

Greenwashing

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Abstract

We test for evidence of greenwashing among hedge fund management companies that endorse the United Nations Principles for Responsible Investment (PRI). We find that a non-trivial number of hedge fund PRI signatories indulge in greenwashing. Hedge funds that greenwash underperform both genuinely green and nongreen funds after adjusting for risk. Consonant with an agency explanation, the underperformance is greater for funds with poor incentive alignment. By exploiting the staggered adoption of stewardship codes, we provide causal evidence that relate greenwashing to fund underperformance. Investors do not appear to discriminate between funds that greenwash and those that are genuinely green.

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1. Introduction

“Greenwashing is the practice of trying to make people believe that a company is doing more to adopt sustainability than it really is, often for public relations reasons.”

– Robeco Asset Management.¹

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 endorse the United Nations Principles for Responsible Investment (henceforth PRI). 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.

Given the unprecedented interest in responsible investment by asset owners, one concern is that some fund managers may deceptively endorse the PRI to attract flows from responsible investors while not honoring their promise of incorporating ESG into their investment decisions.² Put it bluntly, managers may engage in greenwashing. Such managers could subsequently underperform given their focus on asset gathering as opposed to generating alpha. In that case, greenwashing could be symptomatic of agency problems since such fund managers clearly fall short on their dual mandate of delivering both investment performance and ESG exposure, thereby failing to maximize investor welfare (Hart and Zingales, 2017). If investors do not differentiate between funds that greenwash and those that are genuinely green, greenwashing will have important implications for investor welfare.

Both practitioners and regulators have raised concerns about greenwashing. Christopher Hohn of The Children’s Investment fund has accused major asset managers that commit to sustainable investing of being “*full of greenwash*,” while Chamath Palihapitiya of Social Capital observes that the ESG movement has been used by some as a “*marketing ploy*

¹<https://www.robeco.com/sg/key-strengths/sustainable-investing/glossary/greenwashing.html>

²According to Cowell and Rajan (2020), hedge fund managers may greenwash due to inadequate expertise, shortage of data, or skepticism about the value of ESG.

and a way for companies to get free money.”³ SEC Commissioner Hester Peirce alludes to greenwashing and agency problems when she argues that ESG may stand for “*enabling stakeholder graft*”.⁴ Anecdotal evidence that finds that sustainable funds enjoy record inflows but often continue to invest in oil and gas companies is also consistent with greenwashing.⁵

Since greenwashing implies that financial intermediaries do not follow through on their commitment to invest responsibly, it could impede the process, envisaged in the theoretical models of Pástor, Stambaugh, and Taylor (2020) and Pedersen, Fitzgibbons, and Pomorski (2020), by which asset prices incorporate investors’ tastes for green assets. Despite the unprecedented demand for responsible investment products, the concerns voiced by practitioners and regulators about greenwashing, and its potential implications for investor welfare and asset prices, we know little about greenwashing. In this study, we fill this gap by studying greenwashing among hedge fund management companies that endorse the PRI.

The hedge fund industry provides a fertile ground to study greenwashing for three reasons. First, as some of the world’s most sophisticated investors (Brunnermeier and Nagel, 2004), 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, charitable foundations, and university endowments, many of whom have embraced responsible investing.⁶ As a testament to the importance of hedge funds for institutional investors, the PRI offers tools to help them incorporate ESG factors into their hedge fund selection process.⁷ In contrast, the PRI does not provide similar tools to aid in mutual fund selection. Second, 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 opportunistic behavior, thereby increasing the likelihood of greenwashing. Third, 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

³See “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.

⁴See “ESG funds draw SEC scrutiny,” Wall Street Journal, 16 December 2019, and Peirce (2018, 2019).

⁵See “ESG funds enjoy record inflows, still back big oil and gas,” Wall Street Journal, 11 November 2019.

⁶See https://www.hedgefundresearch.com/sites/default/files/articles/1Q20_HFR_GIR.pdf.

