.136		-0.204		-0.418	
	[-0.947]		[-0.465]		[0.758]		[-1.256]		[-0.273]		[-0.408]	
q + 1		-0.052		-0.415		-0.027		-0.259		0.034		-2.867*
		[-0.410]		[-0.591]		[-0.030]		[-1.259]		[0.023]		[-1.775]
q + 2		-0.066		-0.587		0.781		-0.287		-0.071		-2.295
		[-0.464]		[-0.741]		[0.785]		[-1.293]		[-0.045]		[-1.341]
q + 3		-0.065		-0.657		0.536		-0.311		-0.101		-2.872
		[-0.399]		[-0.723]		[0.491]		[-1.286]		[-0.058]		[-1.549]
q + 4		-0.061		-0.606		0.189		-0.321		0.063		-3.544*
		[-0.338]		[-0.607]		[0.155]		[-1.232]		[0.034]		[-1.748]
q + 5		-0.044		-0.632		0.457		-0.332		0.148		-3.572*
		[-0.227]		[-0.602]		[0.338]		[-1.196]		[0.076]		[-1.649]
q + 6		-0.058		-0.842		0.006		-0.364		0.029		-4.224*
		[-0.272]		[-0.744]		[0.004]		[-1.236]		[0.014]		[-1.835]
FE	Time and Fund											
Observations	3,463	3,463	3,358	3,358	3,663	3,663	3,311	3,311	3,183	3,183	3,521	3,521
R^2	0.797	0.797	0.880	0.880	0.567	0.568	0.818	0.818	0.891	0.891	0.581	0.584

This table presents the results from examining the trend in fund-level ESG performance considering alternative pre-periods. MSCI ESG Score, Sustainalytics ESG Score, and TVL ESG Score are value-weighted scores of respective firm-level scores according to their market capitalization at quarter end. Post indicates the six quarters post signing the PRI. q+j indicates the j-th quarter after signing the PRI. Time (fund) fixed effect indicates quarter (WFICN) fixed effect. Standard errors are robust to heteroskedasticity and clustered at the fund level. ***, **, * are statistically significant at the 1, 5, and 10% levels, respectively.

Panel B. Trend in Fund-level ESG Controversy

	Total Controversies		Environmental Controversies		Social Controversies		Governance Controversies	
Post	-0.183		0.008		-0.101		-0.072	
	[-0.898]		[0.137]		[-0.755]		[-1.480]	
q + 1		-0.167		0.061		-0.144		-0.062
		[-0.814]		[0.954]		[-1.084]		[-1.233]
q + 2		-0.265		0.097		-0.266		-0.076
		[-0.980]		[1.353]		[-1.459]		[-1.282]
q + 3		-0.200		0.131		-0.272		-0.038
		[-0.621]		[1.457]		[-1.261]		[-0.569]
q + 4		-0.180		0.226**		-0.323		-0.059
		[-0.485]		[2.121]		[-1.296]		[-0.786]
q + 5		-0.300		0.261**		-0.469		-0.068
		[-0.703]		[2.112]		[-1.647]		[-0.785]
q + 6		-0.237		0.296**		-0.471		-0.038
		[-0.482]		[2.113]		[-1.454]		[-0.369]
FE	Time and Fund							
Observations	3,662	3,662	3,662	3,662	3,655	3,655	3,662	3,662
R^2	0.896	0.896	0.869	0.87	0.884	0.884	0.818	0.818

This table presents the results from examining the trend in fund-level ESG performance. Total Controversies is the number of total controversies experienced by stocks held in a portfolio. Environmental Controversies is the number of total environment related controversies experienced by stocks held in a portfolio. Social Controversies is the number of total social related controversies experienced by stocks held in a portfolio. Governance Controversies is the number of total governance related controversies experienced by stocks held in a portfolio.. Post indicates the six quarters post signing the PRI. q+j indicates the j-th quarter after signing the PRI. Time (fund) fixed effect indicates quarter (WFICN) fixed effect. Standard errors are robust to heteroskedasticity and clustered at the fund level. ***, **, * are statistically significant at the 1, 5, and 10% levels, respectively.

Panel C. Trend in Bottom ESG Performers (Quartile)

	MSCI		Sustainalytics		TVL	
Post	-0.026		0.148		0.322	
	[-0.789]		[0.577]		[0.464]	
$q + 1$		-0.025		0.171		-0.492
		[-0.711]		[0.624]		[-0.704]
$q + 2$		-0.027		-0.067		0.510
		[-0.577]		[-0.182]		[0.630]
$q + 3$		-0.019		-0.140		-0.313
		[-0.314]		[-0.296]		[-0.335]
$q + 4$		-0.007		-0.120		-0.947
		[-0.098]		[-0.221]		[-0.880]
$q + 5$		-0.012		-0.164		-0.899
		[-0.150]		[-0.282]		[-0.770]
$q + 6$		-0.025		-0.296		-1.671
		[-0.286]		[-0.452]		[-1.342]
FE			Time and Fund			
Observations	3,786	3,786	3,662	3,662	4,041	4,041
R^2	0.797	0.797	0.867	0.868	0.481	0.482

This table presents the results from examining the trend in fund-level ESG performance by restricting the sample to firms that are in the bottom quartile of ESG Scores in each portfolio. MSCI ESG Score, Sustainalytics ESG Score, and TVL ESG Score are value-weighted scores of respective firm-level scores according to their market capitalization at quarter end. Post indicates the six quarters post signing the PRI. q+j indicates the j-th quarter after signing the PRI. Time (fund) fixed effect indicates quarter (WFICN) fixed effect. Standard errors are robust to heteroskedasticity and clustered at the fund level. ***, **, * are statistically significant at the 1, 5, and 10% levels, respectively.

