

Socially Responsible Hedge Funds

Hao Liang, Lin Sun, and Melvyn Teo[☆]

Abstract

Hedge funds whose management companies endorse the United Nations Principles for Responsible Investment (PRI) underperform other hedge funds after adjusting for risk but attract larger flows, harvest greater fee revenues, and accumulate more capital. Consonant with an agency explanation, the underperformance is driven by PRI signatories with low ESG exposures. By exploiting quasi-natural experiments, we provide causal evidence that relate agency problems to signatory underperformance. Low-ESG signatories that do not walk the talk trigger more regulatory, investment, and severe infractions, and report more suspicious returns. The results suggest that some signatories strategically embrace responsible investment to pander to investor preferences.

[☆]Liang is at the Lee Kong Chian School of Business, Singapore Management University. E-mail: hliang@smu.edu.sg. Sun is at the Fanhai International School of Finance, Fudan University. E-mail: linsun@fudan.edu.cn. Teo (corresponding author) is at the Lee Kong Chian School of Business, Singapore Management University. Address: 50 Stamford Road, Singapore 178899. E-mail: melvynteo@smu.edu.sg. Tel: +65-6828-0735. Fax: +65-6828-0427. We have benefitted from conversations with Simba Chang, Stephen Dimmock, Matt Hearth, Chuan Yang Hwang, John Kuong, Roger Loh, Victor Ong, Yuehua Tang, Lucie Tepla, Theo Vermaelen, and Qifei Zhu as well as seminar participants at Fudan University, INSEAD, Nanyang Technological University, and Singapore Management University.

1. Introduction

“I think that should be part of the discussion, trying to figure out to what extent ESG might stand for enabling stakeholder graft.”

– Hester Peirce, U.S. Securities and Exchange Commission, 13 December 2018.¹

“As almost \$31 trillion has flowed into investment funds and strategies that emphasize good governance and socially responsible business practices, hedge funds have largely found themselves left out. . . . They are starting to find their way in.”

– Bloomberg, 22 May 2019.²

Responsible investment is an approach to managing assets that sees investors include environmental, social, and governance (henceforth ESG) factors in their decisions about what to invest and the role they play as owners and creditors. For investment managers, a popular way to publicly signal one’s commitment to responsible investment is to sign the United Nations Principles for Responsible Investment (henceforth PRI), the world’s leading proponent of responsible investment. Attesting to the spectacular growth in investor interest in responsible investment, the assets under management of PRI signatories have ballooned from US\$6.5 trillion in 2006 to US\$86.3 trillion in 2019.

What are the performance implications of investment firms’ public commitment to responsible investment? Firms that endorse responsible investment could enhance shareholder value (Flammer, 2015) by acting as active owners and pressuring firms to improve ESG performance.³ However, by focusing on a smaller investment opportunity set that comprise stocks with strong ESG performance or that exclude sin stocks (Hong and Kacperczyk, 2009), PRI signatories may constrain their ability to deliver superior investment returns. These explanations presume that signatories walk the talk. Alternatively, insofar as endorsement

¹“ESG funds draw SEC scrutiny,” Wall Street Journal, 16 December 2019.

²“Hedge funds start to figure out socially responsible investing,” Bloomberg, 22 May 2019.

³See, for example, Dyck et al. (2019), Naaraayanan, Sachdeva, and Sharma (2019), Chen, Dong, and Lin (2020), Akey and Appel (2020), and Dimson, Karakas, and Li (2020).

reflects efforts by money managers to exploit investors' nonpecuniary preference for responsible investment (Barber, Morse, and Yasuda, 2020), PRI endorsement may be symptomatic of agency problems. SEC Commissioner Hester Peirce alludes to the agency view when she argues that ESG may stand for "enabling stakeholder graft".⁴ In this study, we shed light on this important question by analyzing hedge funds managed by PRI signatories.

The hedge fund industry provides an important setting to study the performance ramifications of responsible investment for a number of reasons. First, hedge funds collectively managed US\$2.96 trillion of assets by the end of the first quarter of 2020 and form an integral part of the portfolios of pension funds, sovereign wealth funds, and university endowments, many of whom have embraced socially responsible investing.⁵ As a testament to the importance of hedge funds, the PRI offers tools to help institutional investors incorporate ESG factors into their hedge fund selection process.⁶ Second, unlike other alternative investments such as private equity, real estate, farmland, and forestry which also feature prominently in asset owners' portfolios, hedge funds typically report monthly returns to commercial databases, allowing researchers to cleanly measure investment performance and evaluate the investment implications of PRI endorsement. Third, unlike mutual funds, which are evaluated relative to their respective benchmarks, hedge funds are evaluated on an absolute return basis. Consequently, hedge funds present a more direct bet on investment performance. Fourth, the complex strategies employed by hedge funds and their lower levels of transparency, disclosure, and regulatory oversight, relative to mutual funds, amplify the potential for agency problems and strategic behavior.

The results are intriguing. Hedge funds managed by investment management firms that endorse the PRI underperform those managed by other investment management firms by 2.45 percent per annum (t -statistic = 3.93) after adjusting for co-variation with the Fung

⁴See also Peirce (2018, 2019). Anecdotal evidence that finds that sustainable funds enjoy record inflows but often continue to invest in oil and gas companies is also consistent with this idea. See "ESG funds enjoy record inflows, still back big oil and gas," Wall Street Journal, 11 November 2019.

⁵See https://www.hedgefundresearch.com/sites/default/files/articles/1Q20_HFR_GIR.pdf.

⁶For example, PRI offers a responsible investment due diligence questionnaire on hedge funds which helps investors identify hedge funds that have the personnel, knowledge, and structure to incorporate ESG factors in the investment decision-making process. See <https://www.unpri.org/investor-tools/hedge-funds>.

and Hsieh (2004) seven factors. To understand what drives the underperformance of hedge funds managed by PRI signatories, we leverage on Thomson Reuters (formerly ASSET4) stock ESG scores to calculate value-weighted portfolio level ESG scores for investment management firms.⁷ We find that the underperformance of signatory hedge funds is substantially stronger in signatories with low ESG scores. Specifically, low-ESG signatory hedge funds underperform low-ESG nonsignatory hedge funds by an impressive 7.72% per annum (t -statistic = 3.18) after adjusting for risk. In contrast, the difference in risk-adjusted performance between high-ESG signatory and nonsignatory hedge funds is an economically modest 0.54% per annum (t -statistic = 0.74). Moreover, amongst signatories, the hedge funds of those with low ESG exposure underperform by a risk-adjusted 5.94% per year (t -statistic = 3.00) the hedge funds of those with high ESG exposure.

These findings are robust to alternative ways of evaluating investment management firm exposure to responsible companies. We obtain qualitatively similar results when we decompose the Thomson Reuters ESG score into the component based on environmental and social (henceforth E&S) factors and the component based on corporate governance factors, and redo the tests using these component scores. Inferences also do not change when we employ ESG data from MSCI ESG STAT (formerly Kinder, Lydenberg, Domini & Co) and Sustainalytics. Collectively, the findings suggest that the underperformance of signatory hedge funds cannot be traced to high ESG stocks and, therefore, support the agency view.

To further test the agency view, we redo the baseline sort and double sort on hedge funds partitioned by fund incentive alignment metrics that include manager total delta (Agarwal, Daniel, and Naik, 2009), the ratio of fund management fee to performance fee (Fung et al., 2020), and fund governance score (Ozik and Sadka, 2015). Prior work suggests that funds with low manager total deltas, high management fees to performance fees, and low governance scores are more susceptible to agency problems. Consonant with the agency view, we find that the underperformance of hedge funds managed by (i) signatories and (ii)

⁷Investment management firm ESG scores, as opposed to fund ESG scores, are more relevant for our purposes as PRI endorsement is a firm-level decision as opposed to a fund-level decision. Moreover, agency problems, if any, should manifest at the fund management company level and not just at the fund level.

signatories with low ESG exposures is larger for precisely such funds.

Next, we investigate the pecuniary benefits associated with PRI endorsement. After adjusting for myriad factors that drive fund flows, including past Fung and Hsieh (2004) alpha rank, we find that signatories attract an economically and statistically meaningful 15.90% more flows per annum than do nonsignatories. Moreover, relative to the 36-month pre-endorsement period and to comparable firms, PRI signatories accumulate US\$83.12m more assets, harvest US\$4.08m more fee revenues per year, and launch 0.36 more funds during the 36-month post-endorsement period. These results suggest that PRI endorsement is beneficial for asset gathering and echo those of Hartzmark and Sussman (2019) and Kim and Yoon (2020) who show that high sustainability mutual funds garner more flows.

One concern is that unobserved factors, unrelated to agency, that shape both PRI endorsement and fund performance could drive our results. For example, we need to entertain the notion that unskilled hedge funds endorse the PRI to compensate for their inability to outperform and subsequently mismanage ESG implementation. To address such endogeneity concerns, we exploit two quasi-natural experiments: (i) the April 2010 BP Deepwater Horizon oil spill and (ii) the June 2017 Trump withdrawal from the Paris Agreement on climate change mitigation. The Deepwater Horizon oil spill unexpectedly increased while the Trump withdrawal unexpectedly decreased the perceived importance of ESG practices and, consequently, the value that investors place on responsible investment. While the Trump withdrawal from the Paris accord was not inconsistent with his pre-election statements, anecdotal evidence (which we provide) suggests that the timing and magnitude of the policy shift still came as a surprise to investors. If agency problems drive the underperformance of signatory hedge funds, we expect the underperformance to positively relate to exogenous increases in the value investors place on responsible investment, since it is the latter that drives the wedge in incentive alignment between signatories and nonsignatories. This is precisely what we find. Signatory hedge funds underperform more in the wake of the Deepwater Horizon oil spill and less in the aftermath of the Trump withdrawal. These findings are more in keeping with an explanation based on manager motivation than one based on manager skill since it

is not clear why manager skill should wax and wane with impediments to climate change mitigation and environmental disasters, respectively.

To further address endogeneity, we analyze temperature shocks at the cities where hedge fund firms are based. Choi, Gao, and Jiang (2020) show that investors pay more attention to global warming when the monthly temperatures in their respective cities are abnormally high. Adverse local temperature shocks should therefore increase the value that investors place on socially responsible investing. Consistent with this view, we find that signatory hedge funds underperform more when local temperatures are abnormally high or abnormally extreme. These findings suggest that exogenous increases in investors' perceived willingness-to-pay for sustainable investing undermine the motivation to outperform for managers who endorsed responsible investment.

Do the conflicts of interests at signatories with low ESG exposures translate into greater operational risk? We show that low-ESG signatories are more likely to disclose new regulatory actions as well as investment and severe violations on their Form ADVs (Brown et al., 2008; 2009; 2012), suggesting that they deviate from expected standards of business conduct or cut corners when it comes to compliance and record keeping. Moreover, they are more likely to report fund returns that feature a discontinuity around zero, a paucity of negative returns, and extremely low correlation with style factors, transgressions that may be indicative of return misreporting and fraud (Bollen and Pool, 2009; 2012).⁸

Investors appear unaware of the agency and operational issues percolating at such signatories. Low-ESG signatories attract as much fund flows as do high-ESG signatories. We believe that information acquisition costs explain why low-ESG signatories may continue to thrive for the following reasons. First, there is considerable disagreement between different data vendors when it comes to ESG ratings. Low-ESG signatories classified based on Thomson Reuters are only 47.46% and 35.44% likely to be categorized as low-ESG based on MSCI and Sustainalytics, respectively. Second, low-ESG signatories only differ marginally from high-ESG signatories along more transparent dimensions such as sin stock ownership

⁸One caveat is that a return discontinuity around zero may instead reflect the imputation of incentive fees (Jorion and Schwarz, 2014).

(Hong and Kacperczyk, 2009). Without appealing to data from ESG vendors, it would not be easy for investors to assess signatory ESG exposure. Third, low-ESG signatories market their funds more aggressively. They report to more fund databases and are more likely to offer duplicate share classes, thereby reducing investor search costs.

Why do we not observe more investment firms strategically embracing responsible investment? We show that social norms (Dyck et al., 2019) help align managers' interests with those of environmentally and socially conscious investors. Specifically, investment firms in countries with strong E&S social norms exhibit substantially higher ESG scores. Consequently, signatory underperformance manifests only in countries with weak E&S social norms, supporting the view that societal pressures induce fund managers to internalize their investors' preferences for responsible investment and therefore help curb strategic behavior.

The findings resonate with research in asset management that shows that socially responsible mutual funds (Riedl and Smeets, 2017), venture capital funds (Barber, Morse, and Yasuda, 2020), and university endowments (Aragon et al., 2020) underperform. A key premise is that the underperformance derives from socially responsible managers' greater exposure to socially responsible firms. By showing that managers who endorse responsible investment but do not walk the talk underperform, we uncover a novel channel, i.e., agency, which can engender underperformance in socially responsible managers.

We build on two research themes on hedge funds. The first theme examines fund alpha and finds that unmotivated (Agarwal, Daniel, and Naik, 2009), older (Aggarwal and Jorion, 2010), low R-squared (Titman and Tiu, 2011), and nondistinctive (Sun, Wang, and Zheng, 2012) hedge funds underperform. We show that hedge funds whose management companies endorse responsible investing but exhibit low ESG exposures also underperform. The second theme studies agency problems and finds that some hedge funds inflate year-end returns (Agarwal, Daniel, and Naik, 2011), take on excessive liquidity risk (Teo, 2011), and delay reporting poor performance (Aragon and Nanda, 2017). We find that some hedge fund firms strategically endorse responsible investment.

This study complements Gibson et al. (2020) and Kim and Yoon (2020) who primarily

investigate the characteristics and the ESG implementation strategies of institutional investors and mutual fund firms that endorse the PRI. They also analyze holdings-based and mutual fund returns but find no significant difference in performance between signatories and nonsignatories.⁹ By focusing on hedge funds, we obtain much sharper and stronger results. Unlike them, we (i) show that signatory underperformance is driven by signatories with low ESG exposures, (ii) connect the underperformance to incentive alignment, exogenous shocks that shape the value investors place on responsible investment, and social norms, and (iii) show that signatories who do not walk the talk exhibit greater operational risk, thereby advancing the agency view.¹⁰

We caution that our findings do not suggest that all hedge fund signatories endorse the PRI for strategic reasons. Nonetheless, based on our estimates, a non-trivial 17.05% or US\$161 billion of hedge fund signatory assets are managed by signatories with ESG exposure that fall below that of the median hedge fund firm. These results call into question the view that signatories are exemplars of responsible investment. Consequently, this study is among the first to contribute to the larger debate on whether asset managers who embrace responsible investment truly walk the talk. For example, Christopher Hohn of The Children's Investment fund has accused major asset managers that have committed to sustainable investing of being "full of greenwash," while Chamath Palihapitiya of Social Capital argues that the ESG movement has been used by some as a "marketing ploy and a way for companies to get free money."¹¹ Our findings suggest that the aforementioned accusations are not completely without merit.

⁹See Tables 7 and 8 in Gibson et al. (2020) and Table 11 in Kim and Yoon (2020).

¹⁰Filbeck, Krause, and Reis (2016) also analyze the performance of hedge funds that engage in socially responsible investing. However, their sample of socially responsible funds is small, i.e., 37 funds, and they do not find consistent results. Moreover, they neither adjust for risk nor study the drivers underlying the performance differences between socially responsible and non-socially responsible hedge funds.

¹¹See "Hedge fund TCI vows to punish directors over climate change," Financial Times, 2 December 2019 and "ESG investing is a 'complete fraud,' Chamath Palihapitiya says," CNBC, 26 February 2020. In corporate finance, Raghunandan and Rajgopal (2020) find that publicly-listed signatories of the Business Roundtable, which advocates commitment to stakeholders, report higher rates of environmental and labor violations.

2. Data and methodology

2.1. United Nations Principles for Responsible Investment

The United Nations PRI is the world's leading proponent of responsible investment. The PRI works to understand the investment implications of ESG factors and to support its network of investor signatories in incorporating ESG factors into their investment decisions. It was established on 27 April 2006, with 21 original institutions and 51 founding signatories. The 21 original institutions, or drafting signatories, include institutional investors such as CalPERS, Hermes Pensions Management, and the Norwegian Government Pension Fund. Figure 1 showcases the phenomenal growth in the number and assets under management of PRI signatories since 2006. By April 2019, more than 2,300 asset owners (19%), investment managers (70%) and service providers (11%) have joined the PRI network, and total assets under management by PRI signatories have exceeded US\$86 trillion.¹²

[Insert Figure 1 here]

Information available on the PRI website includes the signatory's name, category (investment manager, asset owner, or service provider), headquarter, signature date, organizational overview, strategy and governance, and reporting practice. PRI also provides its own assessments of its signatories based on their reports on their responsible investment activities with respect to asset-specific modules in the PRI reporting framework. Given that PRI's own assessment is based on self-reported data, we use ESG ratings from third parties, such as Thomson Reuters, MSCI, and Sustainalytics, to more objectively assess ESG exposure.

PRI signatories are expected to adhere to the following six principles for responsible investment: (i) to incorporate ESG issues into investment analysis and decision-making processes; (ii) to be active owners and incorporate ESG issues into ownership policies and practices; (iii) to see appropriate disclosure on ESG issues by the entities in which they invest; (iv) to promote acceptance and implementation of the Principles within the investment

¹²A complete list of signatories can be found at <https://www.unpri.org/signatories>.

industry; (v) to work together to enhance effectiveness in implementing the Principles; (vi) to report their activities and progress towards implementing the Principles.

2.2. Hedge fund data

We evaluate hedge funds using monthly net of fee returns and assets under management data of live and dead hedge funds reported in the Hedge Fund Research (HFR) and Morningstar data sets from January 1990 to April 2019. Because HFR and Morningstar started distributing their data in 1994, the data sets do not contain information on funds that died before January 1994, thereby giving rise to survivorship bias. We mitigate this bias by focusing on data from January 1994 onward.