⁷For 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>.

to cleanly measure investment performance and evaluate the investment implications of greenwashing in a timely manner.

To test for evidence of greenwashing, we first compute the value-weighted portfolio level ESG scores for hedge fund management companies by leveraging on Refinitiv (formerly Thomson Reuters ASSET4) stock ESG scores and long-only stock holdings data.⁸ We find that while *on average* hedge fund signatories feature greater ESG exposures than do nonsignatories, there is significant overlap in the distributions of their ESG exposures. Based on our estimates, a non-trivial 20.79% of hedge fund signatories or US\$149 billion of hedge fund assets have ESG exposures below that of the median hedge fund firm. These results call into question the view that signatories are exemplars of responsible investment.

Next, we investigate the investment implications of greenwashing. We show first that on average hedge funds managed by investment management firms that endorse the PRI underperform other hedge funds by 2.45 percent per annum (t -statistic = 3.93) after adjusting for co-variation with the Fung and Hsieh (2004) seven factors. The results are not driven by the usual suspects that affect hedge fund performance including fund age (Aggarwal and Jorion, 2010), fund manager incentive fee (Agarwal, Daniel and Naik, 2009), fund size (Berk and Green, 2004), past fund performance (Jagannathan, Malakhov, and Novikov, 2010), serial correlation (Getmansky, Lo, and Makarov, 2004), incubation bias (Fung and Hsieh, 2009) and backfill bias (Bhardwaj, Gorton, and Rouwenhorst, 2014).

The underperformance of hedge fund signatories can be traced to signatories that greenwash, i.e., those with low ESG scores.⁹ Specifically, low-ESG signatory hedge funds underperform low-ESG nonsignatory hedge funds by an economically significant 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 funds is an economically modest 0.54% per annum (t -statistic = 0.74). Moreover, signatories with low ESG exposures underperform signatories with high ESG exposures by a risk-adjusted 5.94% per year (t -statistic = 3.00). Therefore, funds that greenwash underperform both genuinely green and nongreen

⁸Investment management firm ESG scores, as opposed to fund ESG scores, are more relevant for our purposes as greenwashing 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.

⁹We define low-ESG signatories as those with bottom-tercile ESG scores and define high-ESG signatories as those with top-tercile ESG scores. Our results are robust to classifying as low-ESG signatories those with below-median ESG scores and classifying as high-ESG signatories those with above-median ESG scores.

funds.

The findings are robust to alternative ways of evaluating investment management firm exposure to responsible companies. We obtain qualitatively similar results when we decompose the Refinitiv 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. Our results are also robust to augmenting the performance evaluation model with factor-mimicking stock portfolios for ESG, CO₂ emissions (Bolton and Kacperczyk, 2020), and toxic emissions (Hsu, Li, and Tsou, 2020).

To test whether the underperformance of signatories that greenwash is related to agency problems, we redo the baseline and double sorts 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 fund signatories with low ESG exposures is larger for precisely such funds.

Our fund performance results are not immune to endogeneity concerns. 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 the staggered adoption of stewardship codes in the different countries where hedge funds are based. The stewardship codes, either mandated by regulators or proposed by industry associations, ratchet up the pressure on fund managers to improve engagement and transparency, thereby making it harder for them to engage in greenwashing. In line with this view, we find that the ESG exposures of low-ESG signatories increase in the year post stewardship code adoption relative to the prior year. If greenwashing leads to fund underperformance via the agency channel, insofar as the codes help align incentives at such funds with those of socially responsible investors, we expect that the adoption of the stewardship codes will ameliorate the underperformance of funds that heretofore indulged in greenwashing. This is precisely what we find. Low-ESG signatories

underperform less in the year following the adoption of such codes.