Table 12 Robustness Tests- On the Mechanism

Panel A. Entry and Exit – Quant Funds

	(# of Stocks>75th Pct ESG Score)/ Total # of Stocks in Portfolio			($ Amt of Stocks>75th Pct ESG Score)/ Total $ Amt of Portfolio			(# of Stocks<25th Pct ESG Score)/ Total # of Stocks in Portfolio			($ Amt of Stocks<25th Pct ESG Score)/ Total $ Amt of Portfolio		
	MSCI	Sustainalytics	TVL	MSCI	Sustainalytics	TVL	MSCI	Sustainalytics	TVL	MSCI	Sustainalytics	TVL
Post*Quant Fund	0.021**	-0.003	0.011**	0.018*	-0.002	0.015**	0.018**	-0.002	0.003	0.011	-0.005	-0.001
	[2.274]	[-0.466]	[2.331]	[1.661]	[-0.304]	[2.495]	[2.506]	[-0.448]	[0.563]	[1.330]	[-0.999]	[-0.193]
Post	-0.017**	0.003	-0.004	-0.022***	0.000	-0.009*	-0.003	-0.001	-0.003	0.001	-0.001	0.004
	[-2.325]	[0.550]	[-0.870]	[-2.796]	[0.004]	[-1.813]	[-0.559]	[-0.287]	[-0.675]	[0.219]	[-0.177]	[0.744]
Quant Fund	-0.013	0.019*	-0.004	0.002	0.028**	-0.010	-0.030*	-0.003	0.005	-0.024	0.002	-0.005
	[-0.721]	[1.788]	[-0.415]	[0.079]	[2.219]	[-1.187]	[-1.778]	[-0.349]	[0.728]	[-1.386]	[0.284]	[-0.605]
FE	Time and Fund											
Observations	1,316	1,271	1,476	1,316	1,271	1,476	1,316	1,271	1,476	1,316	1,271	1,476
R^2	0.832	0.929	0.757	0.806	0.926	0.774	0.692	0.833	0.583	0.668	0.835	0.642

This table presents the results examining whether signatories that are quant funds buy high and sell low ESG performers. # of Stocks > 75th Pct ESG Score/Total # of Stocks in Portfolio is the number of stocks that are above 75th percentile in ESG score during the specific quarter divided by the total number of stocks in portfolio. $ Amt of Stocks > 75th Pct ESG Score/Total $ Amt of Stocks in Portfolio is the dollar amount of stocks that are above 75th percentile in ESG score during the specific quarter divided by the total dollar amount of stocks in portfolio. # of Stocks < 25th Pct ESG Score/Total # of Stocks in Portfolio is the number of stocks that are below 25th percentile in ESG score during the specific quarter divided by the total number of stocks in portfolio. $ Amt of Stocks < 25th Pct ESG Score/Total $ Amt of Stocks in Portfolio is the dollar amount of stocks that are below 25th percentile in ESG score during the specific quarter divided by the total dollar amount of stocks in portfolio. Post indicates the six quarters post signing the PRI. q+j indicates the j-th quarter after signing the PRI. Time (fund) fixed effect indicates quarter (WFICN) fixed effect. Standard errors are robust to heteroskedasticity and clustered at the fund level. ***, **, * are statistically significant at the 1, 5, and 10% levels, respectively.

Panel B. Testing for Improvements- Passive Funds

	MSCI		Sustainalytics		TVL	
Post	-0.003		0.042		-0.002	
	[-0.153]		[0.444]		[-0.011]	
$q + 1$		-0.015		0.041		0.067
		[-0.820]		[0.496]		[0.461]
$q + 2$		0.006		0.081		-0.075
		[0.252]		[0.626]		[-0.410]
$q + 3$		0.020		0.214		0.147
		[0.639]		[1.240]		[0.639]
$q + 4$		0.006		0.161		-0.102
		[0.186]		[0.885]		[-0.402]
$q + 5$		0.012		0.218		0.053
		[0.307]		[1.029]		[0.187]
$q + 6$		0.004		0.329		0.167
		[0.098]		[1.345]		[0.530]
FE			Time and Fund			
Observations	4,622	4,622	4,534	4,534	5,313	5,313
R^2	0.808	0.809	0.902	0.902	0.525	0.525

This table presents the results from examining the improvements in fund-level ESG performance by restricting the sample to the firms that are held at signing the UN PRI and held for subsequent 8 quarters. MSCI ESG Score, Sustainalytics ESG Score, and TVL ESG Score are value-weighted scores of respective firm-level scores according to their market capitalization at quarter end. Post indicates the six quarters post signing the PRI. q+j indicates the j-th quarter after signing the PRI. Time (fund) fixed effect indicates quarter (WFICN) fixed effect. Standard errors are robust to heteroskedasticity and clustered at the fund level. ***, **, * are statistically significant at the 1, 5, and 10% levels, respectively.

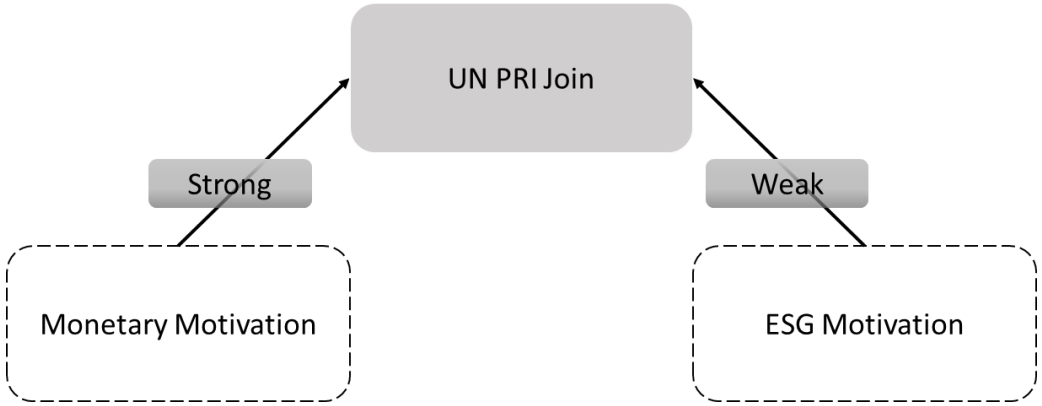
Panel C. Testing for Threshold- Passive Funds