Our fund universe has a total of 18,440 hedge funds, of which 3,896 are live funds and 14,544 are dead funds. We exclude duplicate share classes from the sample due to concerns that funds with multiple share classes could cloud the analysis.¹³ This leaves a total of 13,515 hedge funds, of which 2,911 are live funds and 10,604 are dead funds. While 7,173 funds appear in multiple databases, many funds belong to only one database. There are 4,555 and 1,787 funds unique to the HFR and Morningstar databases, respectively, underscoring the advantage of obtaining data from more than one source. In addition to monthly return and size, our sample captures data on fund characteristics such as management fee, performance fee, redemption notice period, minimum investment, investment style, and age.¹⁴

We download the complete list of signatories from the PRI website. The signatory directory provides information on account name, signatory category, headquarter country, and signing date. During our sample period, which starts from May 2006 with the first batch of signatories and ends in April 2019, there are 2,321 PRI signatories. We manually connect PRI signatories to hedge fund management companies by matching on name and headquarter

¹³Inferences do not change when we include multiple share classes of the same fund in the analysis. To merge databases, we follow the procedure outlined in the Appendix of Joenväärä et al. (2020).

¹⁴To ameliorate the impact of return outliers, we winsorize the hedge fund returns in our sample at the 99.5th and 0.5th percentiles. The baseline results are virtually unchanged when we use the original returns reported in the databases.

country. We are able to identify 287 such fund management company matches.¹⁵

Table 1 reports summary statistics on the number of PRI signatory and nonsignatory hedge fund firms, as well as the number of hedge funds and level of the assets that they manage. At the end of the first year of our sample period, in December 2006, there are 16 PRI signatory hedge fund firms operating 90 hedge funds with US\$26.23 billion in AUM. By the end of the sample period, in April 2019, there are 174 PRI signatory hedge fund firms managing 489 hedge funds with US\$315.60 billion in AUM. This represents an impressive 11-fold increase in the hedge fund assets managed by PRI signatories. Moreover, during this period, the assets managed by hedge fund firms that endorsed the PRI increased from a modest 2.71% to a sizeable 29.54% of all hedge fund assets.

[Insert Table 1 here]

Following Agarwal, Daniel, and Naik (2009), we classify funds into four broad investment styles: Security Selection, Multi-process, Directional Trader, and Relative Value. Security Selection funds take long and short positions in undervalued and overvalued securities, respectively. Usually, they take positions in equity markets. Multi-process funds employ multiple strategies that take advantage of significant events, such as spin-offs, mergers and acquisitions, bankruptcy reorganizations, recapitalizations, and share buybacks. Directional Trader funds bet on the direction of market prices of currencies, commodities, equities, and bonds in the futures and cash markets. Relative Value funds take positions on spread relations between prices of financial assets and aim to minimize market exposure. Funds that do not fit into the four broad investment styles are classified as Others.

Hedge fund data are susceptible to selection biases that stem from the fact that inclusion in hedge fund databases is voluntary (Liang, 2000; Fung and Hsieh, 2009). For instance, funds often undergo an incubation period during which they rely on internal funding before

¹⁵We also collect information on organizations that ceased to be PRI signatories from PRI annual reports. We are able to match 41 of these former signatories to our sample of fund management companies. Unfortunately, PRI does not typically provide signing and delisting dates for these former signatories. To ensure that our results are robust to signatory delistings, we will redo our analysis with these former signatories after estimating their signing and delisting dates.

seeking capital from investors. Incubated funds with successful track records then go on to list in various databases while the unsuccessful funds do not, resulting in an incubation bias. Separate from this, when a fund is listed on a database, it often includes data prior to the listing date. Again, because successful funds have a strong incentive to list and attract capital inflows, these backfilled returns tend to be higher than the non-backfilled returns. In our analysis, we repeat the tests after dropping the first 24 months of returns from each fund to ensure that the results are robust to incubation bias. To address backfill bias (Bhardwaj, Gorton, and Rouwenhorst, 2014), we redo the tests after removing all return observations backfilled prior to the fund listing date. For funds without listing date information, we employ the Jorion and Schwarz (2019) algorithm to back out listing dates.

We model the risk of hedge funds using the Fung and Hsieh (2004) seven-factor model. The Fung and Hsieh factors are the excess return on the Standard and Poor's (S&P) 500 index (SNPMRF); a small minus big factor (SCMLC) constructed as the difference between the Russell 2000 and S&P 500 stock indexes; the yield spread of the U.S. ten-year Treasury bond over the three-month Treasury bill, adjusted for duration of the ten-year bond (BD10RET); the change in the credit spread of Moody's BAA bond over the ten-year Treasury bond, also appropriately adjusted for duration (BAAMTSY); and the excess returns on portfolios of lookback straddle options on currencies (PTFSFX), commodities (PTFSCOM), and bonds (PTFSBD), which are constructed to replicate the maximum possible return from trend-following strategies on their respective underlying assets.¹⁶ Fung and Hsieh (2004) show that these seven factors have considerable explanatory power on aggregate hedge fund returns.

Our investment firm sample covers a wide array of asset management firms including those that also offer mutual funds and private equity funds. This maximizes our coverage of the hedge fund industry and also allows us to shed light on the implications of PRI endorsement for the asset management industry in general. However, there are concerns that for some of these firms, hedge fund assets may constitute a relatively small part of their business. Therefore, we will redo our analysis on pure play hedge fund firms. To identify pure play

¹⁶David Hsieh kindly supplied these risk factors. The trend-following factors can be downloaded from <http://faculty.fuqua.duke.edu/%7Edah7/DataLibrary/TF-Fac.xls>.

firms, we follow the algorithm of Brunnermeier and Nagel (2004). First, we check whether a firm is registered as an investment adviser with the SEC. Registration is a prerequisite for conducting non-hedge fund business. If a firm is not registered, we include it in our pure play sample. If a firm is registered, we obtain its registration documents (Form ADV). For a registered firm to be included in our pure play hedge fund firm sample, we require that it charges performance-based fees and that at least 50% of its clients are “Other pooled investment vehicles (e.g., hedge funds)” or “High net worth individuals.”

2.3. ESG data

We calculate firm ESG performance primarily using Thomson Reuters data. The database (now owned by Refinitiv) has been employed by Ferrell, Liang, and Renneboog (2016), Liang and Renneboog (2017), and Dyck et al. (2019), among others. The Thomson Reuters ESG ratings measure a company’s relative ESG performance, commitment, and effectiveness across ten main themes: environmental resource use, environmental emissions, environmental product innovation, workforce, human rights, community, product responsibility, management, shareholders, and CSR strategy. The ratings are derived from more than 400 company-level ESG metrics, which are based on information from annual reports, company websites, non-profit organization websites, stock exchange filings, corporate social responsibility reports, and news sources. The process entails a series of data entry checks, automated quality rules, sample audits on a daily basis, and management review. The ESG ratings are reported both as a normalized score ranging from 0 to 100 and as an actual computed value. To calculate the percentile scores, Thomson Reuters evaluates firm E&S ratings relative to firms in the same Thomson Reuters Business Classification industry and assesses firm governance ratings relative to other firms in the same country.

We complement the Thomson Reuters ESG data with data from MSCI ESG STAT and Sustainalytics. The MSCI ESG score is based on strength and concern ratings for seven qualitative issue areas, which include community, corporate governance, diversity, employee relations, environment, human rights, and product, as well as concern ratings for

six controversial business issue areas, namely, alcohol, gambling, firearms, military, nuclear power, and tobacco. Following Deng et al. (2013), Servaes and Tamayo (2013), and Lins, Servaes, and Tamayo (2017), we count the number of strengths and concerns within each issue area and subtract the number of concerns from the number of strengths to construct the raw score for each issue area in each year. The overall raw ESG score is the sum of the raw scores across the 13 issue areas. As the potential number of strengths and concerns within each issue area can differ (Mănescu, 2011), to facilitate consistent comparisons cross-sectionally and over time, we scale the number of strengths and concerns for each firm-year.¹⁷

The Sustainalytics ESG ratings, which range from 0 to 100, gauge how well companies manage ESG issues related to their businesses and provide an assessment of firms' ability to mitigate risks and capitalize on opportunities. Sustainalytics assesses a company's ESG engagement along four dimensions: (i) preparedness – assessments of company management systems and policies designed to manage material ESG risks, (ii) disclosure – assessments of whether company reporting meets international best practice standards and is transparent with respect to most material ESG issues, (iii) quantitative performance – assessments of company ESG performance based on quantitative metrics such as carbon intensity, and (iv) qualitative performance – assessments of company ESG performance based on the controversial incidents that the company is involved in.

[Insert Figure 2 here]

Figure 2 examines the distributions of annual ESG scores for hedge fund signatories and nonsignatories. Annual ESG scores are the value-weighted average of the Thomson Reuters ESG scores of the stock holdings of hedge fund firms. Stock holdings are from the Thomson Reuters 13-F long-only holdings database. As one would expect, signatories exhibit better ESG performance than do nonsignatories; the average ESG scores for signatories and nonsignatories are 68.57 and 60.00, respectively. However, the average ESG scores mask

¹⁷Specifically, for each issue area, we divide the number of strengths and concerns for each firm-year by the maximum possible number of strengths and concerns in the issue area, respectively, to get the adjusted strength and concern scores. We then subtract the adjusted concern score from the adjusted strength score to obtain the adjusted ESG score for the issue area that year.

significant heterogeneity in firm ESG scores. As Figure 2 shows, there is substantial overlap between the distributions of ESG scores for signatories and nonsignatories. Interestingly, a non-trivial 20.79% of signatory ESG scores fall below the median ESG score, reflecting the long left tail of the signatory ESG distribution. This suggests that there are a number of signatories who may not walk the talk.

We note that investment firm ESG performance is highly persistent; firms with below-median ESG scores have a 81.6% chance of exhibiting below-median ESG scores the next year while firms with above-median ESG scores have a 81.4% chance of displaying above-median ESG scores the following year. The persistence suggests that ESG performance is a durable characteristic of investment firms. For the average month in our sample period, signatories with below-median ESG exposure manage a non-trivial 17.05% of signatory hedge fund assets. Given the proportion of signatory assets relative to all hedge fund assets at the end of the sample reported in Table 1, i.e., 29.54%, and the BarclayHedge estimate of assets managed by the hedge fund industry, i.e., US\$3.19 trillion, the 17.05% estimate implies that a substantive US\$161 billion of hedge fund industry assets are managed by signatories with ESG exposure below that of the median hedge fund firm.

3. Empirical results

3.1. Fund performance

In this section, we compare the performance of hedge funds managed by asset management firms that endorse the PRI with those managed by asset management firms that eschew the PRI. In that effort, we sort hedge funds every month into two equal-weighted portfolios based on whether their fund management companies were PRI signatories last month. The post-formation returns on these two portfolios over the next month are linked across months to form a single return series for each portfolio. We then evaluate the performance of these portfolios relative to the Fung and Hsieh (2004) seven-factor model. We base statistical inferences on White (1980) heteroskedasticity consistent standard errors.

Panel A of Table 2 indicates that hedge funds managed by PRI signatories do not outperform. The spread in raw returns between the portfolio of signatory hedge funds (portfolio A) and the portfolio of nonsignatory hedge funds (portfolio B) is -1.44% per annum (t -statistic = -2.06). After adjusting for covariation with the Fung and Hsieh (2004) seven factors, the spread widens to an economically significant -2.45% per annum (t -statistic = -3.93). The greater risk-adjusted return versus the raw return of the spread can be partly attributed to the spread portfolio's positive loading on the equity market factor.

The findings are not driven by smaller hedge funds, which are less relevant for institutional investors. Panel B of Table 2 reveals that when we confine the sample to hedge funds with at least US\$20m in AUM, the underperformance of the portfolio of signatory hedge funds is still economically meaningful at 2.24% per year (t -statistic = 3.52). The findings also apply at the fund management company level. Panel C of Table 2 indicates that hedge fund firms that endorse the PRI underperform hedge fund firms that do not endorse the PRI by 2.97% per year (t -statistic = 3.78) after adjusting for risk. Hedge fund firm returns are the value-weighted returns of the hedge funds operated by each firm.¹⁸

[Insert Tables 2 and 3 here]

To investigate whether the signatory underperformance is driven by exposure to socially responsible companies or by agency problems, every month, we independently double sort hedge funds into 2×3 portfolios based on PRI endorsement and fund management company ESG scores. In the double sort, hedge funds are grouped into low and high ESG portfolios based on whether their firm ESG scores fall in the bottom or top terciles, respectively. To ensure that there is at least one fund in each of the six portfolios, we sort funds starting in January 2009.¹⁹

¹⁸As Panel A in Table A1 of the Internet Appendix reveals, the findings are robust to value-weighting the portfolios. The results are also robust when we split the sample period into two and redo the baseline portfolio sort. The alpha spread for the first half of the sample period is -2.67% per annum (t -statistic = -2.80) while that for the second half of the sample period is -1.71% per annum (t -statistic = -2.36).

¹⁹Prior to January 2009, there were no hedge funds that were managed by signatories with bottom-tercile ESG exposures. Inferences do not change when we restrict the sample to the period, i.e., from August 2009 onwards, when there are at least ten funds in each portfolio.

Panel A of Table 3 indicates that the underperformance of signatory hedge funds is not driven by a greater exposure to socially responsible firms. Signatory hedge funds with low ESG exposure underperform nonsignatory hedge funds with low ESG exposure by a staggering 7.72% per year (t -statistic = 3.18) after adjusting for risk. Conversely, signatory hedge funds with high ESG exposure only underperform nonsignatory hedge funds with high ESG exposure by a risk-adjusted 0.54% per year (t -statistic = 0.74). Moreover, amongst signatories, relative to those with high ESG exposure, those with low ESG exposure offer hedge funds that underperform by a risk-adjusted 5.94% per year (t -statistic = 3.00). These findings are consistent with an agency explanation.²⁰

As Panel B of Table 3 reveals, we obtain slightly weaker results when we employ a coarser independent double sort where we stratify hedge funds into two groups based on the median fund management company ESG score. Signatory hedge funds with below-median ESG exposure underperform nonsignatory hedge funds with below-median ESG exposure by an economically meaningful 6.02% per year (t -statistic = 2.76) after adjusting for risk. For the remainder of the paper, we classify hedge funds into low and high ESG funds as per the more granular tercile sort, although our findings also extend to the coarser median-based sort.²¹

Figure 3 illustrates the cumulative abnormal returns of the hedge fund portfolios in Tables 2 and 3. Abnormal return is the difference between a portfolio's excess return and its factor loadings multiplied by the Fung and Hsieh (2004) risk factors, where factor loadings

²⁰To address residual concerns that our findings could be driven by covariation with a priced ESG factor, we will redo our baseline portfolio sorts after augmenting the Fung and Hsieh (2004) model with a factor-mimicking stock portfolio for ESG that longs the top 30% and shorts the bottom 30% of stocks based on Thomson Reuters ESG scores. See Panel G of Table 11. One concern is that the Thomson Reuters 13F data do not contain information on short positions of hedge fund firms. Inferences remain qualitatively unchanged when, as part of an analogous independent double sort, we stratify hedge funds based on hedge fund firm loadings on the factor-mimicking stock portfolio for ESG.

²¹To mitigate look-ahead bias, the sort on ESG scores is based on prior year's ESG scores after allowing for a one-year publication lag. For example, the sort on January 2010 is based on investment firm 13-F stock holdings at the end of 2009 and stock-level ESG scores from 2008. The one-year publication lag ensures that ESG scores are known prior to firm investment. Panel B in Table A1 of the Internet Appendix indicates that inferences do not change when we do not allow for a one-year publication lag. In results available upon request, we show also that inferences remain unchanged when we sort based on contemporaneous as opposed to lagged ESG scores, thereby addressing the possibility that some signatories may invest in low ESG stocks with the view towards improving their ESG performance subsequently through, for instance, the passage of CSR-related shareholder proposals (Chen, Dong, and Lin, 2020).

are estimated over the entire sample period. The cumulative abnormal returns indicate that signatories consistently underperform nonsignatories over the sample period and the underperformance is driven by signatories with low ESG exposures.

[Insert Figure 3 and Table 4 here]

To test whether our findings are artifacts of the way we measure exposure to socially responsible firms, we first decompose the Thomson Reuters score into a component based on E&S factors and a component based on corporate governance factors, and redo the double sort using the component scores. Columns 1 to 4 of Table 4 indicate that our inferences remain unchanged when we employ component Thomson Reuters scores. Next, we repeat the same exercise using ESG scores from MSCI and Sustainalytics in lieu of Thomson Reuters. Columns 5 to 8 of Table 4 show that our conclusions remain unchanged.

A corollary of the agency view is that hedge funds that endorse the PRI should underperform even prior to endorsement since signing the PRI should signal, as opposed to trigger, incentive misalignment. To test, we sort hedge funds into funds operated by (i) current PRI signatories, (ii) future PRI signatories, and (iii) neither current nor future signatories. Table A2 of the Internet Appendix supports the agency view. While current signatories underperform nonsignatories by a risk-adjusted 2.55% per annum (t -statistic = 3.92), future signatories also underperform, albeit by a more modest 1.53% per annum (t -statistic = 2.47).

To investigate whether our findings are driven by fund characteristics that explain fund performance, we estimate the following pooled ordinary least squares (OLS) regression:

$$ALPHA_{im} = a + bPRI_{im} + cMGTFEE_i + dPERFFEE_i + eNOTICE_i + fMININV_i + g\log(SIZE_{im-1}) + hAGE_{im} + \sum_k p^k STRATDUM_i^k + \sum_l q^l YEARDUM_{im}^l + \epsilon_{im}, \quad (1)$$

where $ALPHA$ is fund alpha, PRI is an indicator variable that takes a value of one when a fund is managed by a PRI signatory, $MGTFEE$ is fund management fee in percentage, $PERFFEE$ is fund performance fee in percentage, $NOTICE$ is fund redemption notification

period in months, *MININV* is fund minimum investment in US\$m, *SIZE* is fund AUM in US\$m, *AGE* is fund age in decades, *STRATDUM* is the fund investment strategy dummy, and *YEARDUM* is the year dummy. Fund alpha is monthly abnormal return from the Fung and Hsieh (2004) model, with the factor loadings estimated over the prior 24 months.²² We also estimate the analogous regression on raw monthly fund returns and base statistical inferences on robust standard errors that are clustered by fund and month.

[Insert Table 5 here]

The coefficient estimates on *PRI* reported in Columns 1, 2, 4, and 5 of Table 5 indicate that, after adjusting for the various fund characteristics that could explain fund performance, signatory hedge funds underperform nonsignatory hedge funds. The coefficient estimates on the fund control variables accord with the literature. They indicate that larger (Berk and Green, 2004), more illiquid (Aragon, 2007), and older (Aggarwal and Jorion, 2010) funds underperform.²³ To test whether the underperformance of PRI funds relates to differences in underlying ESG exposure, we include *ESG_LOW* as well as the interaction between *PRI* and *ESG_LOW* as additional independent variables. *ESG_LOW* is an indicator variable that takes a value of one for hedge funds managed by firms with bottom-tercile ESG scores.²⁴ The coefficient estimates on the interaction term reported in Columns 3 and 6 of Table 5 suggest that the underperformance of PRI funds is concentrated in funds that have low ESG exposure. To test whether our regression results are robust to alternative specifications, we estimate Fama and MacBeth (1973) regressions on fund performance and report qualitatively similar results in Columns 7 to 12 of Table 5.