Do investors discriminate between signatories that greenwash and those that are genuinely green? We find that after adjusting for past fund performance and other usual suspects, signatories attract an economically and statistically meaningful 20.20% more flows per annum than do nonsignatories. These results suggest that PRI endorsement facilitates asset gathering and echo those of Hartzmark and Sussman (2019) who show that high sustainability mutual funds garner more flows. More interestingly, low-ESG signatories attract as much fund flows as do high-ESG signatories after controlling for past performance and other factors that affect flows. Moreover, there is also no discernible difference in the sensitivity of flows to past performance for low- versus high-ESG signatories.

Does greenwashing provide insight into other aspects of managerial opportunism à la Ali and Hirshleifer (2017) in corporate finance? We show that signatories with low ESG exposures exhibit greater operational risk. Specifically, 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 an extremely low correlation with style factors, transgressions that may be indicative of return misreporting and fraud (Bollen and Pool, 2009; 2012).¹⁰ These results are broadly consistent with the agency view.

Why do investors appear unaware of the incentive alignment and operational issues percolating at signatories that greenwash? We believe that there are several reasons why low-ESG signatories continue to thrive despite not walking the talk, underperforming other hedge funds, and exhibiting greater operational risk. First, there is considerable disagreement between data vendors when it comes to the inherently subjective ESG ratings. Therefore, low-ESG signatories are unlikely to face significant litigation risk. Second, low-ESG signatories only differ marginally from high-ESG signatories along more salient dimensions such as sin stock ownership (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

¹⁰As Jorion and Schwarz (2014) note, one caveat is that a return discontinuity around zero may instead reflect the imputation of incentive fees.

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. Fourth, low-ESG signatories tend to attract more unsophisticated investors relative to high-ESG signatories. For instance, high-net worth individuals, who lack the financial wherewithal to accurately assess ESG exposure, tend to allocate more capital to low-ESG signatories than to high-ESG signatories.

What prevents more investment firms from opportunistically endorsing responsible investment? We show that social norms (Hong and Kacperczyk, 2009) with regards to E&S performance help align managers' interests with those of environmentally and socially conscious investors. Specifically, investment firms in countries with strong social norms exhibit substantially higher ESG scores. Consequently, signatory underperformance manifests only in countries with weak social norms, supporting the view that societal pressures induce fund managers to internalize their investors' preferences for responsible investment and therefore help curb greenwashing.

The findings provide novel insights relative to research that shows that socially responsible mutual funds, venture capital funds, and university endowments underperform due to their greater exposure to socially responsible firms (Riedl and Smeets, 2017; Barber, Morse, and Yasuda, 2020; Aragon et al., 2020). By showing that managers who indulge in greenwashing underperform, we uncover a different channel, i.e., agency, which can engender underperformance in socially responsible managers. Our results suggest that financial intermediation introduces agency-induced leakages or frictions which could impede the process, envisioned in the equilibrium models of Pástor, Stambaugh, and Taylor (2020) and Pedersen, Fitzgibbons, and Pomorski (2020), by which investors' tastes for green assets are impounded into asset prices.

We build on two research themes on hedge funds. The first theme studies agency problems and finds that some hedge funds inflate year-end returns, take on excessive liquidity risk, and delay reporting poor performance (Agarwal, Daniel, and Naik, 2011; Teo, 2011; Aragon and Nanda, 2017). Unlike these papers, we identify problem funds by exploiting the dissonance between what investment firms say they do and what they actually do. A key distinction of our work is that we tackle the notion of agency that encompasses deviations from maximizing investor welfare as opposed to deviations from maximizing investor returns. The second

theme examines fund alpha and finds that less incentivized, older, high R-squared, and nondistinctive hedge funds underperform (Agarwal, Daniel, and Naik, 2009; Aggarwal and Jorion, 2010; Titman and Tiu, 2011; Sun, Wang, and Zheng, 2012). By showing that hedge funds that greenwash also underperform, our results speak to the importance of manager motivation (versus manager skill) as a driver of fund alpha.