	MSCI			Sustainalytics			TVL		
	>75th Pct (1.651%)	> 5%	> 10%	>75th Pct (1.651%)	> 5%	> 10%	>75th Pct (1.651%)	> 5%	> 10%
Post	-0.025	-0.052	0.010	0.026	0.307	0.893	0.729	0.038	0.021
	[-0.790]	[-1.295]	[0.168]	[0.151]	[1.156]	[1.612]	[1.485]	[0.053]	[0.024]
Observations	3,059	2,084	1,373	3,016	1,762	1,080	3,893	2,808	1,899
R^2	0.668	0.750	0.742	0.811	0.805	0.806	0.470	0.450	0.506

This table presents the results from examining the trend in fund-level ESG performance by restricting the sample to firms that PRI signatories hold above the following thresholds: 75th percentile (1.651%), 5%, and 10%. For example, >5% contains a group of firms that a signatory owns more than 5% of the total outstanding shares. MSCI ESG Score, Sustainalytics ESG Score, and TVL ESG Score are value-weighted scores of respective firm-level scores according to their market capitalization at quarter end. Post indicates the six quarters post signing the PRI. q+j indicates the j-th quarter after signing the PRI. Time (fund) fixed effect indicates quarter (WFICN) fixed effect. Standard errors are robust to heteroskedasticity and clustered at the fund level. ***, **, * are statistically significant at the 1, 5, and 10% levels, respectively.

Figure 1. Causal Diagram

Panel A – Greenwashing



Panel B – Empirical Design

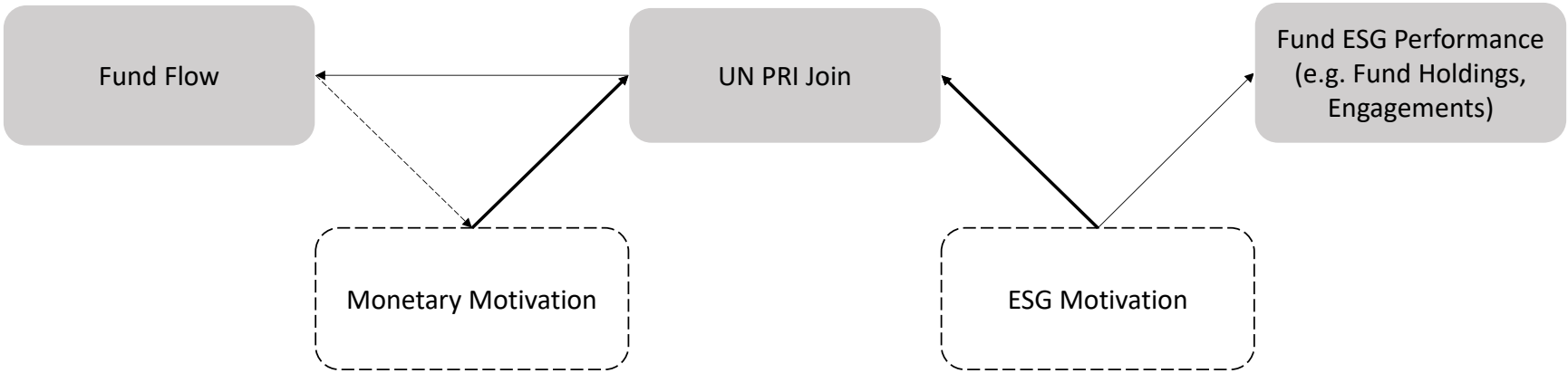
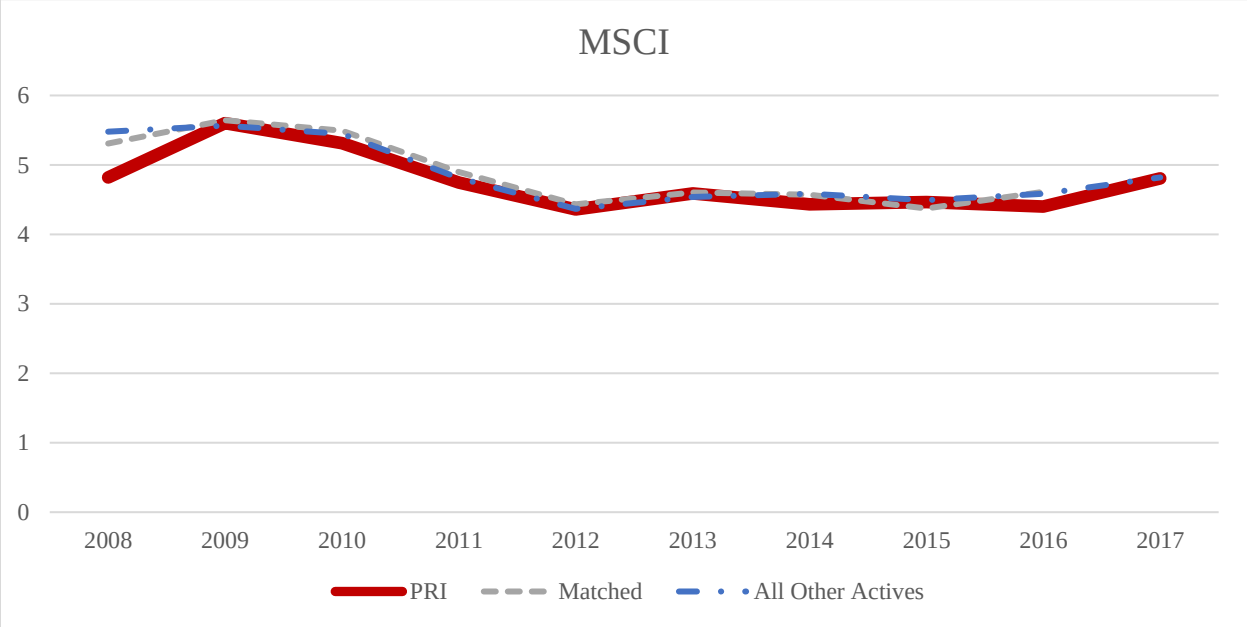
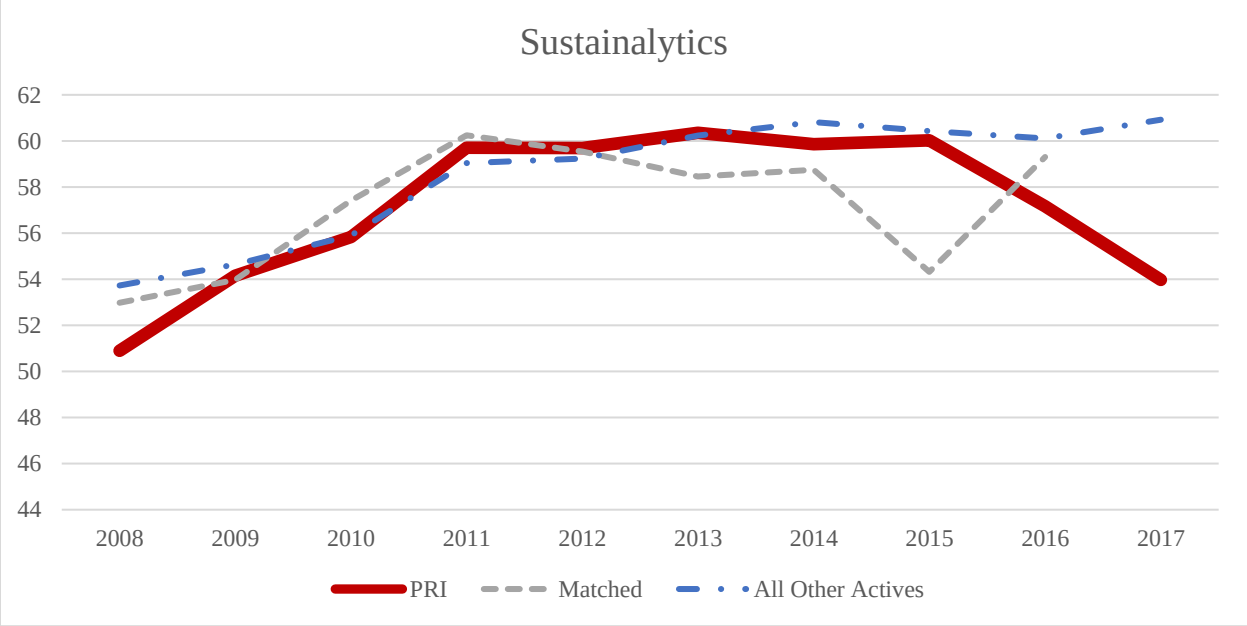