²²Inferences do not change when we use factor loadings estimated over the past 36 months instead.

²³To cater to readers who may wonder whether PRI endorsement has incremental explanatory power on fund performance over and above that of past performance (Jagannathan, Malakhov, and Novikov, 2010), we reestimate the regressions after controlling for past one-year and two-year fund alpha. As shown in Table A3 in the Internet Appendix, our results are robust to this adjustment.

²⁴For the regressions with *ESG_LOW*, to facilitate comparison between firms in the top and bottom ESG terciles, we drop hedge fund firms with ESG scores in the middle tercile.

3.2. Incentive alignment

To further test the agency view, we first sort funds into two subgroups based on various metrics that capture incentive alignment between fund management and investors. These metrics include manager total delta (Agarwal, Daniel, and Naik, 2009), the ratio of fund management fee to performance fee (Fung et al., 2020), and fund governance score (Ozik and Sadka, 2015).

For the sorts on manager total delta and the ratio of management fee to performance fee, we partition funds based on the median value of the respective incentive alignment metric. Funds with zero performance fees are assigned to the high management fee to performance fee group. The Ozik and Sadka (2015) governance score is based on whether a fund is an onshore fund, features a high-water mark, is SEC registered, and employs a top auditor or legal counsel.²⁵ Since the governance score takes values from zero to five, we classify as low scores those less than or equal to two and as high scores those greater than or equal to three.

Funds with low manager total deltas, high management fees relative to performance fees, and low governance scores should be more susceptible to agency problems. For example, Agarwal, Daniel, and Naik (2009) show that funds that are operating far below their high-water marks, and therefore exhibit low manager total deltas, have incentives that are less aligned with those of their investors. Consequently, under the agency view, we expect signatory underperformance, as well as the underperformance of low-ESG signatories, to be greater for such funds. Therefore, for each subgroup of funds partitioned by incentive alignment, we redo the baseline sort on PRI endorsement and the double sort on PRI endorsement and investment firm ESG scores.

Table 6 supports the agency view. It indicates that our baseline performance findings are stronger for funds whose incentives are less aligned with their investors. For low manager total delta, high management fee to performance fee, and low governance score funds, the risk-adjusted underperformance of signatory hedge funds is 3.12%, 3.90%, and 4.55%

²⁵See http://en.wikipedia.org/wiki/List_of_100_largest_law_firms_by_revenue for the top law firms and <http://www.accountingmajors.com/accountingmajors/articles/top100.html> for the top accounting firms.

per annum, respectively. Conversely, for high manager total delta, low management fee to performance fee, and high governance score funds, the risk-adjusted underperformance of signatory hedge funds is only 0.96%, 1.49%, and 2.04% per annum, respectively. Similarly, we find that the risk-adjusted fund underperformance of low-ESG signatories, relative to low-ESG nonsignatories, is larger for funds featuring low manager total deltas, high management fees to performance fees, and low governance scores.

[Insert Table 6 here]

3.3. *Asset gathering*

Are there pecuniary benefits associated with PRI endorsement for hedge fund firms? In this section, we explore the implications of PRI endorsement for fund flow, AUM, fee revenues, and fund launches. We also test whether signatories increase their exposure to socially responsible portfolio companies post endorsement

To understand the effects on fund flow, we estimate multivariate OLS regressions on annual hedge fund flow (*FLOW*) with *PRI* as the independent variable of interest. We include, as control variables, the set of fund characteristics from the Eq. (1) regression, the standard deviation of fund returns estimated over the last 12 months (*RETSTD*), as well as year and strategy fixed effects. In the spirit of Siri and Tufano (1998), we also control for past 12-month fund return rank (*RANK*). Since investors may respond to risk-adjusted measures such as fund alpha (Agarwal, Green, and Ren, 2018), we also estimate regressions where we control for past 12-month CAPM alpha rank (*RANK_CAPM*) or Fung and Hsieh (2004) alpha rank (*RANK_FH*) in lieu of *RANK*. Finally, we estimate analogous regressions on annual hedge fund firm flow (*FIRM_FLOW*) since any benefits from PRI endorsement are even more likely to accrue at the firm level than at the fund level. For example, signatories could take advantage of the potential marketing uplift generated by their commitment to responsible investment to launch more hedge funds post endorsement.

Table 7 reveals that signatory hedge funds attract greater investor flows after controlling for past fund performance and a variety of fund characteristics. The coefficient estimate on

FLOW in the regression with *RANK_FH* indicates that PRI endorsement is associated with a 9.50% increase in annual hedge fund flow. Consistent with the view that the benefits of PRI endorsement manifest more strongly at the firm level, we find that PRI endorsement is associated with a larger 15.90% increase in annual hedge fund firm flow. These results are economically meaningful given that the average unconditional fund and firm flow are -4.03% and -3.87% per annum, respectively. Consistent with prior work, fund flow relates positively to past performance and negatively to past return volatility. In results that are available upon request, we find no evidence that PRI endorsement is associated with reductions in the sensitivity of flows to past performance. We also find that flows to low-ESG signatories do not differ meaningfully from flows to high-ESG signatories.

[Insert Tables 7 and 8 here]

To understand the implications of PRI endorsement on other fund and firm characteristics, such as AUM, fee revenue, and ESG exposure, we perform an event study. We choose as the event window the period starting 36 months prior to and ending 36 months after PRI endorsement.²⁶ To be included in the sample, a fund must have monthly return information during the event window. This leaves 197 funds that belong to 82 firms with sufficient return information. To account for observable differences between signatories and nonsignatories, we match event hedge funds with non-event hedge funds based on fund characteristics in the 36-month pre-endorsement period and conduct a difference-in-differences analysis. For example, in the fund AUM analysis, event funds are matched to non-event funds by minimizing the sum of the absolute differences in monthly fund AUM in the 36-month pre-endorsement period. Panel A of Table 8 reports differences in fund AUM and fund fee revenue before and after PRI endorsement relative to the matched sample. We also match event firms with non-event firms based on firm AUM, firm fee revenue, firm ESG score, and the number of funds launched since inception, and report results from the difference-in-differences analyses of these firm attributes in Panel B of Table 8.

²⁶Our difference-in-differences results are robust to using an event window that starts 24 months prior to PRI endorsement and ends 24 months after PRI endorsement.

Panel A of Table 8 shows that relative to the 36-month pre-endorsement period and to comparable funds, signatory hedge funds manage US\$23.59m more assets and garner US\$0.96m more fee revenues per year during the 36-month post-endorsement period. Similarly, Panel B of Table 8 indicates that relative to the 36-month pre-endorsement period and to comparable firms, signatories oversee US\$83.12m more assets, harvest US\$4.08m more fee revenues per year, and launch 0.36 more funds during the 36-month post-endorsement period.²⁷ These findings suggest that PRI endorsement benefits hedge fund firms by facilitating asset gathering.

Signatories do not increase their exposure to socially responsible companies post endorsement. The difference-in-differences ESG score estimate from Panel B of Table 8 alludes to a modest 2.35 unit or 3.13% decline in their ESG scores relative to those of matching nonsignatories. However as Figure 2 shows, signatories may invest more in high ESG stocks prior to endorsement. To check, we estimate probit regressions on the probability of endorsing the PRI. Table A4 of the Internet Appendix indicates that funds and firms with higher ESG scores are indeed more likely to embrace responsible investment. In addition, funds and firms that are larger, are younger, underperform, and feature less onerous share restrictions are more likely to endorse the PRI.²⁸ The last result is also consistent with the asset gathering view, since hedge funds with investor friendly redemption terms are more likely to hold liquid assets and, therefore, can more easily scale up without hitting capacity constraints.

3.4. Endogeneity

One concern is that unobserved factors, unrelated to agency, that affect both PRI endorsement and fund performance could drive our findings. For example, unskilled hedge fund firms may endorse PRI to compensate for their inability to outperform and subsequently botch ESG implementation, leading to low ESG exposures. To address such endogeneity

²⁷In any given 36-month period, the average investment firm launches 0.66 funds while the median firm conceives zero funds.

²⁸The difference-in-differences results are qualitatively unchanged when we match control funds to treatment funds based on the propensity scores derived from the probit.

concerns, we exploit two quasi-natural experiments: (i) the April 2010 BP Deepwater Horizon oil spill and (ii) the June 2017 Trump withdrawal from the Paris Agreement on climate change mitigation.

The BP Deepwater Horizon oil spill is regarded as one of the largest environmental disasters in American history. The U.S. government estimated the total discharge at 4.9 million barrels (210 million U.S. gallons, or 780,000 m³), which polluted 68,000 square miles (180,000 km²) of ocean and devastated marine life in the Gulf. The Paris Agreement on climate change mitigation aims to hold the increase in the global average temperature to well below 2 °C above pre-industrial levels, predominantly by reducing greenhouse gas emissions.

We argue that the Deepwater Horizon oil spill unexpectedly increased the perceived importance of ESG practices and, consequently, the value investors place on responsible investment. While the Trump withdrawal from the Paris Agreement was not inconsistent with Trump's pre-election statements, anecdotal evidence suggests that the timing and magnitude of the policy shift still caught some financial market participants off guard. According to the Financial Times, "Mr Trump's rejection of the Paris accord has introduced fresh uncertainty into US energy and environmental policies for investors." Reflecting on the policy shift, Will Oulton of First State Investments worries that some companies "may use this as a reason to roll back on investing for a low carbon future."²⁹ Therefore, by reneging on the Paris accord, Trump diminished the perceived value of having in place environmentally sound practices, especially among U.S. companies.

If agency problems engender signatory underperformance, we expect the underperformance to positively relate to exogenous increases in the value investors place on responsible investment, since it is the latter that drives the wedge in incentive alignment between signatories and nonsignatories.³⁰ Therefore, we include two additional independent variables

²⁹See "Trump can't put the green genie back in the bottle," Financial Times, 5 May 2020.

³⁰The agency view posits that PRI endorsement is a sign of agency problems. PRI endorsement by itself does not trigger underperformance since firms may endorse the PRI for reasons unrelated to agency. Therefore, our identification strategy does not simply involve analyzing exogenous shocks that affect PRI endorsement. Rather, we focus on exogenous shocks that affect the value investors accord to responsible investment, which in turn drives the disparity in incentive alignment between signatories and nonsignatories.

in the Eq. (1) regressions: *SHOCK* and *PRI * SHOCK*, where *SHOCK* is a placeholder for an exogenous shock. We estimate two sets of regressions on fund performance that correspond to the following two exogenous shocks: *DEEPWATER*, an indicator variable that takes a value of one during the three months that coincide with and follow the Deepwater Horizon oil spill, and *TRUMP*, an indicator variable that takes a value of one during the three months that coincide with and follow the Trump withdrawal from the Paris Agreement.

[Insert Table 9 here]

Columns 1 to 4 of Table 9 reveal that the underperformance of signatory hedge funds increases (decreases) when an exogenous shock leads investors to increase (decrease) the value that they place on ESG practices and responsible investment. The coefficient estimate on the interaction of *PRI* and *DEEPWATER* in the regression on fund alpha indicates that signatory hedge funds underperform by 38.2 basis points per month more in the wake of the Deepwater Horizon oil spill. Conversely, the coefficient estimate on the interaction of *PRI* and *TRUMP* in the regression on fund alpha suggests that signatory hedge funds underperform by 35.9 basis points per month less in the wake of the Trump withdrawal. These results are difficult to reconcile with an explanation based on manager skill since it is not clear why increases and decreases in the value investors accord to responsible investment should blunt and sharpen manager skill, respectively.

Our results cannot be explained by the exogenous shocks directly affecting the relative performance of signatories through the returns of the stocks that they hold. As Figure 2 reveals, on average signatories hold stocks with higher ESG scores than do nonsignatories. If anything, the Deepwater event should benefit while the Trump event should hurt the performance of high ESG stocks. Therefore, the stock return story predicts that the relative performance of signatories will improve following the Deepwater event and worsen following the Trump event, which is the exact opposite of what we find. Moreover, consonant with the view that the exogenous shocks affect the value investors place on responsible investment, in results available upon request we find that three- and twelve-month signatory flows increase following the Deepwater Horizon oil spill and decrease following the Trump withdrawal.

To further address endogeneity, we study temperature shocks at the cities where hedge fund firms are based. Choi, Gao, and Jiang (2020) show that attention to global warming increases in cities that experience abnormally high monthly temperatures, even though such localized temperature shocks are typically not indicative of climate change per se. Moreover, Anderson and Robinson (2020) find that adverse weather events lead people to make more “green” choices, including paying more for green mutual funds. Therefore, adverse local temperature shocks should increase the value investors place on responsible investment. As such, for our second set of identification tests, we estimate regressions on fund performance with the following exogenous shocks: *HIGHTEMP*, an indicator variable that takes a value of one if the monthly abnormal temperature at the hedge fund firm city is in the top quintile, and *EXTREMETEMP*, an indicator variable that takes a value of one if the monthly abnormal temperature at the hedge fund firm city is in the top or bottom quintile.³¹ Columns 7 and 8 of Table 9 reveal that signatories underperform by 13.6 basis points per month and 19.6 basis points per month more when local temperatures are abnormally high and extreme, respectively. These results further support the agency view that incentive misalignment engenders signatory underperformance.

3.5. *Low-ESG signatories*

Do the agency problems at hedge fund signatories with low ESG exposures translate into greater operational risk, which hurts their clients? We hypothesize that such signatories may deviate from expected standards of business conduct or cut corners when it comes to compliance and record-keeping, precipitating regulatory action or lawsuits, which have to

³¹Choi, Gao, and Jiang (2020) decompose monthly temperatures at 74 major stock exchange cities into three components which account for predictable, seasonal, and abnormal patterns. We study the abnormal component and focus on abnormal temperature observations in the top and bottom quintiles as Choi, Gao, and Jiang (2020) show that their results are driven by such observations. Abnormal temperature quintiles are constructed from the full sample of monthly abnormal temperature observations. For firms that are not based in any of the major stock exchange cities, we use the temperature of the major stock exchange city in the country that the firm is based as a proxy. For example, for hedge fund firms that are based in Stamford, Connecticut, we use the temperature of New York City as a proxy. We assume that investors are more likely to reside in the same city or in the major stock exchange city of the same country as the hedge fund firm. Darwin Choi and Wenxi Jiang kindly supplied monthly temperature data from January 2004 to December 2017.

be reported on Item 11 of the Form ADV file (Brown et al., 2008; 2009; 2012). Moreover, hedge fund signatories who do not walk the talk may exhibit some of the suspicious patterns in reported returns that Bollen and Pool (2009; 2012) show are leading indicators of fraud.

To investigate, we estimate probit regressions on the probability that hedge fund firms report fresh violations on their Form ADVs each year. The probit regressions feature the independent variables used in Eq. (1) as well as *ESG_LOW* and the interaction of *ESG_LOW* and *PRI*. The probit regressions include as dependent variables the following four indicator variables: *VIOLATION*, *REGULATORY*, *INVESTMENT*, and *SEVERE* that takes values of one when a firm reports any violation, a regulatory violation, an investment violation, and a severe violation, respectively.³² Since, Item 11 on the Form ADV documents whether an advisor had committed a violation *within the past ten years*, we leverage instead on Form ADV Disclosure Reporting Pages, which must accompany any affirmative response to Item 11, to determine the first and last date for each violation. For each fund-year observation, the violation variables take a value of one if and only if the year overlaps with the date range for the specific violation. The coefficient estimates on the interaction variables reported in Columns 1 to 4 of Table 10 reveal that, relative to signatories with high ESG scores, those with low ESG scores experience more regulatory actions, trigger more investment violations, and report more severe infractions. The marginal effect reported in Column 1 suggests that low-ESG signatories have a 8.7% greater probability of reporting a violation in any given year than do high-ESG signatories, which is economically meaningful given that the unconditional probability that a fund reports a violation in any given year is 3.8%.

[Insert Table 10 here]

We also estimate analogous probit regressions on the probability that hedge fund firms trigger the four performance flags that are most often linked to funds with reporting violations as per Panel B of Table 5 in Bollen and Pool (2012): Kink, % Negative, Maxrsq,

³²Investment violations refer to Form ADV Items 11.B.1., 11.C.3, 11.C.4, 11.C.5, 11.D.2, 11.D.3, 11.D.4, 11.D.5, 11.E.3, 11.H.1a, and 11.H.1b. Severe violations refer to Form ADV Items 11.A.1, 11.A.2, 11.C.4, 11.C.5, 11.D.4, or 11.D.5.

and % Repeat. Kink is triggered by a discontinuity at zero in the hedge fund return distribution. % Negative is triggered by a low number of negative returns. Maxrsq is triggered by an adjusted R^2 that is not significantly different from zero. % Repeat is triggered by a high number of repeated returns. The probit regressions include as dependent variables the following four indicator variables that correspond to the performance flags: *KINK*, *%NEGATIVE*, *MAXRSQ*, and *%REPEAT*. Each indicator variable takes a value of one when the corresponding flag is triggered by at least one fund managed by the firm over each non-overlapping 24-month period post inception. The coefficient estimates on the interaction variables reported in Columns 5 to 8 of Table 10 indicate that relative to signatories with high ESG scores, those with low ESG scores are more likely to set off three of the four performance flags considered, namely, Kink, % Negative, and Maxrsq. Overall, Table 10 suggests that PRI endorsement by investment firms with low ESG exposure could itself be a red flag for operational risk.

3.6. Equilibrium implications

As discussed, investor flows into hedge funds operated by low-ESG signatories do not differ meaningfully from flows into hedge funds operated by high-ESG signatories. Why do hedge funds managed by low-ESG signatories continue to thrive despite not walking the talk, exhibiting greater operational risk, and underperforming other hedge funds?

We believe that the answer lies in investor information acquisition costs for the following reasons. First, we find considerable disagreement between the ESG assessments by different data providers. Low-ESG signatories categorized based on Thomson Reuters are only 47.46% and 35.44% likely to be classified as low-ESG based on MSCI and Sustainalytics, respectively. This is not surprising given the inherent subjectivity of ESG assessments.