This study complements Gibson et al. (2020) and Kim and Yoon (2020) who broadly investigate institutional investors and mutual fund firms, respectively, that endorse the PRI. Both studies find marginal differences in performance between signatories and nonsignatories.¹¹ By focusing on hedge funds, which feature lower levels of transparency, disclosure, and regulatory oversight, and are consequently more likely to greenwash, we obtain much stronger evidence of signatory underperformance. While Kim and Yoon (2020) find that mutual fund signatories do not improve their ESG performance post endorsement, that in itself is not indicative of greenwashing as signatories may have higher ESG scores prior to endorsement. By analyzing ESG differences between signatories and nonsignatories, Gibson et al. (2020) find some evidence of greenwashing, albeit only among US-based institutional investors. A key distinction of our work is that we relate greenwashing to a host of fund manager level attributes beyond manager domicile. Specifically, we connect greenwashing to signatory underperformance, incentive alignment, operational risk, investor flows, social norms, and exogenous shocks, i.e., the adoption of stewardship codes, that impact fund management company ESG practices. By doing so, we advance the agency view and deepen our understanding of greenwashing in the asset management context.

The remainder of this paper proceeds as follows. Section 2 provides the institutional background on the PRI and describes the data and methodology. Section 3 reports the empirical results while Section 4 presents robustness tests. Section 5 concludes.

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

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 leading data providers, such as Refinitiv, 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 industry; (v) to work together to enhance effectiveness in implementing the Principles; (vi) to report their activities and progress towards implementing the Principles.

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

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 May 2006 to April 2019. The start of our sample period, May 2006, corresponds to the first full month that follows the establishment of the PRI.

Our fund universe has a total of 16,001 hedge funds, of which 3,881 are live funds and 12,120 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 11,387 hedge funds, of which 2,911 are live funds and 8,476 are dead funds. There are 3,389 and 1,703 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 country. We are able to identify 307 such fund management company matches.¹⁵

Panel A of 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 signatory hedge fund firms operating 90 hedge funds with US\$26.23 billion in

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 0.5th and 99.5th percentiles. The baseline results are virtually unchanged when we use the original returns reported in the databases.

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.

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 signatory hedge fund assets. Moreover, during this period, the hedge fund assets managed by signatories 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.

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 change in the constant maturity yield of the US ten-year Treasury bond, appropriately adjusted for the 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.

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>.

2.3. ESG data

We calculate firm ESG performance primarily using Refinitiv data (formerly Thomson Reuters ASSET4). The database has been employed by Ferrell, Liang, and Renneboog (2016), Liang and Renneboog (2017), and Dyck et al. (2019), among others. The Refinitiv 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, Refinitiv evaluates firm E&S ratings relative to firms in the same Refinitiv Business Classification industry and assesses firm governance ratings relative to other firms in the same country. One concern is that Refinitiv ESG percentile ratings are rescaled and adjusted every year, especially as more equity indices are included in the sample of stocks with Refinitiv ESG scores. Therefore, fund ESG scores measured at distant points in time may not be comparable.¹⁷

We complement the Refinitiv 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

¹⁷For example, Refinitiv ESG data are available for S&P 500 stocks starting in 2003, for Russell 1000 stocks starting in 2011, and for Russell 2000 and Russell 3000 stocks starting in 2017.

differ (Mănescu, 2011), to facilitate consistent comparisons cross-sectionally and over time, we scale the number of strengths and concerns for each firm-year.¹⁸

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]

To measure investment firm ESG exposure, we compute annual and quarterly ESG scores. Quarterly ESG scores are the value-weighted average of the Refinitiv ESG scores of the quarterly stock holdings of hedge fund firms. Stock holdings are from the Thomson Reuters 13F long-only holdings database. Annual ESG scores are quarterly ESG scores averaged over the year. The requirement that stock holdings information is available reduces the hedge fund sample from 11,387 funds to 3,281 funds. Within this group of funds, 2,774 funds hold stocks with valid Refinitiv ESG scores during the sample period.