Figure 2. Comparing Initial ESG Scores of Signatories to Others

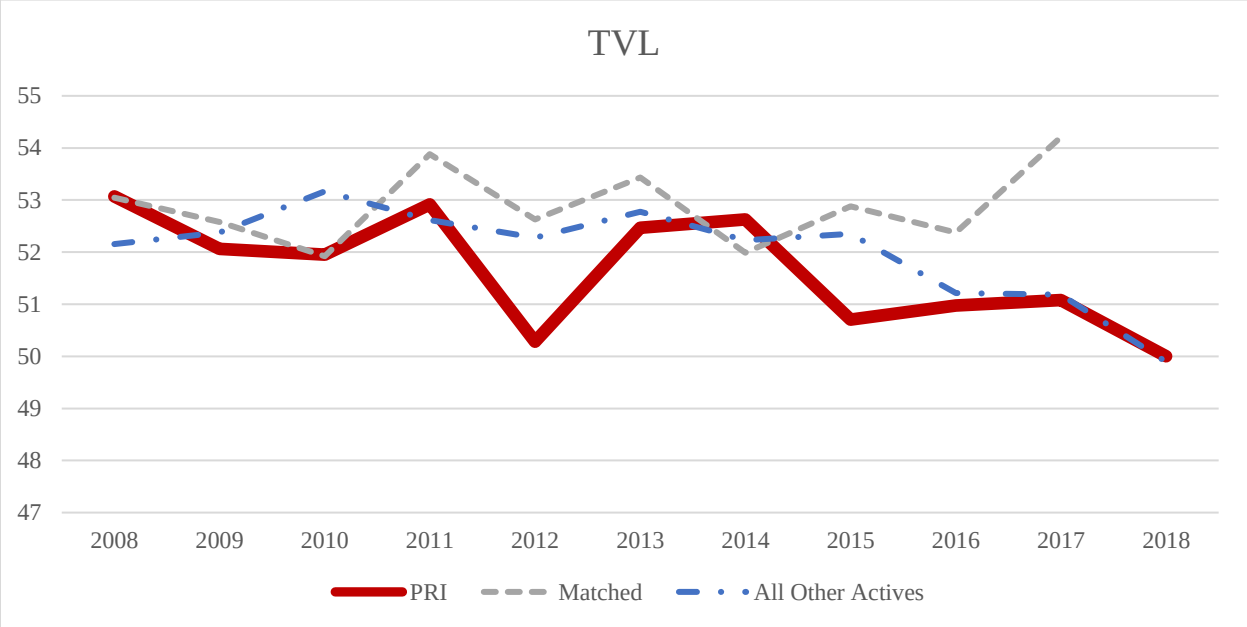
Panel A. MSCI



Panel B. Sustainalytics



Panel C. TVL

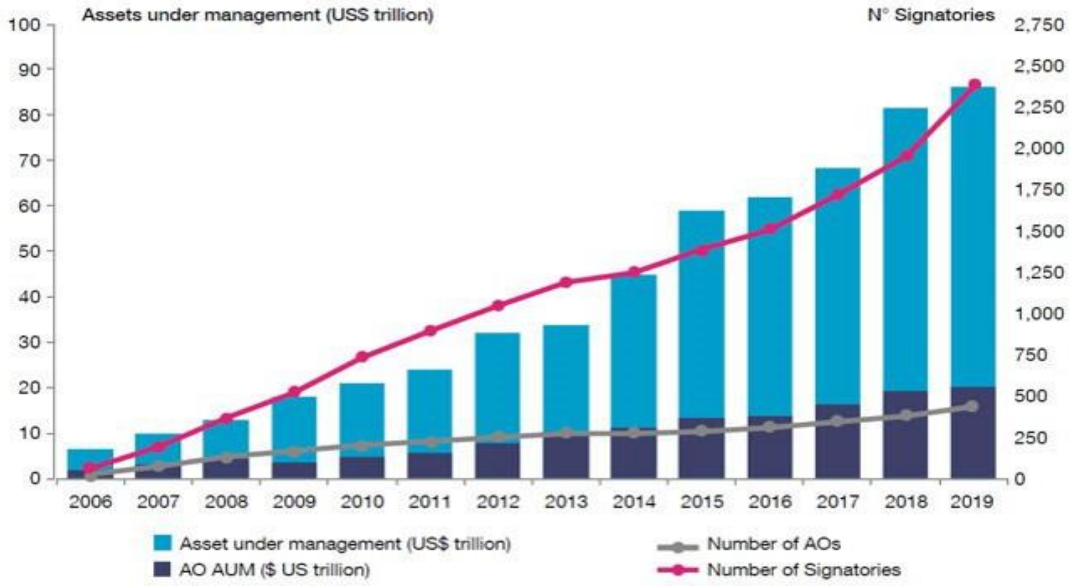


This figure presents the trend in ESG scores at the time of joining. PRI indicates the PRI funds. Matched indicates the propensity score matched control group as in the difference-in-differences specification. All Other Actives indicates non-PRI active funds that are unmatched.

Appendix

A1. UN PRI

Panel A. Growth in UN PRI Signatories' Assets Under Management



Panel B. UN PRI- Six Principles

The six Principles for Responsible Investment are a voluntary and aspirational set of investment principles that offer a menu of possible actions for incorporating ESG issues into investment practice.

The Principles were developed by investors, for investors.

In implementing them, signatories contribute to developing a more sustainable global financial system.

Signatories' commitment

"As institutional investors, we have a duty to act in the best long-term interests of our beneficiaries. In this fiduciary role, we believe that environmental, social, and corporate governance (ESG) issues can affect the performance of investment portfolios (to varying degrees across companies, sectors, regions, asset classes and through time).

We also recognise that applying these Principles may better align investors with broader objectives of society. Therefore, where consistent with our fiduciary responsibilities, we commit to the following:

- Principle 1: We will incorporate ESG issues into investment analysis and decision-making processes.
- Principle 2: We will be active owners and incorporate ESG issues into our ownership policies and practices.
- Principle 3: We will seek appropriate disclosure on ESG issues by the entities in which we invest.
- Principle 4: We will promote acceptance and implementation of the Principles within the investment industry.
- Principle 5: We will work together to enhance our effectiveness in implementing the Principles.
- Principle 6: We will each report on our activities and progress towards implementing the Principles.

The Principles for Responsible Investment were developed by an international group of institutional investors reflecting the increasing relevance of environmental, social and corporate governance issues to investment practices. The process was convened by the United Nations Secretary-General.

In signing the Principles, we as investors publicly commit to adopt and implement them, where consistent with our fiduciary responsibilities. We also commit to evaluate the effectiveness and improve the content of the Principles over time. We believe this will improve our ability to meet commitments to beneficiaries as well as better align our investment activities with the broader interests of society.

Panel C. Three Minimum Requirements

PRI Principles for Responsible Investment

Minimum requirements for membership

In 2018 the PRI implemented minimum requirements for membership alongside introducing programmes for showcasing leadership.

The increased accountability of the PRI as an organisation is one of the focus areas of our 10-year Blueprint for responsible investment.

The PRI's consultation on strengthening signatory accountability in September 2017 showed strong signatory support for using reporting and assessment data to delist signatories whose progress in implementing the Principles is not sufficient to meet a basic criteria of being a signatory, as defined by the PRI. A full overview of the consultation responses can be found here.

Minimum requirements

The PRI has implemented the following minimum requirements for existing and future asset owner and investment manager signatories. Failure to meet these requirements over a two-year period, following extensive engagement with the PRI, would result in delisting.