Second, low-ESG signatories only differ marginally from high-ESG signatories along more salient and transparent dimensions. For example, the sin stock ownership (Hong and Kacperczyk, 2009) of low-ESG signatories only exceeds that of high-ESG signatories by 1.2 percent. Therefore, without appealing to data from ESG providers it would be difficult for asset

owners to assess the ESG exposure of hedge fund signatories.

Third, we find that low-ESG signatories promote their hedge funds more aggressively. Low-ESG and high-ESG signatories report hedge fund returns to 1.46 and 1.26 databases, respectively. The difference is statistically distinguishable from zero at the 1% level. Moreover, the percentage of low-ESG and high-ESG signatories with duplicate share classes is 49.06% and 42.97%, respectively, and the difference in proportions is also statistically different from zero at the 1% level. By reporting to multiple databases and offering duplicate share classes, low-ESG signatories effectively lower investor search and entry costs.

Why do we not observe more investment firms strategically embracing responsible investment? We find that social norms help align fund managers' interests with those of socially and environmentally conscious investors. Following Dyck et al. (2019), we measure social norms three ways. First, we gauge social norms toward the environment using the Environmental Performance Index from Yale University and Columbia University. Second, we infer social norms toward worker rights and other social issues using the Employment Laws Index from Botero et al. (2004). Third, we derive social norms on societal attitudes and beliefs regarding E&S issues using data from the World Values Survey. Regardless of how we measure social norms, we find that investment firm ESG scores are substantially higher in countries with strong social norms. For example, based on norms derived from the Environmental Performance Index, strong social norm countries exhibit ESG scores that are 15.51% greater than those exhibited by weak social norm countries. Moreover as Table A5 of the Internet Appendix shows, signatory underperformance only manifests in weak social norm countries and not in strong social norm countries, supporting the view that societal pressures induce fund managers to internalize their investors' preference for responsible investment.

4. Robustness tests

We conduct a battery of robustness tests to ascertain the strength of our empirical results.

4.1. Backfill and incubation bias

To address backfill bias, we remove all returns prior to database listing from the analysis and redo the baseline sorts. We employ the Jorion and Schwarz (2019) algorithm to back out listing dates for funds that report to Morningstar but not to HFR, since Morningstar does not provide listing date information. To adjust for incubation bias, we remove the first 24 months of returns for each fund and redo the baseline analysis. Panels A and B of Table 11 indicate that our findings are not driven by backfill and incubation bias.

[Insert Table 11 here]

4.2. Serial correlation

To address concerns that serial correlation in fund returns could inflate some of the test statistics used to make inferences, we redo the baseline portfolio sorts on returns that are unsmoothed using the Getmansky, Lo, and Makarov (2004) algorithm. Panel C of Table 11 suggests that our findings are robust to adjusting for serial correlation.

4.3. Pre-fee returns

To address concerns that signatory hedge funds may charge higher fees, we derive pre-fee returns by matching each capital outflow to the relevant capital inflow when calculating the high-water mark and performance fee, assuming as per Agarwal, Daniel, and Naik (2009) that capital leaves the fund on a first-in, first-out basis. Panel D of Table 11 indicates that our findings cannot be traced to differences in fund fees.

4.4. Omitted factors

To cater for omitted risk factors, we separately augment the Fung and Hsieh (2004) model with the excess return from the MSCI Emerging Markets Index, the Pástor and Stambaugh (2003) liquidity factor, and a factor-mimicking stock portfolio for ESG. The ESG factor is

constructed by going long and short stocks with ESG scores in the top 30th and the bottom 30th percentiles, respectively. Panels E, F, and G of Table 11 suggest that our findings are not driven by omitted risk factors.

4.5. Dynamic factor loadings

To ameliorate concerns that the risk loadings of hedge fund portfolios may vary over time, we estimate factor loadings dynamically over a rolling 24-month window. Panel H of Table 11 indicates that our findings are robust to allowing for dynamic loadings.

4.6. Limited attention

Investment firms could be distracted by the additional reporting requirements that come with PRI endorsement, which could lead to fund underperformance. Limited attention should be confined to small investment firms since large investment firms can easily accommodate the additional reporting requirements. To test, we split our sample into large and small investment firms and redo the baseline portfolio sorts. Panels I and J of Table 11 show that our findings apply to hedge funds operated by both small and large investment firms.

4.7. Activist hedge funds

To address concerns that the results may be driven by hedge fund activism (Akey and Appel, 2020) or investor engagement (Dimson, Karakaş, and Li, 2020), we redo the baseline portfolio sorts on the non-activist hedge fund sample. By checking 13D filings, we identify 432 activist hedge fund managers, of which 42 are PRI signatories and 21 have valid return observations after endorsing PRI. Panel K of Table 11 reveals that our findings are not driven by activists.

4.8. Former signatories

We download the list of former signatories from PRI annual reports. We are able to match them to 41 of the fund management firms in our sample. According to the PRI, 14 of the

41 firms were delisted due to merger with or acquisition by another signatory. The other 27 firms either did not pay the mandatory annual membership fee, did not participate in the annual reporting and assessment process, or chose to voluntarily leave the PRI. The PRI does not typically report signing and delisting dates for former signatories. For firms that appear on the new signatory lists in annual reports, we assume that they endorsed the PRI in the middle of the reporting period spanned by the relevant annual report. Otherwise, we assume that they joined at founding, i.e., on 27 April 2006. For firms without delisting dates, we assume that they delisted in the middle of the reporting period associated with the relevant annual report. Panel L of Table 11 suggests that our conclusions are unchanged with the inclusion of delisted signatories.

4.9. Pure play hedge fund firms

To maximize coverage, our sample of PRI signatories and nonsignatories includes investment firms that offer non-hedge fund products. We redo our baseline sorts on pure play hedge fund firms, for whom hedge funds is a dominant business. Panel M of Table 11 suggests that our findings also apply to pure play hedge fund firms.

4.10. FactSet holdings data

In our analysis, we rely on stock holdings from Thomson Reuters 13F to compute investment firm ESG exposure. As a robustness test, we merge stock holdings data from Thomson Reuters 13F and FactSet, and recompute firm ESG exposure. The advantage of FactSet is that it includes institutional investor holdings of international stocks. A disadvantage of FactSet is that, for some countries, its international stock holdings data may be derived exclusively from mutual fund filings. Panel N of Table 11 indicates that inferences remain unchanged when we employ the combined stock holdings database.

5. Conclusion

In this paper, we study hedge funds operated by investment firms that publicly commit to responsible investment. We establish four main facts. First, hedge funds managed by PRI signatories underperform those managed by nonsignatories after adjusting for risk. The underperformance cannot be traced to a greater exposure to socially responsible companies. Instead, the underperformance is driven by signatories with low ESG exposure. Consistent with the agency view, the underperformance is stronger for hedge funds for whom the incentives of fund managers and investors are misaligned.

Second, hedge fund firms that endorse responsible investment reap tangible and pecuniary benefits. PRI signatories attract substantially larger inflows than do nonsignatories. Relative to a matched sample of nonsignatories, signatories amass more capital, launch more new funds, and earn higher fee revenues post endorsement. While signatories tend to have higher ESG exposure prior to endorsement, they reduce their ESG exposures post endorsement. In conjunction with the first finding, these results suggest that some investment firms that offer hedge funds endorse responsible investment for strategic reasons.

Third, exogenous shocks that impact the value investors place on socially responsible investing affect the relative performance of signatories versus nonsignatories. Signatory hedge funds underperform more following an exogenous shock that increases the value investors attach to protecting the environment. Conversely, signatory hedge funds underperform less following an exogenous shock that diminishes the value investors put on climate change mitigation. Therefore, exogenous increases in investors' perceived willingness-to-pay for sustainable investing undermine the motivation to outperform for managers who endorsed responsible investment.

Fourth, signatories who do not walk the talk exhibit greater operational risk. They are more likely to trigger regulatory, investment, and severe violations. They are also more likely to display suspicious patterns in reported fund returns that are potential indicators of return misreporting and fraud. Therefore, for investment managers with low ESG exposure, the

endorsement of responsible investment may itself be a red flag for operational risk.

Collectively, these results shed light on the investment performance, asset gathering, and operational risk implications of the drive towards responsible investment for hedge funds. They also contribute to the larger debate on whether asset managers who embrace responsible investment truly walk the talk. The results suggest that signatories are not always as one would expect exemplars of responsible investment. Given the subjectivity and substantial costs associated with ESG assessment, signatories who do not walk the talk are likely to persist. Nonetheless, environmentally and socially conscious asset owners can take comfort in the fact that societal pressures help fund managers internalize their investors' preferences for responsible investment.

References

- Agarwal, V., Daniel, N., Naik, N. Y., 2009. Role of managerial incentives and discretion in hedge fund performance. *Journal of Finance* 64, 2221–2256.
- Agarwal, V., Daniel, N., Naik, N. Y., 2011. Do hedge funds manage their reported returns? *The Review of Financial Studies* 24, 3281–3320.
- Agarwal, V., Green, T.C., Ren, H., 2018. Alpha or beta in the eye of the beholder: what drives hedge fund flows? *Journal of Financial Economics* 127, 417–434.
- Agarwal, V., Naik, N. Y., 2004. Risk and portfolio decisions involving hedge funds. *Review of Financial Studies* 17, 63–98.
- Aggarwal, R. K., Jorion, P., 2010. The performance of emerging hedge funds and managers. *Journal of Financial Economics* 96, 238–256.
- Akey, P., Appel, I., 2020. Environmental externalities of activism. Unpublished working paper, University of Toronto.
- Anderson, A., Robinson, D.T., 2020. Talking about the weather: availability, affect, and the demand for green investments. Unpublished working paper, Stockholm School of Economics.
- Aragon, G. 2007. Share restrictions and asset pricing: evidence from the hedge fund industry. *Journal of Financial Economics* 83, 33–58.

- Aragon, G., Jiang, Y., Joenväärä, J., Tiu, C., 2020. Socially responsible investments: costs and benefits for university endowment funds. Unpublished working paper, Arizona State University.
- Aragon, G., Nanda, V., 2017. Strategic delays and clustering in hedge fund reported returns. *Journal of Financial and Quantitative Analysis* 52, 1–35.
- Barber, B.M., Morse, A., Yasuda, A., 2020. Impact investing. *Journal of Financial Economics*, forthcoming.
- Berk, J., Green, R., 2004. Mutual fund flows and performance in rational markets. *Journal of Political Economy* 112, 1269–1295.
- Bhardwaj, G., Gorton, G., Rouwenhorst K.G., 2014. Fooling some of the people all of the time: the inefficient performance and persistence of commodity trading advisors. *Review of Financial Studies* 27, 3099–3132.
- Bollen, N., Pool, V., 2009. Do hedge fund managers misreport returns? Evidence from the pooled distribution. *Journal of Finance* 64, 2257–2288.
- Bollen, N., Pool, V., 2012. Suspicious patterns in hedge fund returns and the risk of fraud. *Review of Financial Studies* 25, 2673–2702.
- Botero, J., Djankov, S., La Porta, R., Lopez-de-Silanes, F., Shleifer, A., 2004. The regulation of labor. *Quarterly Journal of Economics* 119, 1339–1382.
- Brown, S., Goetzmann, W., Liang, B., Schwarz, C., 2008. Mandatory disclosure and operational risk: evidence from hedge fund registration. *Journal of Finance* 63, 2785–2815.
- Brown, S., Goetzmann, W., Liang, B., Schwarz, C., 2009. Estimating operational risk for hedge funds: The ω -score. *Financial Analysts Journal* 65, 43–53.
- Brown, S., Goetzmann, W., Liang, B., Schwarz, C., 2012. Trust and delegation. *Journal of Financial Economics* 103, 221–234.
- Brunnermeier, M. K., Nagel, S., 2004. Hedge funds and the technology bubble. *Journal of Finance* 59, 2013–2040.
- Carhart, M., 1997. On persistence in mutual fund performance. *Journal of Finance* 52, 57–82.
- Chen, T., Dong, H., Lin, C., 2020. Institutional shareholders and corporate social responsibility. *Journal of Financial Economics* 135, 483–504.
- Choi, D., Gao, Z., Jiang, W., 2020. Attention to global warming. *Review of Financial Studies*, forthcoming.

- Deng, X., Kang, J.K., Low, B.S., 2013. Corporate social responsibility and stakeholder value maximization: evidence from mergers. *Journal of Financial Economics* 110, 87–109.
- Dimson, E., Karakaş, O., Li, X., 2020. Coordinated engagements. Unpublished working paper, London Business School.
- Dyck, A., Lins, K., Roth, L., Wagner, H.F., 2019. Do institutional investors drive corporate social responsibility? International evidence. *Journal of Financial Economics* 131, 693–714.
- Fama, E., MacBeth, J., 1973. Risks, return, and equilibrium: empirical tests. *Journal of Political Economy* 81, 607–636.
- Ferrell, A., Liang, H., Renneboog, L., 2016. Socially responsible firms. *Journal of Financial Economics* 122, 585–606.
- Filbeck, G., Krause, T.A., Reis, L., 2016. Socially responsible investing in hedge funds. *Journal of Asset Management* 17, 408–421.
- Flammer, C., 2015. Does corporate social responsibility lead to superior financial performance? A regression discontinuity design. *Management Science* 61, 2549–2568.
- Fung, W., Hsieh, D., 2004. Hedge fund benchmarks: a risk based approach. *Financial Analysts Journal* 60, 65–80.
- Fung, W., Hsieh, D., 2009. Measurement biases in hedge fund performance data: an update. *Financial Analysts Journal* 65, 36–38.
- Fung, W., Hsieh, D., Naik, N., Teo, M., 2020. Hedge fund franchises. *Management Science*, forthcoming.
- Getmansky, M., Lo, A., Makarov, I., 2004. An econometric model of serial correlation and illiquidity of hedge fund returns. *Journal of Financial Economics* 74, 529–610.
- Gibson, R., Glossner, S., Krueger, P., Matos, P., Steffen, T., 2020. Responsible institutional investing around the world. Unpublished working paper, University of Geneva.
- Hartzmark, S.M., Sussman, A.B., 2019. Do investors value sustainability? A natural experiment examining ranking and fund flows. *Journal of Finance* 74, 2789–2837.
- Hong, H., Kacperczyk, M., 2009. The price of sin: the effects of social norms on markets. *Journal of Financial Economics* 93, 15–36.
- Jagannathan, R., Malakhov, A., Novikov, D., 2010. Do hot hands exist among hedge fund managers? An empirical evaluation. *Journal of Finance* 65, 217–255.
- Joenväärä, J., Kauppila, M., Kosowski, R., Tolonen, P., 2020. Hedge fund performance: are

- stylized facts sensitive to which database one uses? *Critical Finance Review*, forthcoming.
- Jorion, P., Schwarz, C., 2014. Are hedge fund managers misreporting? Or not? *Journal of Financial Economics* 111, 311–327.
- Jorion, P., Schwarz, C., 2019. The fix is in: properly backing out backfill bias. *Review of Financial Studies* 32, 5048–5099.
- Kim, S., Yoon, A., 2020. Analyzing active manager’s commitment to ESG: evidence from United Nations Principles for Responsible Investment. Unpublished working paper, Georgia Institute of Technology.
- Liang, B., 2000. Hedge funds: the living and the dead. *Journal of Financial and Quantitative Analysis* 35, 309–326.
- Liang, H., Renneboog, L., 2017. On the foundations of corporate social responsibility. *Journal of Finance* 72, 853–910.
- Lins, K.V., Servaes, H., Tamayo, A. 2017. Social capital, trust, and firm performance: the value of corporate social responsibility during the financial crisis. *Journal of Finance* 72, 1785–1824.
- Mănescu, C., 2011. Stock returns in relation to environmental, social and governance performance: mispricing or compensation for risk? *Sustainable Development* 19, 95–118.
- Naaraayanan, S.L., Sachdeva, K., Sharma, V., 2019. The real effects of environmental activist investing. Unpublished working paper, Hong Kong University of Science and Technology.
- Newey, W., West, K., 1987. A simple, positive semi-definite, heteroskedasticity and autocorrelation consistent covariance matrix. *Econometrica* 55, 703–708.
- Ozik, G., Sadka, R., 2015. Skin in the game versus skimming the game: governance, share restrictions, and insider flows. *Journal of Financial and Quantitative Analysis* 50, 1293–1319.
- Peirce, H., 2018. My Beef with Stakeholders: Remarks at the 17th Annual SEC Conference, Center for Corporate Reporting and Governance. Speech, U.S. Securities and Exchange Commission.
- Peirce, H., 2019. Scarlet Letters: Remarks before the American Enterprise Institute. Speech, U.S. Securities and Exchange Commission.
- Pástor, L., Stambaugh, R., 2003. Liquidity risk and expected stock returns. *Journal of Political Economy* 111, 642–685.

- Raghunandan, A. Rajgopal, S., Do the socially responsible walk the talk? Unpublished working paper, London School of Economics.
- Riedl, A., Smeets, P., 2017. Why do investors hold socially responsible mutual funds? *Journal of Finance* 72, 2505–2550.
- Servaes, H., Tamayo, A., 2013. The impact of corporate social responsibility on firm value: the role of customer awareness. *Management Science* 59, 1045–1061.
- Siri, E.R., Tufano, P., 1998. Costly search and mutual fund flows. *Journal of Finance* 53, 1589–1622.
- Sun, Z., Wang, A., Zheng, L., 2012. The road less traveled: strategy distinctiveness and hedge fund performance. *Review of Financial Studies* 25, 96–143.
- Teo, M., 2011. The liquidity risk of liquid hedge funds. *Journal of Financial Economics* 100, 24–44.
- Titman, S., Tiu, C., 2011. Do the best hedge funds hedge? *Review of Financial Studies* 24, 123–168.
- White, H., 1980. A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica* 48, 817–838.