Figure 2 examines the distributions of annual ESG scores for hedge fund signatories and nonsignatories. As one would expect, the average ESG score for signatories at 68.57 exceeds that of nonsignatories at 60.00, respectively. However, the average ESG scores mask significant heterogeneity in firm ESG scores. As Figure 2 shows, there is substantial overlap between the distributions of ESG scores for signatories and nonsignatories. On average, each year, a non-trivial 20.79% of signatories have ESG scores that fall below the median ESG

¹⁸Specifically, 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.

score for all firms.¹⁹ This reflecting the long left tail of the signatory ESG distribution and suggests that there are a number of signatories that do not walk the talk.

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 exposures 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 HFR estimate of assets managed by the hedge fund industry, i.e., US\$2.96 trillion, the 17.05% estimate implies that a substantive US\$149 billion of hedge fund assets are managed by signatories with ESG exposures below that of the median hedge fund firm.

3. Empirical results

3.1. Fund performance

To evaluate the performance implications of greenwashing, we first 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

¹⁹The corresponding percentages for signatories with ESG scores below that of the median firm are 14.82% and 25.09% when we construct ESG scores based on MSCI and Sustainalytics data, respectively.

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.²⁰

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.

[Insert Tables 2 and 3 here]

The underperformance of funds that endorse the PRI could be driven by agency problems related to greenwashing or by their greater exposure to socially responsible companies.²¹ To investigate, 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 2009.²²

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 exposures underperform nonsignatory hedge funds with low ESG exposures by a staggering 7.72% per year (t -statistic = 3.18) after adjusting for risk. Conversely, signatory hedge funds with high ESG exposures only underperform nonsignatory hedge funds with high

²⁰As Panel A in Table A1 of the Internet Appendix reveals, the hedge fund results are robust to value-weighting the portfolios. The results are also robust when we split the sample period 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).

²¹Pástor, Stambaugh, and Taylor (2020) show that due to investors' preference for green holdings and green assets' ability to hedge climate change risks, green assets feature negative alphas.

²²Prior 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.

ESG exposures by a risk-adjusted 0.54% per year (t -statistic = 0.74). Moreover, amongst signatories, relative to those with high ESG exposures, those with low ESG exposures offer hedge funds that underperform by a risk-adjusted 5.94% per year (t -statistic = 3.00). These findings are most consistent with an agency explanation related to greenwashing.²³

As Panel B of Table 3 reveals, we obtain slightly weaker results when we perform a coarser independent double sort whereby we stratify hedge funds into two groups based on the median fund management company ESG score. Signatory hedge funds with below-median ESG exposures underperform nonsignatory hedge funds with below-median ESG exposures 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.²⁴

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 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 Refinitiv score into a component based on E&S

²³One concern is that the Thomson Reuters 13F data, which we use to derive fund management company ESG exposure, 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 a factor-mimicking stock portfolio for ESG constructed by going long and short stocks with ESG scores in the top and bottom 30th percentiles, respectively.

²⁴To 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 13F 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).

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 Refinitiv scores. Next, we repeat the same exercise using ESG scores from MSCI and Sustainalytics in lieu of Refinitiv. Columns 5 to 8 of Table 4 show that our conclusions remain unchanged.

A corollary of the agency view is that since PRI endorsement should signal, as opposed to trigger, incentive misalignment, hedge funds that endorse the PRI should underperform even prior to endorsement. 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 2.57% per annum (t -statistic = 3.94), future signatories also underperform, albeit by a more modest 1.12% per annum (t -statistic = 2.65).

Panel B of Table 1 indicates that signatory hedge funds charge lower fees, impose shorter redemption notice periods, set higher minimum investments, are older, and raise more capital than do nonsignatory hedge funds. In contrast, low-ESG signatory funds do not differ meaningfully from high-ESG signatory funds except along two dimensions. The former tend to charge higher management fees and to be older than the latter. To investigate whether our findings are driven by these fund characteristics, we estimate the following 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.²⁵

²⁵Inferences do not change when we use factor loadings estimated over the past 36 months instead.