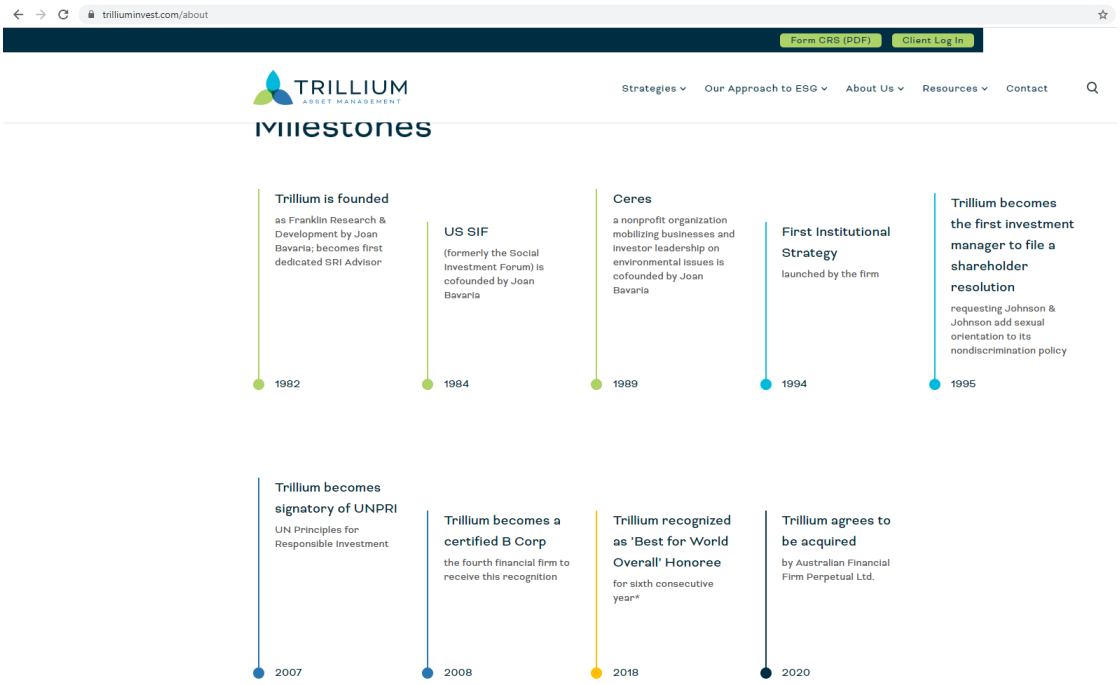
The three requirements are:

- Investment policy that covers the firm's responsible investment approach, covering >50% of AUM [indicator SG 01]
- Internal/external staff responsible for implementing RI policy [indicator SG 07]
- Senior-level commitment and accountability mechanisms for RI implementation [indicator SG 07]

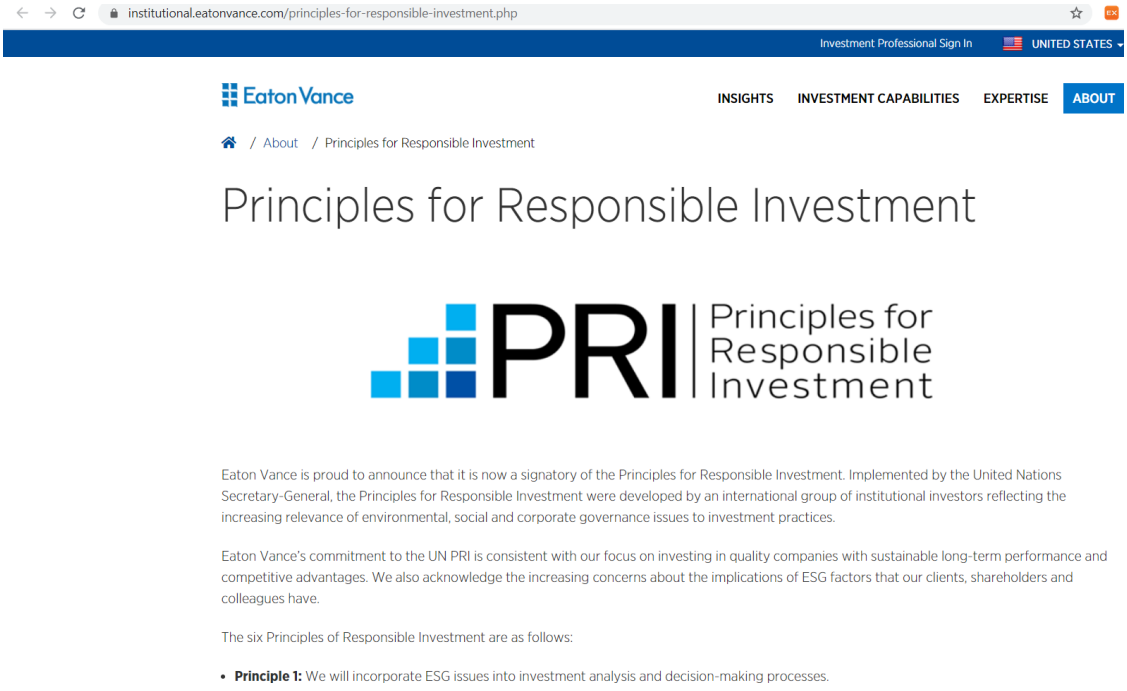
Signatories that do not meet the criteria will be informed privately and delisting will only be as a last resort following unsuccessful engagement over the two-year period.