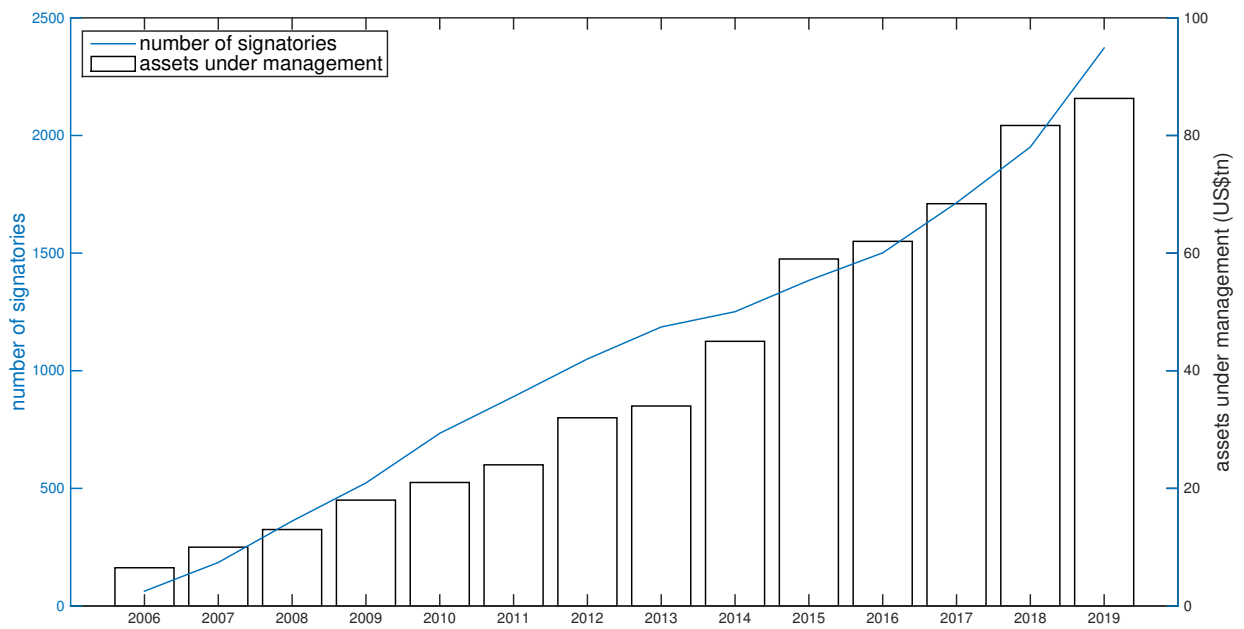


Figure 1: PRI signatory growth. PRI denotes the Principles for Responsible Investment. PRI signatories include asset owners, investment managers, and service providers. The line graph depicts the number of PRI signatories (y-axis on the left). The bar graph depicts the assets under management in trillions of US dollars of PRI signatories (y-axis on the right). PRI was launched on 27 April 2006.

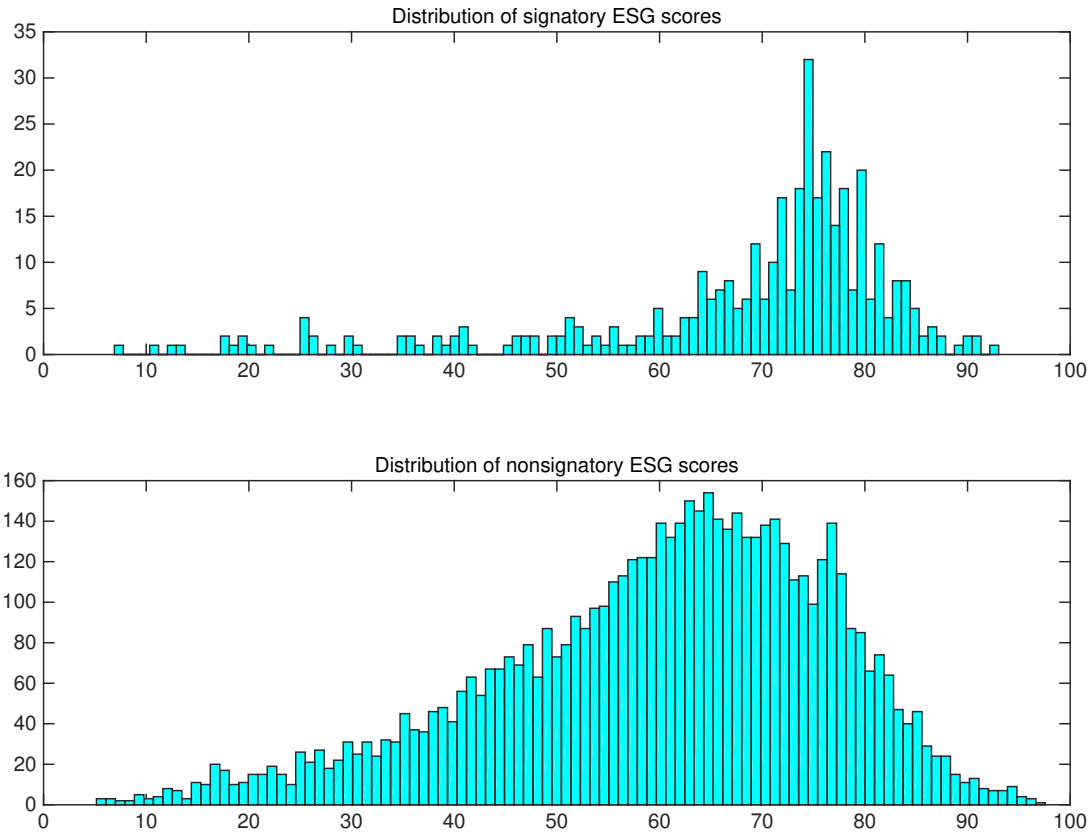


Figure 2: Firm ESG scores for PRI signatories and nonsignatories. PRI denotes the Principles for Responsible Investment. Firm ESG scores are the value-weighted average of the Thomson Reuters ESG scores of the stocks held by hedge fund firms at the end of each year. The sample period is from May 2006 to April 2019.

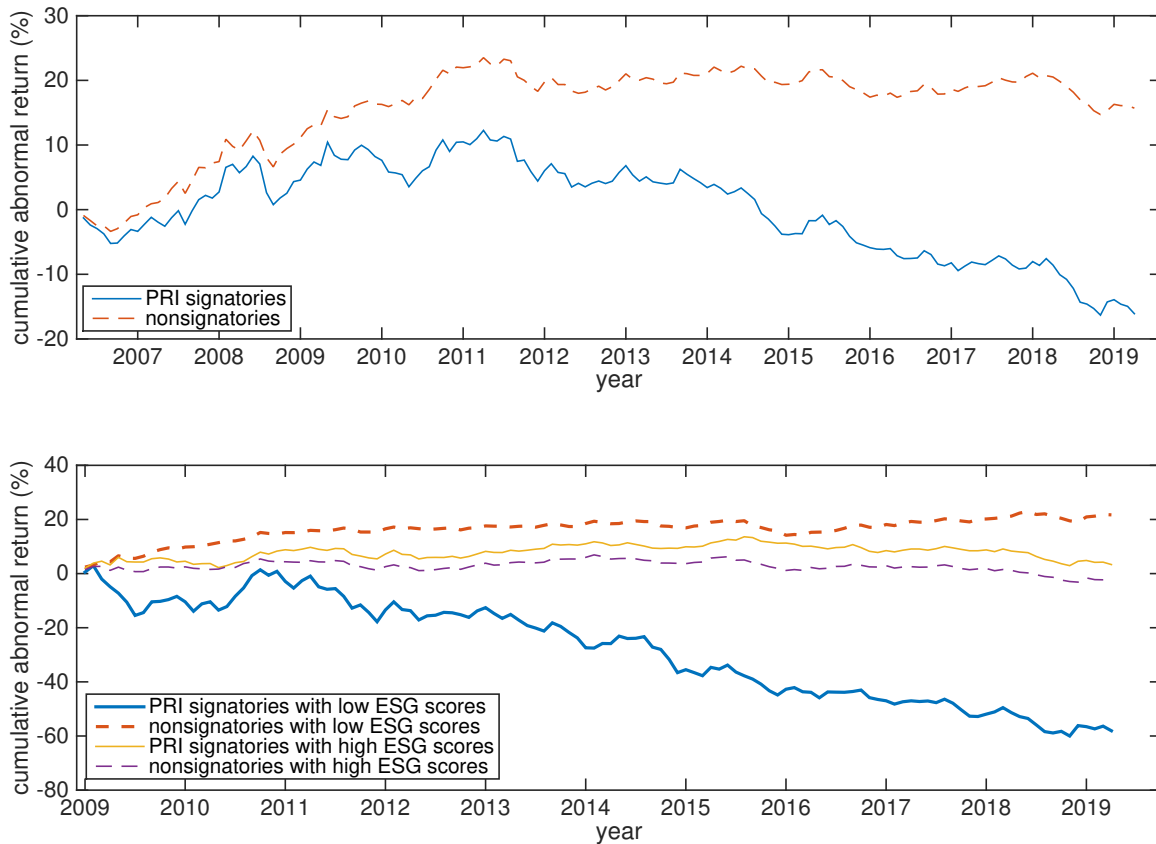


Figure 3: Cumulative abnormal returns of hedge funds sorted on PRI endorsement and firm ESG scores. Every month, hedge funds are sorted into two portfolios based on PRI endorsement (top graph) or sorted independently into 2 x 3 portfolios based on PRI endorsement and firm ESG scores (bottom graph). The solid lines denote portfolios of hedge funds managed by PRI signatories. The dashed lines denote portfolios of hedge funds managed by nonsignatories. In the bottom graph, the thick and thin lines denote portfolios of hedge funds managed by signatories or nonsignatories with bottom-tercile and top-tercile ESG scores, respectively. PRI denotes the Principles for Responsible Investment. Firm ESG scores are the value-weighted average of the Thomson Reuters ESG scores of the stocks held by hedge fund firms. Abnormal return is the difference between a portfolio's excess return and its factor loadings multiplied by the Fung and Hsieh (2004) risk factors, where factor loadings are estimated over the entire sample period. The sample periods are from May 2006 to April 2019 for the basic sort and from January 2009 to April 2019 for the double sort.

Table 1: **Summary statistics**

This table reports the number of hedge funds, the number of hedge fund firms or fund management companies, and the total hedge fund assets under management (AUM) for PRI signatory firms and nonsignatory firms at the end of each year. PRI denotes the Principles for Responsible Investment. The sample period is from May 2006 to April 2019.

Year	PRI signatory firms			nonsignatory firms		
	Number of fund management companies	Number of hedge funds	Total AUM (US\$m)	Number of fund management companies	Number of hedge funds	Total AUM (US\$m)
2006	16	90	\$26,232	2,783	4,971	\$943,176
2007	23	111	\$33,117	2,777	5,018	\$1,178,579
2008	34	154	\$41,729	2,679	4,643	\$774,208
2009	44	197	\$57,067	2,659	4,492	\$759,299
2010	55	216	\$60,115	2,570	4,364	\$861,206
2011	65	225	\$71,313	2,506	4,250	\$854,672
2012	77	270	\$148,418	2,406	3,996	\$832,033
2013	84	314	\$196,056	2,359	3,893	\$951,770
2014	93	330	\$226,707	2,241	3,733	\$974,013
2015	103	386	\$268,944	2,040	3,334	\$939,121
2016	119	418	\$269,917	1,906	3,111	\$883,879
2017	146	489	\$354,631	1,762	2,867	\$896,911
2018	171	498	\$316,275	1,531	2,430	\$774,724
2019 (April)	174	489	\$315,603	1,429	2,235	\$752,962

Table 2: Portfolio sorts on PRI endorsement

Every month, hedge funds are sorted into two portfolios based on whether they are managed by PRI signatory or nonsignatory firms. The post-formation returns of the two portfolios over the next month are linked across months to form a single return series for each portfolio. Portfolios A and B are equal-weighted portfolios of hedge funds managed by PRI signatory and nonsignatory firms, respectively. PRI denotes the Principles for Responsible Investment. Performance is estimated relative to the Fung and Hsieh (2004) factors, which are the S&P 500 return minus risk-free rate (SNPMRF), Russell 2000 return minus S&P 500 return (SCMLC), change in the constant maturity yield of the US ten-year Treasury bond appropriately adjusted for the duration of the ten-year bond (BDIORET), change in the spread of Moody's BAA bond over ten-year Treasury bond appropriately adjusted for duration (BAAMTSY), bond PTFS (PTFSBD), currency PTFS (PTFSFX), and commodities PTFS (PTFSCOM), where PTFS is primitive trend following strategy. In Panel A, we report results for hedge funds. In Panel B, we report results for hedge funds with assets under management (AUM) greater than US\$20 million. In Panel C, we report results for hedge fund firms. The *t*-statistics, derived from White (1980) standard errors, are in parentheses. The sample period is from May 2006 to April 2019. *, ** denote significance at the 5% and 1% levels, respectively.

Hedge fund portfolio	Excess return (percent/year)	Alpha (percent/year)	SNPMRF	SCMLC	BDIORET	BAAMTSY	PTFSBD	PTFSFX	PTFSCOM	Adj. R ²
Panel A: Hedge funds										
Portfolio A (PRI signatories)	2.54 (1.16)	-1.24 (-0.97)	0.35** (10.37)	-0.06 (-1.18)	-1.62** (-3.24)	-3.17** (-4.12)	-0.02** (-2.79)	0.01 (0.80)	-0.01 (-0.89)	0.70
Portfolio B (nonsignatories)	3.99* (2.27)	1.21 (1.26)	0.31** (12.79)	0.00 (0.01)	-0.62 (-1.51)	-2.16** (-3.52)	-0.01 (-1.60)	0.01 (1.45)	0.00 (-0.42)	0.75
Spread (A minus B)	-1.44* (-2.06)	-2.45** (-3.93)	0.04* (2.47)	-0.06* (-2.52)	-1.01** (-3.64)	-1.01** (-2.90)	-0.01** (-3.07)	0.00 (-0.36)	0.00 (-1.25)	0.31
Panel B: Hedge funds with AUM greater than US\$20 million										
Portfolio A (PRI signatories)	2.99 (1.39)	-0.65 (-0.50)	0.34** (9.73)	-0.06 (-1.27)	-1.49** (-2.97)	-3.16** (-4.09)	-0.02** (-2.67)	0.01 (0.76)	-0.01 (-0.88)	0.69
Portfolio B (nonsignatories)	4.21* (2.45)	1.59 (1.67)	0.29** (12.40)	-0.01 (-0.23)	-0.52 (-1.28)	-2.24** (-3.69)	-0.01 (-1.49)	0.01 (1.41)	0.00 (-0.56)	0.74
Spread (A minus B)	-1.22 (-1.72)	-2.24** (-3.52)	0.05* (2.61)	-0.05* (-2.30)	-0.98** (-3.57)	-0.92** (-2.71)	-0.01** (-2.92)	0.00 (-0.39)	0.00 (-0.99)	0.29
Panel C: Hedge fund firms										
Portfolio A (PRI signatories)	2.59 (1.23)	-1.19 (-0.88)	0.34** (8.95)	-0.07 (-1.37)	-1.73** (-3.29)	-2.72** (-3.65)	-0.02** (-2.96)	0.01 (0.96)	0.00 (-0.39)	0.64
Portfolio B (nonsignatories)	4.52* (2.60)	1.78 (1.95)	0.31** (13.58)	0.02 (0.57)	-0.49 (-1.25)	-2.03** (-3.41)	-0.01 (-1.64)	0.01 (1.55)	0.00 (-0.45)	0.77
Spread (A minus B)	-1.93* (-2.40)	-2.97** (-3.78)	0.03 (1.36)	-0.09** (-3.26)	-1.24** (-3.62)	-0.69 (-1.77)	-0.02** (-2.99)	0.00 (0.07)	0.00 (-0.14)	0.19

Table 3: Portfolio sorts on PRI endorsement and ESG scores

Every month, hedge funds are sorted independently into 2 x 3 portfolios based on PRI endorsement and hedge fund firm ESG scores. Portfolios 1A and 1B are the equal-weighted portfolios of hedge funds managed by signatory and nonsignatory firms, respectively, with bottom-tercile ESG scores. Portfolios 2A and 2B are the analogous portfolios with top-tercile ESG scores. The middle-tercile ESG portfolios are omitted for brevity. PRI denotes the Principles for Responsible Investment. Firm ESG scores are the value-weighted average of the Thomson Reuters ESG scores of the stocks held by hedge fund firms. Performance is estimated relative to the Fung and Hsieh (2004) factors, which are the S&P 500 return minus risk-free rate (SNPMRF), Russell 2000 return minus S&P 500 return (SCMLC), change in the constant maturity yield of the US ten-year Treasury bond appropriately adjusted for the duration of the ten-year bond (BD10RET), change in the spread of Moody's BAA bond over ten-year Treasury bond appropriately adjusted for duration (BAAMTSY), bond PTFS (PTFSFX), currency PTFS (PTFSBD), and commodities PTFS (PTFSCOM), where PTFS is primitive trend following strategy. In Panel , we report results from a coarser independent 2 x 2 sort on PRI endorsement and firm ESG scores, where firms are assigned to low and high ESG groups based on whether their ESG scores lie below or above the median ESG score. The *t*-statistics, derived from White (1980) standard errors, are in parentheses. The sample period is from January 2009 to April 2019. *, ** denote significance at the 5% and 1% levels, respectively.