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. To test whether the underperformance of PRI funds relates to greenwashing, 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.²⁶ 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 exposures. These findings corroborate the portfolio sorts results in Table 4 and suggest that funds that greenwash underperform.

In accordance with the literature, the coefficient estimates on the fund control variables indicate that larger (Berk and Green, 2004), less illiquid (Aragon, 2007), and older (Aggarwal and Jorion, 2010) funds underperform.²⁷ The positive coefficient estimates on *ESG_LOW* are consonant with the Pástor, Stambaugh, and Taylor (2020) conclusion that, given investors' preference for green firms, brown firms should generate greater alphas in equilibrium.²⁸ 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. In results available upon request, we show that inferences do not change when we control for country level fixed effects in the regressions.

²⁶For 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.

²⁷To 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.

²⁸Green firms are firms that generate positive externalities on society while brown firms are firms that impose negative externalities on society.

3.2. Incentive alignment

To test whether the underperformance of funds that greenwash relates to agency problems, we first sort funds into two groups based on 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, has been audited in the past, and employs a top auditor or legal counsel.²⁹ 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 group 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. Moreover, we find that the risk-adjusted fund underperformance of low-ESG signatories, relative to low-ESG nonsignatories, is also larger for funds with poorer incentive alignment. Specifically, for low manager total delta, high management fee to performance fee, and low governance

²⁹See 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.

score funds, the risk-adjusted underperformance of low-ESG signatory hedge funds is 6.95%, 9.81%, and 9.28% 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 low-ESG signatory hedge funds is only 4.69%, 5.97%, and 5.14% per annum, respectively.

[Insert Table 6 here]

3.3. Endogeneity

One concern is that unobserved factors that affect both greenwashing 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 concerns, we exploit the staggered adoption of stewardship codes in the countries where the hedge fund firms are based.

Stewardship codes, either mandated by regulators or proposed by industry associations, seek to promote higher levels of investor engagement by encouraging the development and public disclosure of policies on how investor stewardship responsibilities are discharged. These include investor obligations in a number of key governance areas, most commonly: conflicts of interest, voting, monitoring and engaging with the investee company, and the consideration of ESG factors. In addition, stewardship codes often encourage investors to disclose their policies prominently, typically on the investor's web site and/or within an annual report, and to provide annual updates.³⁰ Therefore, the stewardship codes, by encouraging engagement and transparency, helps curb greenwashing by asset managers. Fig. A1 of the Internet Appendix provides, as an example, the stewardship code adopted by the UK on July 2010.³¹

³⁰For a discussion on stewardship codes, see [https://www.ey.com/Publication/vwLUAssets/ey-stewardship-codes-august-2017/\\$FILE/ey-stewardship-codes-august-2017.pdf](https://www.ey.com/Publication/vwLUAssets/ey-stewardship-codes-august-2017/$FILE/ey-stewardship-codes-august-2017.pdf)

³¹During our sample period, 13 countries from which the hedge funds in the sample are based adopted stewardship codes. These countries include Australia, Brazil, Germany, Hong Kong, Ireland, Netherlands, Norway, Singapore, South Africa, Sweden, Switzerland, the UK, and the US. Among these countries, four countries, namely Australia, Switzerland, the UK, and the US, have hedge funds that report returns in the one-year period post stewardship code adoption. For countries that revised their stewardship codes or adopted different stewardship codes over time, e.g., the UK, we focus on the date at which the first set of stewardship codes was adopted by the country.