A2. Example of Asset Managers Mentioning UN PRI

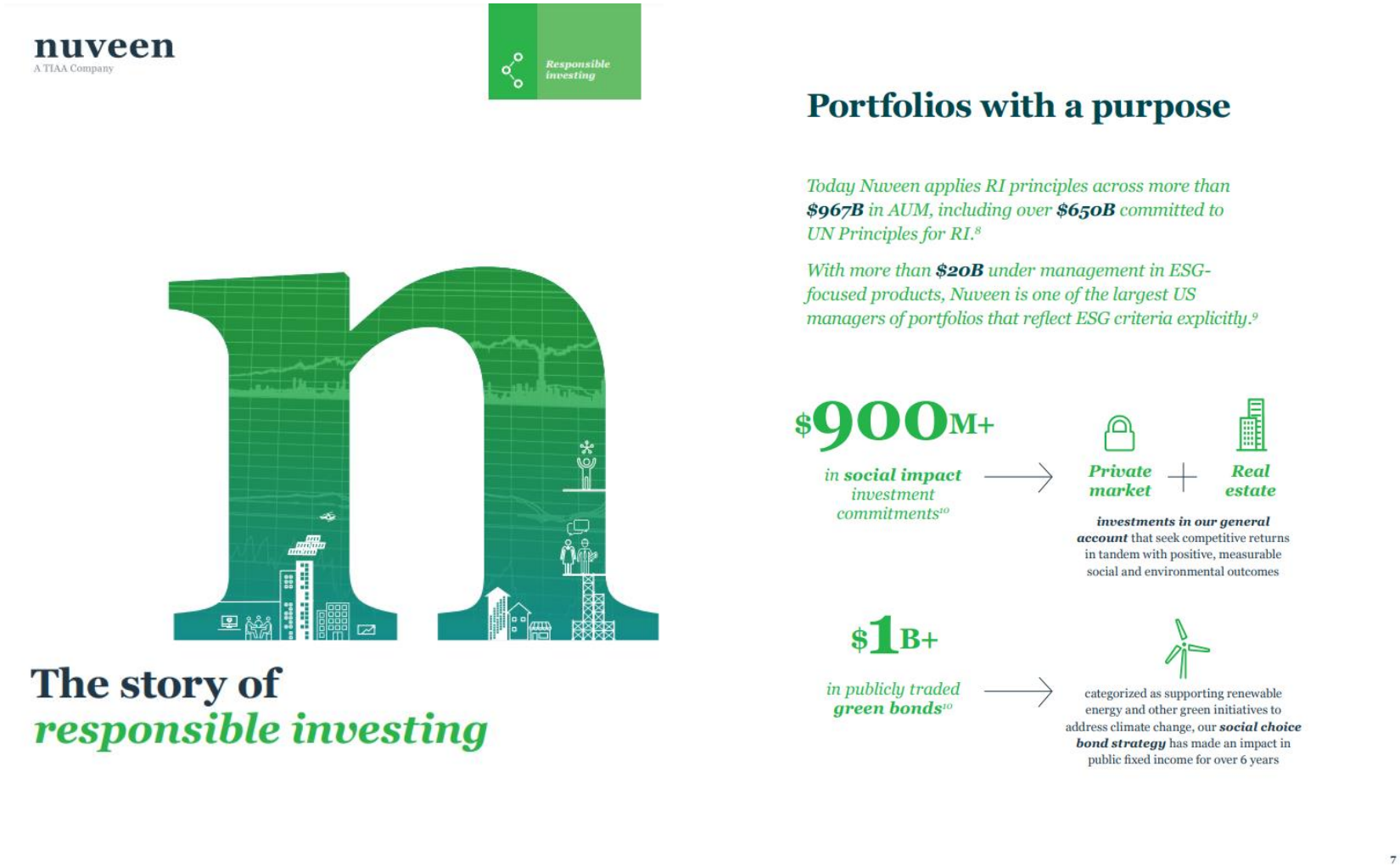
Panel A. In Company Website- Front Page



Panel B. In Company Website- A Dedicated Section



Panel C. In Marketing Materials



Source: https://www.tiaa.org/public/pdf/641364_Nuveen_The_Story_of_Responsible_Investing.pdf

Panel D. In Fund Documents

LSV Asset Management
Statement of Responsible Investment Initiatives

General Statement

LSV Asset Management ("LSV") provides discretionary investment management services in portfolios of publicly-traded global equity securities to a variety of institutional clients, including private funds and mutual funds, utilizing the application of LSV's proprietary quantitative models. The portfolio decision making process is driven by (1) a proprietary model which ranks securities based on fundamental measures of value, past performance and indicators of recent positive changes and (2) a risk control process that controls for residual risk relative to a benchmark. The fundamental premise on which LSV's investment philosophy is based is that superior long-term results can be achieved by systematically exploiting the judgmental biases and behavioral weaknesses that influence the decisions of many investors. These include: the tendency to extrapolate the past too far into the future, to wrongly equate a good company with a good investment irrespective of price, to ignore statistical evidence and to develop a "mindset" about a company.

Principles for Responsible Investment ("PRI")

LSV became a signatory to the PRI in April 2014. The PRI provides a framework, through its six principles, for consideration of environmental, social and governance ("ESG") factors in portfolio management and investment decision-making. The six principles ask an investment manager, to the extent consistent with its fiduciary duties, to seek to: (1) incorporate ESG issues into investment analysis and decision-making processes; (2) be an active owner and incorporate ESG issues into its ownership policies and practices; (3) obtain appropriate disclosure on ESG issues by the entities in which it invests; (4) promote acceptance and implementation of the PRI principles within the investment industry; (5) work to enhance its effectiveness in implementing the PRI principles; and (6) report on its activities and progress toward implementing the PRI principles.

LSV Responsible Investment Initiatives

The PRI, and the application of the foregoing principles, is intended to be aspirational and not a prescriptive set of rules. Given its business model, fiduciary duties to its clients and contractual limitations, LSV may not apply all six principles in its daily activities. However, LSV has taken the following actions that promote ESG factors and is committed to continuing such efforts into the future:

1. Internal Research and Analysis

LSV is frequently looking for new ways to measure value and conducts research on an ongoing basis on a variety of topics in order to develop enhancements to the LSV quantitative model. LSV has conducted a

Source: https://www.lsvasset.com/pdf/fund-docs/LSV-Statement-of-Responsible-Investment-Initiatives-072016.pdf

A3. ISS and ESG Mapping

ISS Classification	Environment
Item Description	Animal Slaughter Methods
Item Description	Animal Welfare
Item Description	Climate Change Action
Item Description	Community -Environmental Impact
Item Description	Environmental - Related (Japan)
Item Description	Establish Environmental/Social Issue Board Committee
Item Description	GHG Emissions
Item Description	Hydraulic Fracturing
Item Description	Miscellaneous Proposal -- Environmental & Social*
Item Description	Nuclear Power - Related
Item Description	Renewable Energy
Item Description	Report on Climate Change
Item Description	Report on Environmental Policies
Item Description	Report on Climate Change
Item Description	Report on Sustainability
Item Description	Require Environmental/Social Issue Qualifications for Director Nominees*
Item Description	Toxic Emissions
Item Description	Wood Procurement
Sub Category	SH - Environmental Proposal