Hedge fund portfolio	Excess return (percent/year)	Alpha (percent/year)	SNPMRF	SCMLC	BD10RET	BAAMTSY	PTFSBD	PTFSFX	PTFSCOM	Adj. R ²
Panel A: Independent 2 x 3 sort on PRI endorsement and firm ESG scores										
Portfolio 1A (PRI signatories with low ESG)	3.88 (1.09)	-5.62* (-2.29)	0.44** (6.61)	0.02 (0.29)	-0.55 (-0.46)	-2.91 (-1.83)	-0.06** (-3.56)	0.01 (0.92)	-0.02 (-1.47)	0.55
Portfolio 1B (nonsignatories with low ESG)	8.47** (3.72)	2.10* (2.57)	0.36** (13.50)	0.18** (5.34)	-0.05 (-0.13)	-3.04** (-4.75)	0.00 (-0.42)	0.00 (1.02)	-0.01** (-2.75)	0.88
Portfolio 2A (PRI signatories with high ESG)	5.67** (3.15)	0.32 (0.30)	0.27** (8.15)	-0.04 (-0.95)	-0.58 (-1.16)	-3.22** (-3.80)	-0.01* (-2.05)	0.01 (1.41)	-0.01* (-2.37)	0.72
Portfolio 2B (nonsignatories with high ESG)	5.96** (3.03)	-0.22 (-0.28)	0.35** (15.55)	0.05 (1.65)	-0.44 (-1.24)	-2.50** (-4.88)	-0.01* (-2.08)	0.01 (1.55)	-0.01* (-2.09)	0.86
Spread (1A minus 1B)	-4.59 (-1.85)	-7.72** (-3.18)	0.08 (1.16)	-0.15 (-1.87)	-0.50 (-0.44)	0.13 (0.07)	-0.06** (-3.43)	0.01 (0.59)	-0.01 (-0.43)	0.12
Spread (2A minus 2B)	-0.29 (-0.39)	0.54 (0.74)	-0.08** (-4.01)	-0.08** (-3.52)	-0.14 (-0.45)	-0.72 (-1.55)	0.00 (-0.20)	0.00 (0.54)	0.00 (-0.86)	0.29
Spread (1A minus 2A)	-1.79 (-0.77)	-5.94** (-3.00)	0.17** (3.04)	0.06 (0.80)	0.03 (0.03)	0.31 (0.18)	-0.05** (-3.38)	0.00 (0.37)	-0.01 (-0.68)	0.26
Panel : Independent 2 x 2 sort on PRI endorsement and firm ESG scores										
Portfolio 1A (PRI signatories with low ESG)	4.83 (1.46)	-4.12 (-1.88)	0.44** (6.82)	0.04 (0.52)	-0.35 (-0.32)	-2.58 (-1.70)	-0.05** (-3.26)	0.01 (0.70)	-0.01 (-1.18)	0.55
Portfolio 1B (nonsignatories with low ESG)	8.01** (3.68)	1.90* (2.34)	0.35** (12.63)	0.15** (4.64)	0.02 (0.04)	-2.88** (-4.54)	0.00 (-0.19)	0.00 (1.23)	-0.01** (-2.67)	0.88
Portfolio 2A (PRI signatories with high ESG)	5.87** (2.98)	-0.07 (-0.06)	0.31** (9.31)	-0.02 (-0.48)	-0.71 (-1.45)	-3.31** (-3.34)	-0.01 (-1.95)	0.01 (1.45)	-0.01* (-2.45)	0.72
Portfolio 2B (nonsignatories with high ESG)	6.17** (3.23)	0.20 (0.27)	0.34** (15.12)	0.05 (1.91)	-0.36 (-1.01)	-2.34** (-4.56)	-0.01* (-2.05)	0.01 (1.67)	-0.01* (-2.57)	0.86
Spread (1A minus 1B)	-3.18 (-1.43)	-6.02** (-2.76)	0.08 (1.22)	-0.11 (-1.54)	-0.37 (-0.34)	0.30 (0.18)	-0.05** (-3.22)	0.00 (0.28)	0.00 (-0.19)	0.12
Spread (2A minus 2B)	-0.30 (-0.49)	-0.27 (-0.42)	-0.03 (-1.49)	-0.07** (-3.09)	-0.35 (-1.26)	-0.97 (-1.63)	0.00 (-0.61)	0.00 (0.74)	0.00 (-0.84)	0.29
Spread (1A minus 2A)	-1.04 (-0.51)	-4.05* (-2.41)	0.12* (2.20)	0.06 (0.84)	0.36 (0.37)	0.73 (0.41)	-0.04** (-3.00)	0.00 (0.00)	0.00 (-0.16)	0.26

Table 4: Portfolio sorts on PRI endorsement and alternative ESG scores

Every month, hedge funds are sorted independently into 2 x 3 portfolios based on PRI endorsement and firm ESG scores. Portfolios 1A and 1B are the equal-weighted portfolios of hedge funds managed by PRI signatory and nonsignatory firms, respectively, with bottom-tercile ESG scores. Portfolios 2A and 2B are the analogous portfolios with top-tercile ESG scores. PRI denotes the Principles for Responsible Investment. Firm ESG scores are the value-weighted average of the ESG scores of the stocks held by hedge fund firms. Stock ESG scores are obtained from Thomson Reuters, MSCI, and Sustainalytics. E&S and CG scores refer to the environmental and social as well as corporate governance components, respectively, of the Thomson Reuters ESG score. Performance is estimated relative to the Fung and Hsieh (2004) factors, which are the S&P 500 return minus risk-free rate (SNPMRF), Russell 2000 return minus S&P 500 return (SCMLC), change in the constant maturity yield of the US ten-year Treasury bond appropriately adjusted for the duration of the ten-year bond (BD10RET), change in the spread of Moody's BAA bond over ten-year Treasury bond appropriately adjusted for duration (BAAMTSY), bond PTFS (PTFSBD), currency PTFS (PTFSFX), and commodities PTFS (PTFSCOM), where PTFS is primitive trend following strategy. The *t*-statistics, derived from White (1980) standard errors, are in parentheses. The sample period is from January 2009 to April 2019. *, ** denote significance at the 5% and 1% levels, respectively.

Hedge fund portfolio	Thomson Reuters (E&S score)			Thomson Reuters (CG score)			MSCI			Sustainalytics		
	Excess return (percent/year) (1)	Alpha (percent/year) (2)	Excess return (percent/year) (3)	Excess return (percent/year) (4)	Alpha (percent/year) (5)	Excess return (percent/year) (6)	Excess return (percent/year) (7)	Alpha (percent/year) (8)	Excess return (percent/year) (9)	Alpha (percent/year) (10)	Excess return (percent/year) (11)	Alpha (percent/year) (12)
Portfolio 1A (PRI signatories with low ESG)	4.03 (1.14)	-5.38* (-2.18)	5.07 (1.40)	-4.38 (-1.82)	3.92 (0.81)	-5.33 (-1.64)	-0.20 (-0.06)	-6.62* (-2.48)				
Portfolio 1B (nonsignatories with low ESG)	8.46** (3.68)	2.06* (2.53)	6.96** (3.21)	1.05 (1.47)	8.77** (2.97)	2.18* (2.02)	5.12* (2.38)	0.57 (0.84)				
Portfolio 2A (PRI signatories with high ESG)	5.38** (3.11)	0.26 (0.25)	4.80** (2.80)	-0.31 (-0.33)	7.85** (2.76)	1.32 (0.93)	3.27 (1.90)	-0.81 (-0.79)				
Portfolio 2B (nonsignatories with high ESG)	6.08** (3.07)	-0.16 (-0.19)	5.24** (2.72)	-0.38 (-0.53)	7.49** (2.98)	1.41 (1.44)	3.97 (1.87)	-1.28 (-1.65)				
Spread (1A minus 1B)	-4.43 (-1.78)	-7.44** (-3.04)	-1.89 (-0.80)	-5.43* (-2.28)	-4.85 (-1.55)	-7.51* (-2.57)	-5.32* (-2.15)	-7.20** (-2.81)				
Spread (2A minus 2B)	-0.71 (-1.01)	0.41 (0.70)	-0.44 (-0.58)	0.06 (0.08)	0.36 (0.38)	-0.09 (-0.11)	-0.70 (-0.80)	0.47 (0.55)				
Spread (1A minus 2A)	-1.34 (-0.56)	-5.63** (-2.74)	0.27 (0.12)	-4.07* (-2.13)	-3.92 (-1.21)	-6.66* (-2.60)	-3.47 (-1.49)	-5.81* (-2.60)				

Table 5: Regressions on hedge fund performance

This table reports results from OLS and Fama and MacBeth (1973) multivariate regressions on hedge fund performance. The dependent variables are hedge fund return (*RETURN*) and alpha (*ALPHA*). *RETURN* is hedge fund monthly net of fee return. *ALPHA* is Fung and Hsieh (2004) seven-factor monthly alpha where factor loadings are estimated over the last 24 months. The primary independent variables of interest are the PRI dummy (*PRI*) and the low ESG dummy (*ESG_LOW*). The PRI dummy (*PRI*) takes a value of one if the hedge fund is managed by a PRI signatory firm. The low ESG dummy (*ESG_LOW*) takes a value of one if the hedge fund is managed by a firm with an ESG score in the bottom tercile. To facilitate comparison with top-tercile ESG score firms, the regressions that feature *ESG_LOW* exclude hedge funds managed by firms with middle-tercile ESG scores. Firm ESG scores are the value-weighted average of the ESG scores of the stocks held by hedge fund firms. Stock ESG scores are obtained from Thomson Reuters. The other independent variables are hedge fund management fee (*MGT_FEE*), performance fee (*PER_FEE*), redemption notice period in months (*NOTICE*), minimum investment in millions of US dollars (*MININV*), the natural logarithm of fund size ($\log(\text{SIZE})$) where *SIZE* is in millions of US dollars, fund age in decades (*AGE*) as well as dummy variables for year and fund investment strategy. The *t*-statistics are in parentheses. For the OLS regressions, they are derived from robust standard errors that are clustered by fund and month. For the Fama and MacBeth regressions, they are derived from Newey and West (1987) standard errors with a three-month lag. The sample period is from May 2006 to April 2019. *, ** denote significance at the 5% and 1% levels, respectively.

Independent variable	OLS regressions										Fama and MacBeth (1973) regressions										
	<i>RETURN</i>					<i>ALPHA</i>					<i>RETURN</i>					<i>ALPHA</i>					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	
<i>PRI</i>	-0.130** (-6.71)	-0.057** (-2.80)	0.019 (0.58)	-0.188** (-9.31)	-0.138** (-6.45)	-0.036 (-1.09)	-0.133* (-2.25)	-0.071 (-1.64)	0.027 (0.60)	-0.167** (-2.92)	-0.135** (-2.95)	-0.001 (-0.02)									
<i>ESG_LOW</i>			0.147** (6.13)		0.114** (4.80)				0.150* (2.56)			0.114** (3.46)									
<i>PRI*ESG_LOW</i>			-0.201** (-2.74)		-0.197** (-2.67)				-0.225 (-1.13)			-0.324 (-1.96)									
<i>MGT_FEE</i> (percent)		0.006 (0.52)	0.029 (1.11)		-0.000 (-0.01)	0.007 (0.29)		-0.004 (-0.12)	0.007 (0.25)		-0.012 (-0.42)	0.000 (0.00)									
<i>PER_FEE</i> (percent)		0.001 (0.51)	-0.010** (-5.34)		0.008** (7.55)	0.006** (3.56)		0.000 (0.08)	-0.010 (-1.97)		0.008* (2.54)	0.005 (1.90)									
<i>NOTICE</i> (months)		0.042** (10.34)	0.049** (6.10)		0.041** (9.43)	0.054** (6.08)		0.046** (3.77)	0.055** (5.09)		0.041** (2.92)	0.057** (3.81)									
<i>MININV</i> (US\$m)		0.004** (5.54)	0.006** (3.21)		0.008** (9.44)	0.008** (4.34)		0.005 (1.49)	0.005 (1.87)		0.009** (3.15)	0.007** (2.85)									
$\log(\text{SIZE})$		-0.041** (-10.54)	-0.028** (-4.20)		0.004 (1.07)	0.011 (1.66)		-0.032** (-2.89)	-0.015 (-1.15)		0.010 (1.02)	0.015 (1.48)									
<i>AGE</i> (decades)		-0.113** (-9.44)	0.012 (0.68)		-0.031* (-2.38)	-0.039* (-2.17)		-0.122** (-4.05)	-0.003 (-0.08)		-0.034 (-1.54)	-0.045 (-1.77)									
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Strategy dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.030	0.031	0.042	0.007	0.007	0.006	0.060	0.073	0.067	0.027	0.037	0.034									
Number of observations	661,764	597,523	111,129	489,535	457,103	96,313	156	156	124	156	156	124	156	156	156	156	156	156	156	156	124

Table 6: **Sorts on PRI endorsement, ESG scores, and fund incentive alignment**

This table reports double sorts on PRI endorsement and fund incentive alignment as well as triple sorts on PRI endorsement, ESG scores, and fund incentive alignment. First, hedge funds are sorted into two groups based on fund manager total delta (Agarwal, Daniel, and Naik, 2009) computed over the previous year (Panel A), on the ratio of fund management fee to performance fee (Panel B) and on their Ozik and Sadka (2015) governance scores (Panel C). Weak incentive alignment funds are funds with low manager total delta, high management fee to performance fee, or governance scores that are ≤ 2 out of 5. Strong incentive alignment funds are funds with high manager total delta, low management fee to performance fee, or governance scores that are ≥ 3 out of 5. Within each incentive alignment group, hedge funds are sorted every month into 2 portfolios based on PRI endorsement (Columns 1 and 4) or into 2 x 3 portfolios based on PRI endorsement and firm ESG scores (Columns 2, 3, 5, and 6). PRI denotes the Principles for Responsible Investment. Firm ESG scores are the value-weighted average of the Thomson Reuters ESG scores of the stocks held by hedge fund firms. Low ESG denotes firms with bottom-tercile ESG scores. High ESG denotes firms with top-tercile ESG scores. Performance is estimated relative to the Fung and Hsieh (2004) model. The t -statistics, derived from White (1980) standard errors, are in parentheses. The sample period is from May 2006 to April 2019. *, ** denote significance at the 5% and 1% levels, respectively.

Hedge fund portfolio	Alpha (percent/year)					
	Strong incentive alignment			Weak incentive alignment		
	All funds	Low ESG	High ESG	All funds	Low ESG	High ESG
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Sort on fund manager total delta (Agarwal, Daniel, and Naik, 2009)						
Portfolio A (PRI signatories)	-0.40 (-0.32)	-3.30 (-1.52)	-0.70 (-0.67)	-2.01 (-1.41)	-6.65* (-2.20)	-0.28 (-0.24)
Portfolio B (nonsignatories)	0.56 (0.61)	1.39 (1.84)	-0.62 (-0.83)	1.11 (1.06)	0.30 (0.36)	-0.86 (-1.09)
Spread (A minus B)	-0.96 (-1.42)	-4.69* (-2.15)	-0.08 (-0.12)	-3.12** (-4.19)	-6.95* (-2.34)	0.58 (0.51)
Panel B: Sort on the ratio of fund management fee to performance fee						
Portfolio A (PRI signatories)	-0.36 (-0.29)	-4.43* (-2.04)	-0.35 (-0.37)	-2.37 (-1.53)	-8.56* (-2.31)	-0.80 (-0.77)
Portfolio B (nonsignatories)	1.13 (1.30)	1.55* (2.46)	-0.72 (-0.97)	1.53 (1.44)	1.25 (1.29)	-1.03 (-1.24)
Spread (A minus B)	-1.49* (-2.33)	-5.97** (-2.80)	0.36 (0.52)	-3.90** (-4.52)	-9.81** (-2.65)	0.23 (0.32)
Panel C: Sort on fund governance score (Ozik and Sadka, 2015)						
Portfolio A (PRI signatories)	0.17 (0.15)	-3.11 (-1.60)	0.18 (0.19)	-3.40* (-2.10)	-8.96** (-2.80)	-2.94* (-2.31)
Portfolio B (nonsignatories)	2.20** (2.63)	2.03** (2.73)	-0.36 (-0.58)	1.15 (1.08)	0.32 (0.43)	-1.05 (-1.09)
Spread (A minus B)	-2.04** (-3.56)	-5.14* (-2.62)	0.54 (0.73)	-4.55** (-4.67)	-9.28** (-2.99)	-1.90 (-1.98)

Table 7: **Regressions on hedge fund flow**

This table reports results from OLS multivariate regressions on hedge fund flow and hedge fund firm flow. For the fund level regressions, the dependent variable is hedge fund annual flow (*FLOW*). The primary independent variable of interest is the PRI dummy (*PRI*) which takes a value of one if the hedge fund is managed by a PRI signatory firm. The other independent variables are hedge fund past 12-month return rank (*RANK*), past 12-month CAPM alpha rank (*RANK_CAPM*), past 12-month Fung and Hsieh (2004) alpha rank (*RANK_FH*), management fee (*MGTFFEE*), performance fee (*PERFFEE*), redemption notice period in months (*NOTICE*), minimum investment in millions of US dollars (*MININV*), the natural logarithm of fund size ($\log(\textit{SIZE})$) where *SIZE* is in millions of US dollars, fund age in decades (*AGE*), standard deviation of fund returns over the past 12 months (*RETSTD*), as well as dummy variables for year and fund investment strategy. The firm level regressions feature the analogous firm level variables and do not include strategy fixed effects. The dependent variable in the firm level regressions is hedge fund firm annual flow (*FIRM_FLOW*). The *t*-statistics in parentheses are derived from robust standard errors that are clustered by fund and year for the fund level regressions or by firm and year for the firm level regressions. The sample period is from May 2006 to April 2019. *, ** denote significance at the 5% and 1% levels, respectively.

Independent variable	Dependent variable					
	<i>FLOW</i>			<i>FIRM_FLOW</i>		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>PRI</i>	0.125** (4.91)	0.092** (3.68)	0.095** (3.82)	0.233** (5.22)	0.155** (3.77)	0.159** (3.85)
<i>RANK</i>	0.489** (29.08)			0.482** (22.17)		
<i>RANK_CAPM</i>		0.384** (23.49)			0.406** (20.29)	
<i>RANK_FH</i>			0.323** (19.93)			0.332** (16.62)
<i>MGTFFEE</i> (percent)	-0.025* (-2.52)	-0.031** (-3.31)	-0.030** (-3.21)	0.009 (0.65)	-0.018 (-1.60)	-0.017 (-1.46)
<i>PERFFEE</i> (percent)	-0.004** (-4.20)	-0.004** (-4.42)	-0.004** (-4.35)	-0.004** (-3.45)	-0.005** (-4.03)	-0.005** (-3.96)
<i>NOTICE</i> (months)	-0.005 (-1.56)	-0.005 (-1.76)	-0.005 (-1.58)	-0.017** (-4.59)	-0.015** (-4.60)	-0.014** (-4.35)
<i>MININV</i> (US\$m)	0.007** (4.53)	0.008** (4.13)	0.008** (4.13)	0.009** (5.18)	0.006** (3.14)	0.006** (3.17)
$\log(\textit{SIZE})$	-0.083** (-20.72)	-0.058** (-13.88)	-0.057** (-13.58)	-0.074** (-14.34)	-0.050** (-9.94)	-0.048** (-9.64)
<i>AGE</i> (decades)	-0.157** (-18.02)	-0.073** (-8.45)	-0.080** (-9.22)	-0.124** (-11.97)	-0.072** (-7.19)	-0.080** (-7.97)
<i>RETSTD</i>	-2.756** (-11.84)	-1.222** (-5.61)	-1.341** (-6.14)	-2.560** (-7.88)	-1.030** (-3.32)	-1.161** (-3.73)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Strategy dummies	Yes	Yes	Yes	No	No	No
Adj. R ²	0.062	0.046	0.041	0.062	0.049	0.041
Number of observations	35,720	26,549	26,549	21,677	17,455	17,455

Table 8: **Event study with difference-in-differences analysis**

This table reports results from an event study analysis of hedge fund and firm attributes around a firm's PRI endorsement date. PRI denotes the Principles for Responsible Investment. Event month is the month that the firm endorses the PRI. The period 'before' is the 36-month period before the event month and the period 'after' is the 36-month period after the event month. To be included in the analysis, a hedge fund or a hedge fund firm must survive at least 36 months before and after the event month. Funds and firms in the control group are matched to funds and firms in the treatment group based on fund assets under management (AUM), fund fee revenue, firm AUM, firm fee revenue, the number of funds launched since inception by the firm, or firm ESG scores in the 36-month pre-event period. For example, in the fund AUM analysis, funds in the control group are matched to funds in the treatment group by minimizing the sum of the absolute differences in monthly fund AUM in the 36-month pre-event period. Firm ESG score is the value-weighted average of the Thomson Reuters ESG scores of the stocks held by the hedge fund firm. Panel A reports results at hedge fund level and Panel B reports results at the hedge fund firm or fund management company level. The sample period is from May 2006 to April 2019. *, ** denote significance at the 5% and 1% levels, respectively.