To test whether the adoption of stewardship codes reduces the tendency of asset managers to indulge in greenwashing, we estimate regressions on fund annual ESG exposure with *PRI*, *STEWARDSHIP*, and the interaction between *PRI* and *STEWARDSHIP* as the independent variables of interest. *STEWARDSHIP* is an indicator variable that takes a value of one during the year that follows the adoption of stewardship codes in the country where the hedge fund firm is based. The regressions also control for the other fund variables featured in Eq. (1). As discussed, since Refinitiv ESG percentile ratings are rescaled and adjusted every year, especially as more equity indices are included in the sample of stocks with Refinitiv ESG scores, fund ESG scores measured at distant points in time may not be comparable. To facilitate meaningful comparison of ESG scores over time, the regressions focus on the period starting one year before and ending one year after the adoption of the stewardship codes. Column 1 of Table 7 reveals that the coefficient estimate on the interaction of *PRI* and *STEWARDSHIP* is indeed positively significant for low-ESG funds suggesting that low-ESG signatories increase ESG exposure in the year after stewardship code adoption.³²

[Insert Table 7 here]

If greenwashing drives the underperformance of hedge funds signatories with low ESG exposure, we should observe that the adoption of stewardship codes ameliorates the underperformance of such funds. This is indeed what we find. Columns 2 and 3 of Table 7 reveal that, for low-ESG funds, the coefficient estimates on the interaction between *PRI* and *STEWARDSHIP* are positive and statistically significant at the 1% level in the regressions on fund return and alpha. For high-ESG funds, we do not observe a similar relation between the interaction term and fund performance. These findings are difficult to reconcile with an explanation based on manager skill since it is not clear why skill would improve for low-ESG signatory managers following the adoption of stewardship codes in the country.

The results are not simply the by-product of the increase in ESG exposures post stewardship code adoption directly affecting the returns of low-ESG signatories. Pástor, Stambaugh, and Taylor (2020) show that, in equilibrium, green assets should generate lower alphas than

³²Column 4 of Table 7 shows that high ESG signatory funds also increase ESG exposure following stewardship code adoption, albeit by a smaller amount. The smaller increase in ESG scores for high ESG signatory funds is consistent with the intuition that for them the pressure to increase ESG exposure, as a result of the stewardship code, is lower given their higher initial ESG scores.

brown assets owing to the greater investor demand for and climate change hedging benefits of green securities. Moreover, Table 5 reveals that funds with low ESG exposures, in general, tend to deliver higher alphas. If anything, the increase in ESG exposures should worsen the underperformance of low-ESG signatories.

3.4. *Investor flows*

Do investors discriminate between funds that greenwash and those that are genuinely green? According to Cowell and Rajan (2020), “*institutional investors are getting more savvy in how they approach ESG in their [hedge fund] due diligence, duly separating the leaders from the pretenders and the winners from the spinners.*” To test whether this is true, we explore the implications of PRI endorsement and greenwashing for fund flow.

To understand the effects on fund flow, we estimate multivariate OLS regressions on annual hedge fund flow (*FLOW*) with *PRI* and the interaction of *PRI* and *LOW_ESG* as the independent variables 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. Following Siri and Tufano (1998) and Agarwal, Green, and Ren (2018), we also control for past 12-month fund return rank (*RANK*), CAPM alpha rank (*RANK_CAPM*), and Fung and Hsieh (2004) alpha rank (*RANK_FH*). Finally, we estimate analogous regressions on annual hedge fund firm flow (*FIRM_FLOW*) since any benefits from PRI endorsement and greenwashing 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.

Table 8 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 11.00% 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 based on an analogous regression specification that PRI endorsement is associated with a larger 20.20% increase in annual hedge fund firm flow. In line with prior work, we find that fund flow relates positively

to past performance.

[Insert Table 8 here]

Table 8 further reveals that fund flows to low-ESG signatories do not differ meaningfully from flows to high-ESG signatories after controlling for the usual suspects. The coefficient estimates on the interaction between *PRI* and *LOW_ESG* reported in columns (4) and (6) are statistically indistinguishable from zero at the 10% level. Columns (10) to (12) reveal similar results when we focus on firm level flows. In results that are available upon request, we also find no evidence that the sensitivity of flows to past performance differs between funds that greenwash and those that are genuinely green. These findings suggest that it is premature to conclude that institutional investors, who are responsible for most of the capital managed by hedge funds, accurately assess ESG exposure in the due diligence process.