ISS Classification	Social
Item Description	Adopt Sexual Orientation Anti-Bias Policy
Item Description	Anti-Social Proposal
Item Description	Approve Charitable Donations
Item Description	Employment Contract
Item Description	Establish Environmental/Social Issue Board Committee
Item Description	Gender Pay Gap
Item Description	Holy Land Principles
Item Description	Human Rights Risk Assessment
Item Description	Labor Issues – Discrimination and Miscellaneous
Item Description	Miscellaneous Proposal -- Environmental & Social*
Item Description	Prepare Tobacco-Related Report
Item Description	Report on Sustainability*
Item Description	Require Environmental/Social Issue Qualifications for Director Nominees*
Item Description	Review Tobacco Marketing
Item Description	Sever Links with Tobacco Industry
Sub Category	SH - Social Proposal

ISS Classification	Governance
Category	Auditor Related
Category	Capitalization
Category	Company Articles
Category	Compensation
Category	Director Election
Category	Director Related
Category	Mutual Funds

Category	Non-Routine Business
Category	Routine Business
Category	SH - Audit Related
Category	SH - Company Articles
Category	SH - Compensation
Category	SH - Corporate Governance
Category	SH - Director Election
Category	SH - Director Related
Category	SH - Miscellaneous
Category	SH - Mutual Funds
Category	SH - Non-Routine Business
Category	SH - Routine Business
Category	Strategic Transactions
Category	Takeover Related
Item Description	Require Environmental/Social Issue Qualifications for Director Nominees*

This table presents how ISS items are classified to E, S, and G. Items marked with asterisk (*) are agendas that classification into E, S, or G are not obvious even at the most granular Item Description Level. Such items are minimal, consisting of only 0.185% of our sample.

A4. Proof of Proposition 2.1

Let $p_{HH}, p_{HL}, p_{LH}, p_{LL}$ denote the prior probability for a fund to be (H,H), (H,L), (L,H), (L,L) type, respectively.

Then, it holds that

$$\mathbf{E}[\text{Greenwasher}] = \frac{\lambda_{\text{HL}} p_{\text{HL}}}{\lambda_{\text{HH}} p_{\text{HH}} + \lambda_{\text{HL}} p_{\text{HL}} + \lambda_{\text{LH}} p_{\text{LH}} + \lambda_{\text{LL}} p_{\text{LL}}} \tag{1}$$

$$= \frac{p_{\text{HL}}}{\frac{\lambda_{\text{HH}}}{\lambda_{\text{HL}}} p_{\text{HH}} + p_{\text{HL}} + \frac{\lambda_{\text{LH}}}{\lambda_{\text{HL}}} p_{\text{LH}} + \frac{\lambda_{\text{LL}}}{\lambda_{\text{HL}}} p_{\text{LL}}}.$$

Also, from Bayes' rule, we have that

$$\mathbf{E}[\text{Greenwasher}|\text{MR} = 1, \text{EP} = 0] = \frac{\mathbf{E}[\text{Greenwasher}, \text{MR} = 1, \text{EP} = 0]}{\mathbf{E}[\text{ MR} = 1, \text{EP} = 0]} \tag{2}$$

We examine the each component in the RHS of (2). First, note that

$$\mathbf{E}[\text{ MR} = 1, \text{EP} = 0] = \frac{A}{\lambda_{\text{HH}} p_{\text{HH}} + \lambda_{\text{HL}} p_{\text{HL}} + \lambda_{\text{LH}} p_{\text{LH}} + \lambda_{\text{LL}} p_{\text{LL}}}, \tag{3}$$

where $\text{A} = \frac{1}{2}(\lambda_{\text{HH}} + c_0)\big(1 - (\gamma + c_1)\big)p_{HH} + \frac{1}{2}(\lambda_{\text{HL}} + c_0)(1 - \gamma)p_{HL}$

$+ \frac{1}{2}(\lambda_{\text{LH}} + c_0)\big(1 - (\gamma + c_1)\big)p_{LH} + \frac{1}{2}(\lambda_{\text{HL}} + c_0)(1 - \gamma)p_{LL}.$

Next, note that

$$\mathbf{E}[\text{Greenwasher}, \text{MR} = 1, \text{EP} = 0] = \frac{\frac{1}{2}(\lambda_{\text{HL}} + c_0)(1 - \gamma)p_{HL}}{\lambda_{\text{HH}} p_{\text{HH}} + \lambda_{\text{HL}} p_{\text{HL}} + \lambda_{\text{LH}} p_{\text{LH}} + \lambda_{\text{LL}} p_{\text{LL}}}. \tag{4}$$

Plugging (3) and (4) to (2), we obtain that

$$\mathbf{E}[\text{Greenwasher}|\text{MR} = 1, \text{EP} = 0] = \frac{p_{\text{HL}}}{a_1 p_{\text{HH}} + p_{\text{HL}} + a_2 p_{\text{LH}} + a_3 p_{\text{LL}}}, \tag{5}$$

$$a_1 = \frac{(\lambda_{\text{HH}} + c_0)(1 - (\gamma + c_1))}{(\lambda_{\text{HL}} + c_0)(1 - \gamma)}, a_2 = \frac{\lambda_{LH}(1 - (\gamma + c_1))}{(\lambda_{\text{HL}} + c_0)(1 - \gamma)}, a_3 = \frac{\lambda_{\text{LL}}(1 - \gamma)}{(\lambda_{\text{HL}} + c_0)(1 - \gamma)}.$$

Furthermore, note that

$$a_1 < \frac{\lambda_{\text{HH}}}{\lambda_{\text{HL}}}, a_2 < \frac{\lambda_{\text{LH}}}{\lambda_{\text{HL}}}, a_3 < \frac{\lambda_{\text{LL}}}{\lambda_{\text{HL}}}. \tag{6}$$

Finally, the comparison of (1) and (5) using (6) yields the desired inequality. This completes the proof of the proposition.