Attribute	Before	After	After – Before
Panel A: Hedge fund attributes			
Fund AUM (US\$m), treatment group	474.06	561.89	87.83** (9.14)
Fund AUM (US\$m), control group	468.93	533.17	64.24** (7.38)
Difference in AUM (US\$m)	5.13 (0.41)	28.72** (7.53)	23.59** (11.59)
Fund fee revenue (US\$m/month), treatment group	0.57	0.70	0.13** (9.64)
Fund fee revenue (US\$m/month), control group	0.58	0.62	0.05** (3.13)
Difference in fee revenue (US\$m/month)	-0.00 (-0.25)	0.08** (5.67)	0.08** (7.23)
Panel B: Hedge fund firm attributes			
Firm AUM (US\$m), treatment group	1361.82	1860.17	498.35** (14.57)
Firm AUM (US\$m), control group	1341.52	1756.76	415.23** (15.91)
Difference in AUM (US\$m)	20.30 (0.65)	103.41** (3.46)	83.12** (6.32)
Firm fee revenue (US\$m/month), treatment group	1.41	2.03	0.62** (16.73)
Firm fee revenue (US\$m/month), control group	1.38	1.66	0.28** (8.94)
Difference in fee revenue (US\$m/month)	0.03 (0.65)	0.37** (17.24)	0.34** (14.43)
Firm number of funds launched, treatment group	5.16	6.22	1.06** (14.46)
Firm number of funds launched, control group	5.16	5.87	0.70** (13.17)
Difference in the number of funds launched	-0.01 (-0.10)	0.35** (7.63)	0.36** (12.26)
Firm ESG score, treatment group	75.19	72.05	-3.14** (-6.60)
Firm ESG score, control group	74.59	73.79	-0.80** (-3.91)
Difference in ESG scores	0.60* (2.22)	-1.74** (-3.95)	-2.35** (-4.92)

Table 9: Regressions on hedge fund performance with exogenous shocks

This table reports results from OLS multivariate regressions on hedge fund performance with exogenous shock variables. The dependent variables are hedge fund return (*RETURN*) and alpha (*ALPHA*). *RETURN* is hedge fund monthly net of fee return. *ALPHA* is Fung and Hsieh (2004) seven-factor monthly alpha where factor loadings are estimated over the last 24 months. The primary independent variables of interest are the PRI dummy (*PRI*) and the interaction of *PRI* with the exogenous shocks. *PRI* takes a value of one if the hedge fund is managed by a PRI signatory firm. The exogenous shock dummy variables include *DEEPWATER*, *TRUMP*, *HIGHTEMP*, and *EXTREMETEMP*. *DEEPWATER* takes a value of one during the three months that follow the BP Deepwater Horizon oil spill, i.e., April 2010 to June 2010. *TRUMP* takes a value of one during the three months that follow President Donald Trump's withdrawal from the 2015 Paris Agreement on climate change mitigation, i.e., June 2017 to August 2017. *HIGHTEMP* takes a value of one during months when the abnormal temperature at the fund management company city is in the top quintile. *EXTREMETEMP* takes a value of one during months when the abnormal temperature at the fund management company city is in the top or bottom quintile. Abnormal temperature is as per defined in Choi, Gao, and Jiang (2020). The other independent variables include management fee (*MGTTEE*), performance fee (*PERFTEE*), redemption notice period in months (*NOTICE*), minimum investment in millions of US dollars (*MININV*), the natural logarithm of fund size ($\log(\text{SIZE})$) where *SIZE* is in millions of US dollars, fund age in decades (*AGE*) as well as dummy variables for year and fund investment strategy. The coefficient estimates on these fund control variables are omitted for brevity. The *t*-statistics in parentheses are derived from robust standard errors that are clustered by fund and month. The sample period is from May 2006 to April 2019. Due to data availability, for the regressions with local temperature stocks, the sample period ends in December 2017. *, ** denote significance at the 5% and 1% levels, respectively.

Independent variable	Regressions with global shocks				Regressions with local temperature shocks			
	<i>RETURN</i> (1)	<i>RETURN</i> (2)	<i>ALPHA</i> (3)	<i>ALPHA</i> (4)	<i>RETURN</i> (5)	<i>RETURN</i> (6)	<i>ALPHA</i> (7)	<i>ALPHA</i> (8)
<i>PRI</i>	-0.048* (-2.38)	-0.063** (-3.05)	-0.133** (-6.19)	-0.150** (-6.84)	-0.003 (-0.12)	0.092** (3.12)	-0.128** (-4.66)	-0.074* (-2.38)
<i>DEEPWATER</i>	-2.696** (-52.05)		-0.227** (-4.08)					
<i>PRI*DEEPWATER</i>	-0.616** (-3.38)		-0.382* (-1.98)					
<i>TRUMP</i>		-0.033 (-0.63)		0.082* (2.02)				
<i>PRI*TRUMP</i>		0.216** (2.68)		0.359** (4.27)				
<i>HIGHTEMP</i>					0.476** (30.07)		0.063** (3.78)	
<i>PRI*HIGHTEMP</i>					-0.138** (-2.87)		-0.136** (-2.58)	
<i>EXTREMETEMP</i>						0.339** (24.40)		0.017 (1.11)
<i>PRI*EXTREMETEMP</i>						-0.320** (-7.21)		-0.196** (-4.21)
Fund controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Strategy dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.036	0.031	0.007	0.007	0.037	0.036	0.007	0.007
Number of observations	597,523	597,523	457,103	457,103	506,349	506,349	384,987	384,987

Table 10: **Multivariate probit regressions on fund disciplinary disclosure and performance flags**

This table reports results from multivariate probit regressions on the probability that hedge fund firms report violations on their Form ADVs or trigger performance flags. The dependent variables include the indicator variables *VIOLATION*, *REGULATORY*, *INVESTMENT*, and *SEVERE* that capture Form ADV violations each year, as well as *KINK*, *%NEGATIVE*, *MAXRSQ*, and *%REPEAT* that capture performance flags. *VIOLATION* takes a value of one if a firm reports any violation. *REGULATORY* takes a value of one if a firm reports a regulatory violation. *INVESTMENT* takes a value of one if a firm reports an investment related violation. *SEVERE* takes a value of one if a firm reports a severe violation. *KINK* takes a value of one when any of the funds managed by a firm exhibits a discontinuity at zero in its return distribution. *%NEGATIVE* takes a value of one when any of the funds managed by a firm reports a low number of negative returns. *MAXRSQ* takes a value of one when any of the funds managed by a firm features an adjusted R^2 that is not significantly different from zero. *%REPEAT* takes a value of one when any of the funds managed by a firm reports a high number of repeated returns. The performance flag variables *KINK*, *%NEGATIVE*, *MAXRSQ*, and *%REPEAT* are estimated over each non-overlapping 24-month period post firm inception. The primary independent variable of interest is the interaction of the PRI dummy (*PRI*) with the low ESG dummy (*ESG_LOW*). The PRI dummy (*PRI*) takes a value of one for PRI signatory firms. The low ESG dummy (*ESG_LOW*) takes a value of one for bottom-tercile ESG score firms. To facilitate comparison with top-tercile ESG score firms, the regressions that feature *ESG_LOW* exclude firms with middle-tercile ESG scores. Firm ESG scores are the value-weighted average of the ESG scores of the stocks held by hedge fund firms. Stock ESG scores are obtained from Thomson Reuters. The other independent variables are hedge fund firm management fee (*MGTFFEE*), performance fee (*PERFFEE*), redemption notice period in months (*NOTICE*), minimum investment in millions of US dollars (*MININV*), the natural logarithm of firm size ($\log(\text{SIZE})$) where *SIZE* is in millions of US dollars, firm age in decades (*AGE*) as well as dummy variables for year and firm investment strategy. The *t*-statistics, in parentheses, are derived from robust standard errors that are clustered by firm and year. The marginal effects, displayed only for the interaction term, are in brackets. The sample period is from January 2009 to April 2019. *, ** denote significance at the 5% and 1% levels, respectively.

Independent variable	Form ADV violations			Bollen and Pool (2009; 2012) performance flags				
	<i>VIOLATION</i> (1)	<i>REGULATORY</i> (2)	<i>INVESTMENT</i> (3)	<i>SEVERE</i> (4)	<i>KINK</i> (5)	<i>%NEGATIVE</i> (6)	<i>MAXRSQ</i> (7)	<i>%REPEAT</i> (8)
<i>PRI</i>	-0.205 (-0.97)	-0.326 (-1.34)	-0.211 (-0.84)	-0.676 (-1.94)	-0.275 (-1.35)	-1.140* (-2.42)	0.069 (0.33)	-0.254 (-1.27)
<i>ESG_LOW</i>	-0.629** (-5.02)	-0.724** (-5.28)	-0.565** (-4.17)	-0.658** (-4.10)	0.012 (0.13)	-0.258 (-1.81)	-0.145 (-1.48)	-0.134 (-1.38)
<i>PRI*ESG_LOW</i>	1.146* (2.58)	1.463** (3.16)	1.354** (2.81)	1.440* (2.34)	1.310* (2.56)	2.169** (3.14)	1.218* (2.08)	0.963 (1.96)
<i>MGTFFEE</i> (percent)	[0.087]	[0.098]	[0.090]	[0.071]	[0.485]	[0.269]	[0.439]	[0.364]
<i>PERFFEE</i> (percent)	0.203 (1.71)	0.188 (1.52)	0.136 (1.04)	0.232 (1.63)	-0.179 (-1.53)	0.290 (1.83)	0.013 (0.12)	0.014 (0.13)
<i>NOTICE</i> (months)	-0.002 (-0.17)	-0.005 (-0.54)	-0.012 (-1.21)	-0.010 (-0.93)	0.004 (0.52)	-0.009 (-0.63)	0.029** (3.48)	-0.003 (-0.43)
<i>MININV</i> (US\$m)	0.006 (0.14)	0.040 (0.84)	0.068 (1.36)	-0.010 (-0.16)	-0.065 (-1.63)	-0.019 (-0.30)	-0.055 (-1.38)	-0.008 (-0.20)
$\log(\text{SIZE})$	0.008 (0.63)	0.008 (0.64)	0.009 (0.68)	0.025* (2.26)	0.002 (0.16)	-0.001 (-0.06)	0.020 (1.73)	-0.011 (-1.02)
<i>AGE</i> (decades)	0.179** (5.26)	0.171** (4.72)	0.161** (4.28)	0.178** (4.08)	0.191** (6.26)	0.109* (2.56)	0.198** (6.53)	0.171** (5.69)
Year dummies	-0.281** (-3.03)	-0.169 (-1.86)	-0.221* (-2.24)	-0.554** (-4.22)	0.111 (1.32)	0.054 (0.47)	-0.260** (-3.04)	0.042 (0.50)
Strategy dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R ²	0.019	0.095	0.105	0.014	0.063	0.121	0.090	0.045
Number of observations	2,252	2,252	2,029	2,029	824	824	824	824

Table 11: **Robustness tests**

Hedge funds are sorted every month into 2 portfolios based on PRI endorsement (Columns 1 and 4) or into 2 x 3 portfolios based on PRI endorsement and hedge fund firm ESG scores (Columns 2, 3, 5, and 6). PRI denotes the Principles for Responsible Investment. Firm ESG scores are the value-weighted average of the Thomson Reuters ESG scores of the stocks held by hedge fund firms. Low ESG denotes firms with bottom-tercile ESG scores. High ESG denotes firms with top-tercile ESG scores. Performance is estimated relative to the Fung and Hsieh (2004) model. FH denotes Fung and Hsieh (2004). The *t*-statistics, derived from White (1980) standard errors, are in parentheses. The sample period is from May 2006 to April 2019. *, ** denote significance at the 5% and 1% levels, respectively.

Hedge fund portfolio	Alpha (percent/year)			Hedge fund portfolio	Alpha (percent/year)		
	All funds (1)	Low ESG (2)	High ESG (3)		All funds (4)	Low ESG (5)	High ESG (6)
Panel A: Adjusted for backfill bias				Panel H: Adjusted for dynamic risk exposures using rolling betas			
PRI signatories	-1.55 (-1.22)	-5.69* (-2.22)	-0.17 (-0.16)	PRI signatories	-2.45 (-1.45)	-6.77** (-2.63)	-1.09 (-1.01)
nonsignatories	-0.15 (-0.15)	1.80* (2.26)	-1.13 (-1.36)	nonsignatories	0.39 (0.31)	0.73 (0.71)	-1.47 (-1.54)
Spread (PRI minus non-PRI)	-1.41* (-2.13)	-7.49** (-2.95)	0.96 (1.29)	Spread (PRI minus non-PRI)	-2.85** (-3.57)	-7.50** (-3.16)	0.38 (0.64)
Panel B: Adjusted for incubation bias				Panel I: Small investment firms			
PRI signatories	-1.31 (-0.97)	-6.78* (-2.55)	-0.57 (-0.53)	PRI signatories	-1.79 (-1.18)	-4.60 (-1.62)	-1.80 (-0.90)
nonsignatories	0.52 (0.55)	1.29 (1.71)	-0.95 (-1.34)	nonsignatories	1.81 (1.87)	3.60** (2.74)	-0.99 (-0.82)
Spread (PRI minus non-PRI)	-1.83** (-2.68)	-8.07** (-3.07)	0.39 (0.49)	Spread (PRI minus non-PRI)	-3.59** (-3.60)	-8.19* (-2.40)	-0.81 (-0.48)
Panel C: Adjusted for serial correlation				Panel J: Large investment firms			
PRI signatories	-1.24 (-0.94)	-5.62* (-2.24)	0.32 (0.27)	PRI signatories	-1.15 (-0.91)	-6.06* (-2.30)	-0.62 (-0.63)
nonsignatories	1.21 (1.19)	2.10* (2.21)	-0.22 (-0.25)	nonsignatories	0.41 (0.42)	1.10 (1.46)	-0.64 (-0.87)
Spread (PRI minus non-PRI)	-2.45** (-4.23)	-7.72** (-3.34)	0.54 (0.70)	Spread (PRI minus non-PRI)	-1.56* (-2.52)	-7.17** (-2.73)	0.02 (0.03)
Panel D: Pre-fee returns				Panel K: Excluding activist hedge funds			
PRI signatories	1.73 (1.01)	-5.34 (-1.50)	3.67* (2.33)	PRI signatories	-1.72 (-1.25)	-5.41* (-2.15)	-1.00 (-0.77)
nonsignatories	5.09** (3.94)	6.07** (6.20)	3.37** (3.30)	nonsignatories	1.05 (1.05)	1.95* (2.49)	-0.82 (-1.03)
Spread (PRI minus non-PRI)	-3.36** (-4.32)	-11.41** (-3.46)	0.30 (0.31)	Spread (PRI minus non-PRI)	-2.77** (-4.10)	-7.36** (-3.04)	-0.18 (-0.20)
Panel E: FH model + an emerging markets equity factor				Panel L: Including delisted signatories			
PRI signatories	-0.26 (-0.31)	-2.85 (-1.48)	1.37 (1.47)	PRI signatories	-0.62 (-0.48)	-5.62* (-2.29)	0.42 (0.41)
nonsignatories	1.90** (2.79)	2.69** (3.33)	0.51 (0.74)	nonsignatories	1.40 (1.46)	2.10* (2.57)	-0.24 (-0.31)
Spread (PRI minus non-PRI)	-2.17** (-3.84)	-5.54* (-2.57)	0.86 (1.16)	Spread (PRI minus non-PRI)	-2.02** (-3.36)	-7.72** (-3.18)	0.66 (0.99)
Panel F: FH model + Pástor and Stambaugh (2003) liquidity factor				Panel M: Pure play hedge fund firms			
PRI signatories	-1.42 (-1.01)	-6.45* (-2.42)	0.72 (0.63)	PRI signatories	-1.46 (-1.10)	-6.24* (-2.49)	0.51 (0.46)
nonsignatories	1.85 (1.72)	2.30** (2.92)	0.46 (0.55)	nonsignatories	1.25 (1.29)	2.38** (2.81)	0.28 (0.36)
Spread (PRI minus non-PRI)	-3.27** (-5.49)	-8.75** (-3.44)	0.26 (0.34)	Spread (PRI minus non-PRI)	-2.70** (-4.07)	-8.62** (-3.49)	0.23 (0.27)
Panel G: FH model + ESG factor				Panel N: Stock holdings from 13F + FactSet			
PRI signatories	-1.26 (-0.99)	-5.61* (-2.26)	0.19 (0.18)	PRI signatories	-1.24 (-0.97)	-4.82* (-2.04)	0.01 (0.01)
nonsignatories	1.18 (1.23)	1.81* (2.59)	-0.31 (-0.42)	nonsignatories	1.21 (1.26)	1.62 (1.90)	-0.95 (-1.11)
Spread (PRI minus non-PRI)	-2.44** (-3.92)	-7.42** (-3.07)	0.50 (0.67)	Spread (PRI minus non-PRI)	-2.45** (-3.93)	-6.45** (-2.84)	0.96 (1.47)

Internet Appendix: Socially Responsible Hedge Funds

In the Internet Appendix, we provide additional robustness tests to verify the strength of our empirical results.

1. Additional robustness tests

1.1. Value-weighted portfolios

To test whether our findings are driven by the way we weight hedge funds in the portfolio sorts, we redo the analysis with value-weighted portfolios. Panel A of Table A1 shows that inferences remain qualitatively unchanged with value-weighted portfolios.

1.2. ESG score publication lag

In our double sort analysis, we accommodate a publication lag of one year to allow investment firms time to incorporate ESG scores from third parties such as Thomson Reuters when making investment decisions. To test whether our findings are driven by the publication lag, we redo the analysis without a publication lag. Panel B of Table A1 reveals that our findings remain qualitatively unchanged after removing the publication lag.

1.3. Fund termination

To address concerns that funds that terminated their operations may have stopped reporting returns prematurely, we assume that for the month after a fund liquidates, its return is -10% .

Next, we redo the baseline portfolio sorts. Panel C of Table A1 indicates that our findings are robust to adjusting for fund termination.

1.4. Option based factors

To verify that option based factors (Mitchell and Pulvino, 2001) are not driving the results, we redo the tests after augmenting the Fung and Hsieh (2004) model with the out-of-the-money call and put equity option based factors from the Agarwal and Naik (2004) model. Panel D of Table A1 reveals that inferences remain unchanged after incorporating these factors in the risk adjustment model.

1.5. Founding PRI signatories

To check whether our results are driven by founding PRI signatories who endorsed on 27 April 2006, we redo the baseline portfolio sorts on hedge funds that are not managed by such firms. Of the 51 pioneer PRI signatories, we identify eight that offer hedge funds. Panel E of Table A1 suggests that our findings are not driven by founding PRI signatories.

References

- Agarwal, V., Naik, N. Y., 2004. Risk and portfolio decisions involving hedge funds. *Review of Financial Studies* 17, 63–98.
- Fung, W., Hsieh, D., 2004. Hedge fund benchmarks: a risk based approach. *Financial Analysts Journal* 60, 65–80.
- Mitchell, M., Pulvino, T., 2001. Characteristics of risk and return in risk arbitrage. *Journal of Finance* 56, 2135–2175.

Table A1: **Additional robustness tests**

Hedge funds are sorted every month into 2 portfolios based on PRI endorsement (Columns 1 and 4) or into 2 x 3 portfolios based on PRI endorsement and firm ESG scores (Columns 2, 3, 5, and 6). PRI denotes the Principles for Responsible Investment. Firm ESG scores are the value-weighted average of the Thomson Reuters ESG scores of the stocks held by hedge fund firms. Low ESG denotes firms with bottom-tercile ESG scores. High ESG denotes firms with top-tercile ESG scores. Performance is estimated relative to the Fung and Hsieh (2004) model. FH denotes Fung and Hsieh (2004). The *t*-statistics, derived from White (1980) standard errors, are in parentheses. The sample period is from May 2006 to April 2019. *, ** denote significance at the 5% and 1% levels, respectively.

Hedge fund portfolio	Alpha (percent/year)			Hedge fund portfolio	Alpha (percent/year)		
	All funds (1)	Low ESG (2)	High ESG (3)		All funds (4)	Low ESG (5)	High ESG (6)
Panel A: Value-weighted portfolios				Panel C: FH model + Agarwal and Naik (2004) option-based factors			
PRI signatories	-0.41 (-0.39)	-2.67 (-1.56)	0.71 (0.82)	PRI signatories	-1.01 (-0.71)	-5.32* (-2.22)	0.32 (0.24)
nonsignatories	1.30 (1.42)	2.86** (3.13)	0.28 (0.39)	nonsignatories	1.77 (1.68)	2.37** (2.79)	0.75 (0.88)
Spread (PRI minus non-PRI)	-1.70** (-3.25)	-5.53** (-2.93)	0.43 (0.73)	Spread (PRI minus non-PRI)	-2.78** (-4.18)	-7.69** (-3.47)	-0.43 (-0.64)
Panel B: No publication lag for stock ESG scores				Panel D: Excluding founding PRI signatories			
PRI signatories	-1.24 (-0.97)	-4.32 (-1.94)	-0.18 (-0.16)	PRI signatories	-1.06 (-0.85)	-4.39 (-1.96)	0.35 (0.37)
nonsignatories	1.21 (1.26)	1.91* (2.38)	0.21 (0.28)	nonsignatories	1.36 (1.41)	1.90* (2.35)	0.21 (0.29)
Spread (PRI minus non-PRI)	-2.45** (-3.93)	-6.23** (-2.85)	-0.39 (-0.60)	Spread (PRI minus non-PRI)	-2.43** (-3.50)	-6.28** (-2.84)	0.14 (0.27)
Panel C: Adjusted for fund termination							
PRI signatories	-2.91* (-2.02)	-5.34* (-2.44)	-1.87 (-1.31)				
nonsignatories	-0.78 (-0.64)	0.04 (0.04)	-1.71 (-1.47)				
Spread (PRI minus non-PRI)	-2.13** (-3.38)	-5.39* (-2.47)	-0.16 (-0.25)				

Table A2: Portfolio sorts on current and future PRI endorsement

Every month, hedge funds are sorted into three portfolios based on whether they are managed by current PRI signatory, future PRI signatory or non-signatory firms. The post-formation returns on the two portfolios over the next month are linked across months to form a single return series for each portfolio. Portfolio A is the equal-weighted portfolio of hedge funds managed by firms that are PRI signatories. Portfolio B is the equal-weighted portfolio of hedge funds managed by firms that will be (but are not yet) PRI signatories. Portfolio C is the equal-weighted portfolio of hedge funds managed by firms that are neither current signatories nor future signatories. PRI denotes the Principles for Responsible Investment. Performance is estimated relative to the Fung and Hsieh (2004) factors, which are the S&P 500 return minus risk-free rate (SNPMRF), Russell 2000 return minus S&P 500 return (SCMLC), change in the constant maturity yield of the US ten-year Treasury bond appropriately adjusted for the duration of the ten-year bond (BD10RET), change in the spread of Moody's BAA bond over ten-year Treasury bond appropriately adjusted for the duration (BAAMTSY), bond PTFS (PTFSBD), currency PTFS (PTFSFX), and commodities PTFS (PTFSCOM), where PTFS is primitive trend following strategy. The *t*-statistics, derived from White (1980) standard errors, are in parentheses. The sample period is from May 2006 to April 2019. *, **, denote significance at the 5% and 1% levels, respectively.

Hedge fund portfolio	Excess return (percent/year)	Alpha (per- cent/year)	SNPMRF	SCMLC	BD10RET	BAAMTSY	PTFSBD	PTFSFX	PTFSCOM	Adj. R ²
Portfolio A (current PRI signatories)	2.50 (1.14)	-1.18 (-0.92)	0.35** (10.39)	-0.06 (-1.21)	-1.62** (-3.23)	-3.16** (-4.11)	-0.02** (-2.84)	0.01 (0.77)	-0.01 (-0.81)	0.70
Portfolio B (future PRI signatories)	3.31 (1.62)	-0.16 (-0.14)	0.34** (11.99)	-0.05 (-1.17)	-1.20* (-2.60)	-2.55** (-3.71)	-0.02* (-2.29)	0.01 (0.78)	-0.01 (-0.76)	0.71
Portfolio C (neither future nor current signatories)	3.99* (2.29)	1.37 (1.43)	0.30** (12.49)	0.00 (0.11)	-0.56 (-1.36)	-2.11** (-3.47)	-0.01 (-1.55)	0.01 (1.50)	0.00 (-0.33)	0.74
Spread (A minus B)	-0.81 (-1.51)	-1.02 (-1.85)	0.01 (0.44)	-0.01 (-0.27)	-0.42* (-1.99)	-0.61* (-2.46)	0.00 (-0.73)	0.00 (0.38)	0.00 (-0.37)	0.03
Spread (A minus C)	-1.49* (-2.00)	-2.55** (-3.92)	0.05** (2.67)	-0.06* (-2.60)	-1.07** (-3.71)	-1.05** (-2.91)	-0.01** (-3.16)	0.00 (-0.42)	0.00 (-1.18)	0.33
Spread (B minus C)	-0.68 (-1.12)	-1.53* (-2.47)	0.04* (2.14)	-0.06* (-2.46)	-0.64** (-2.97)	-0.44 (-1.86)	-0.01* (-2.10)	0.00 (-1.07)	0.00 (-1.22)	0.24

Table A3: **Regressions on hedge fund performance controlling for past performance**

This table reports results from OLS and Fama and MacBeth (1973) multivariate regressions on hedge fund performance. The dependent variable is Fung and Hsieh (2004) seven-factor monthly alpha where factor loadings are estimated over the last 24 months (*ALPHA*). The primary independent variables of interest are the PRI dummy (*PRI*) and the low ESG dummy (*ESG_LOW*). The *PRI* dummy takes a value of one if the hedge fund is managed by a PRI signatory firm. The low ESG dummy (*ESG_LOW*) takes a value of one if the hedge fund is managed by a firm with an ESG score in the bottom tercile. The regressions that feature *ESG_LOW* exclude hedge funds managed by firms with ESG scores in the middle tercile. Firm ESG scores are the value-weighted average of the ESG scores of the stocks held by hedge fund firms. Stock ESG scores are obtained from Thomson Reuters. The other independent variables are hedge fund management fee (*MGT_FEE*), performance fee (*PERF_FEE*), redemption notice period in months (*NOTICE*), minimum investment in millions of US dollars (*MININV*), the natural logarithm of fund size ($\log(\text{SIZE})$) where *SIZE* is in millions of US dollars, fund age in decades (*AGE*), past 1-year fund alpha (*ALPHA1yr*), past 2-year fund alpha (*ALPHA2yr*) as well as dummy variables for year and fund investment strategy. The *t*-statistics are in parentheses. For the OLS regressions, they are derived from robust standard errors that are clustered by fund and month. For the Fama and MacBeth regressions, they are derived from Newey and West (1987) standard errors with a three-month lag. The sample period is from May 2006 to April 2019. *, ** denote significance at the 5% and 1% levels, respectively.

Independent variable	OLS regressions				Fama and MacBeth (1973) regressions			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>PRI</i>	-0.103** (-4.70)	0.050 (1.32)	-0.079** (-3.32)	0.038 (0.94)	-0.137* (-2.55)	0.037 (0.67)	-0.110 (-1.79)	0.030 (0.50)
<i>ESG_LOW</i>		0.175** (5.85)		0.161** (5.11)		0.184** (3.79)		0.169** (3.36)
<i>PRI*ESG_LOW</i>		-0.408** (-4.38)		-0.379** (-3.74)		-0.482* (-2.37)		-0.450* (-2.12)
<i>MGT_FEE</i> (percent)	-0.015 (-1.27)	0.021 (0.64)	-0.042** (-2.63)	0.010 (0.30)	-0.029 (-1.03)	0.002 (0.05)	-0.043 (-1.49)	0.012 (0.28)
<i>PERF_FEE</i> (percent)	0.004** (3.99)	0.004* (2.00)	0.004** (3.37)	0.003 (1.43)	0.006* (2.20)	0.003 (0.84)	0.005* (1.99)	0.001 (0.46)
<i>NOTICE</i> (months)	0.042** (9.14)	0.044** (4.09)	0.039** (7.78)	0.043** (3.75)	0.031* (2.17)	0.043** (3.09)	0.026 (1.80)	0.039** (3.02)
<i>MININV</i> (US\$m)	0.008** (8.60)	0.007** (3.50)	0.007** (6.76)	0.008** (3.39)	0.009** (3.12)	0.005 (1.32)	0.008** (2.90)	0.005 (1.46)
$\log(\text{SIZE})$	0.008* (2.01)	0.005 (0.61)	0.005 (1.14)	0.003 (0.37)	0.006 (0.67)	0.002 (0.19)	0.004 (0.43)	-0.004 (-0.31)
<i>AGE</i> (decades)	-0.010 (-0.76)	-0.059* (-2.43)	-0.010 (-0.70)	-0.068* (-2.57)	0.015 (0.54)	-0.074 (-1.84)	0.012 (0.41)	-0.087 (-1.78)
<i>ALPHA1yr</i> (percent)	0.129** (15.29)	0.106** (5.48)			0.133** (2.96)	0.102* (2.36)		
<i>ALPHA2yr</i> (percent)			0.193** (16.04)	0.139** (5.40)			0.170** (3.09)	0.119 (1.90)
Year dummies	Yes	Yes	Yes	Yes	No	No	No	No
Strategy dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.011	0.010	0.011	0.010	0.061	0.061	0.063	0.063
Number of observations	367,161	56,289	312,685	50,682	156	124	156	124

Table A4: **Probit regressions on the probability of PRI endorsement**

This table reports results from probit regressions on the probability of PRI endorsement. The dependent variable of interest is the PRI dummy (*PRI*) which takes a value of one if the hedge fund firm endorses the PRI and zero otherwise. *PRI* denotes the Principles for Responsible Investment. The primary independent variable of interest is past year value-weighted average of the Thomson Reuters ESG scores of the stocks held by hedge fund firm (*ESG*). The other independent variables for the fund regressions are hedge fund past 12-month return rank (*RANK*), past 12-month CAPM alpha rank (*RANK_CAPM*), past 12-month Fung and Hsieh (2004) alpha rank (*RANK_FH*), management fee (*MGTFFEE*), performance fee (*PERFFEE*), redemption notice period in months (*NOTICE*), minimum investment in millions of US dollars (*MININV*), the natural logarithm of fund size (*log(SIZE)*) where *SIZE* is in millions of US dollars, fund age in decades (*AGE*), standard deviation of fund returns over the past 12 months (*RETSTD*), as well as dummy variables for year and fund investment strategy. The firm level regressions feature the analogous firm level independent variables but do not include strategy fixed effects. The *t*-statistics, in parentheses, are derived from robust standard errors that are clustered by fund and year for the fund level regressions or by firm and year for the firm level regressions. The sample period is from May 2006 to April 2019. *, **, denote significance at the 5% and 1% levels, respectively.

Independent variables	Dependent variable = <i>PRI</i>				
	Fund level regressions		Firm level regressions		
<i>ESG</i>	0.010** (3.91)	0.008** (2.63)	0.008** (2.69)	0.009* (2.06)	0.010* (2.34)
<i>RANK</i>	-0.301** (-4.78)	-0.233 (-1.94)		-0.466* (-2.09)	
<i>RANK_CAPM</i>	-0.259** (-3.41)		0.115 (0.81)	-0.207 (-1.83)	-0.151 (-0.62)
<i>RANK_FH</i>		-0.149* (-2.04)	0.192 (1.33)	-0.152 (-1.38)	0.087 (0.35)
<i>MGTFFEE</i> (percent)	-0.134** (-3.92)	-0.107** (-2.67)	-0.157 (-1.80)	-0.158** (-2.66)	-0.223 (-1.54)
<i>PERFFEE</i> (percent)	-0.009** (-3.40)	-0.008** (-2.73)	0.003 (0.51)	-0.007 (-1.64)	-0.001 (-0.13)
<i>NOTICE</i> (months)	-0.102** (-5.63)	-0.113** (-5.49)	-0.218** (-6.15)	-0.130** (-4.75)	-0.320** (-7.18)
<i>MININV</i> (US\$m)	-0.011* (-2.51)	-0.011* (-2.19)	-0.011 (-1.31)	-0.012 (-1.80)	-0.011 (-1.27)
<i>log(SIZE)</i>	0.166** (14.35)	0.166** (12.11)	0.119** (5.06)	0.183** (10.38)	0.179** (4.64)
<i>AGE</i> (decades)	-0.229** (-5.98)	-0.225** (-4.99)	-0.352** (-3.99)	-0.049 (-1.18)	-0.248* (-2.39)
<i>RETSTD</i>	0.063 (0.07)	0.911 (1.13)	2.256 (1.04)	-2.197 (-1.49)	-4.693 (-1.54)
Year dummies	Yes	Yes	Yes	Yes	Yes
Strategy dummies	Yes	Yes	Yes	No	No
Pseudo R ²	0.099	0.097	0.120	0.130	0.181
Number of observations	40,087	29,497	6,653	25,296	4,288

Table A5: Portfolio sorts on PRI endorsement and country-level social norms regarding E&S issues

Every month, hedge funds are double sorted into 2 x 2 portfolios based on (i) whether they are managed by PRI signatory or nonsignatory firms and (ii) country-level social norms regarding environmental and social (E&S) issues. Portfolios 1A and 1B are the equal-weighted portfolios of hedge funds managed by PRI signatory and nonsignatory firms, respectively, from countries with weak social norms. Portfolios 2A and 2B are the analogous hedge fund portfolios for firms from countries with strong social norms. PRI denotes the Principles for Responsible Investment. For Columns 1 and 2, we gauge social norms using the Environmental Performance Index from the Yale Center for Environmental Law and Policy and the Columbia University Center for International Earth Science Information Network. For Columns 3 and 4, we infer social norms using the Employment Laws Index from Botero et al. (2004). For Columns 5 and 6, we measure social norms using an E&S index constructed from World Values Survey and European Values Study data. Performance is estimated relative to the Fung and Hsieh (2004) factors. The *t*-statistics, derived from White (1980) standard errors, are in parentheses. The sample period is from May 2006 to April 2019. *Denotes significance at the 5% level; **Denotes significance at the 1% level.

Hedge fund portfolio	Country-level social norms measured using					
	Environmental Performance Index			E&S Index from survey data		
	Excess return (percent/year) (1)	Alpha (percent/year) (2)	Excess return (percent/year) (3)	Alpha (percent/year) (4)	Excess return (percent/year) (5)	Alpha (percent/year) (6)
Portfolio 1A (PRI signatories, weak social norms)	3.08 (1.31)	-0.52 (-0.41)	2.92 (1.47)	-0.33 (-0.29)	2.06 (0.72)	-3.20 (-1.75)
Portfolio 1B (nonsignatories, weak social norms)	4.70** (2.83)	2.31** (2.77)	4.24* (2.52)	1.68 (1.91)	4.77 (1.91)	0.81 (0.47)
Portfolio 2A (PRI signatories, strong social norms)	2.22 (0.99)	-1.76 (-1.21)	2.33 (0.81)	-2.98 (-1.57)	2.32 (1.06)	-1.48 (-1.08)
Portfolio 2B (nonsignatories, strong social norms)	2.22 (1.06)	-1.43 (-0.98)	1.92 (0.72)	-2.60 (-1.27)	2.55 (1.18)	-1.01 (-0.71)
Spread (1A minus 1B)	-1.62 (-1.42)	-2.84** (-2.71)	-1.32* (-2.19)	-2.01** (-3.66)	-2.71* (-2.57)	-4.01** (-3.79)
Spread (2A minus 2B)	0.00 (-0.01)	-0.33 (-0.75)	0.41 (0.51)	-0.37 (-0.51)	-0.23 (-0.41)	-0.46 (-0.93)