3.5. Operational risk

Do the agency problems at hedge fund signatories that greenwash translate into greater operational risk, which hurts their clients? We conjecture 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 be reported on Item 11 of the Form ADV file (Brown et al., 2008; 2009; 2012). Moreover, hedge fund signatories that greenwash 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* with *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.³³ Since, Item 11 on the Form ADV documents whether

³³Regulatory violations refer to Form ADV Items 11.C.1–11.C.5, 11.D.1–11.D.5, 11.E.1–11.E.4, 11.F., and 11.G. Investment violations refer to Form ADV Items 11.B.1., 11.C.3, 11.C.4, 11.D.2, 11.D.3, 11.D.4, 11.D.5,

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 9 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 9 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, 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 aforementioned 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 9 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. Collectively, these results suggest that greenwashing could itself be a red flag for operational risk (Brown et al., 2008; 2009; 2012).

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

3.6. Equilibrium implications

As discussed, investor flows into low-ESG signatory hedge funds do not differ meaningfully from flows into high-ESG signatory hedge funds after adjusting for other factors that explain flows. Moreover, flows into low-ESG signatory hedge funds are also not more (or less) sensitive to past fund performance relative to flows into high-ESG signatory hedge funds. Why do hedge funds managed by low-ESG signatories thrive despite not walking the talk, underperforming other hedge funds, and exhibiting greater operational risk?

We believe that there are several reasons why greenwashing is likely to persist. First, we find considerable disagreement between the ESG assessments by different data providers. Low-ESG signatories categorized based on Refinitiv are only 47.46% and 35.44% likely to be classified as low-ESG based on MSCI and Sustainalytics, respectively. Given the inherent subjectivity of ESG assessments, this is not surprising, and implies that low-ESG signatories are unlikely to face significant litigation risk.

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 percentage points. Therefore, without appealing to costly data from ESG providers it would be difficult for asset owners to assess the ESG exposures of hedge fund signatories.

Third, 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.

Fourth, low-ESG signatories tend to attract less sophisticated investors than do high-ESG signatories. To investigate the composition of the investor base for low versus high-ESG signatories, we use information from Item 5D of the annual Form ADV that reports information on client categories and the percentage of AUM attributed to each client category. We find that for the average year, 8.92% of the AUM of low-ESG signatories can be attributed to

high-net worth individuals (henceforth HNWI). For high-ESG signatories, only 4.08% of AUM can be attributed to HNWI. The difference is statistically significant at the 5% level. Relatively unsophisticated investors such as HNWI (as opposed to institutional investors) are less likely to have the financial wherewithal to acquire the information needed to accurately assess fund management company ESG exposure.

Why do we not observe more opportunistic behavior amongst signatories? We conjecture that social norms (Hong and Kacperczyk, 2009) help align fund managers' interests with those of socially and environmentally conscious investors, thereby curbing opportunistic behavior. To test, we follow Dyck et al. (2019) and measure social norms in three ways. First, we gauge social norms toward the environment using outcomes from the Environmental Performance Index from Yale University and Columbia University. Second, we infer social norms toward worker rights and other social issues using outcomes from the Employment Laws Index (Botero et al., 2004). Third, we derive social norms based on societal attitudes and beliefs regarding E&S issues using survey data from the World Values Survey.

We find that investment firm ESG scores are substantially higher in countries with strong social norms for all three measures of social norms. For example, investment firms based in countries with strong norms exhibit ESG scores that are 15.51% greater than those based in countries with weak social norms for norms derived from environmental outcomes. The differences in ESG scores for firms from strong versus weak social norm countries are all statistically significant at the 1% level. Moreover as Table 10 shows, regardless of how social norms are measured, 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.

[Insert Tables 10 and 11 here]

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 caused by successful funds including returns prior to listing date onto fund databases (Bhardwaj, Gorton, and Rouwenhorst, 2014), 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 only HFR provides listing date information. To adjust for incubation bias induced by funds relying on internal funding before, conditional on generating a successful track record, seeking capital from investors (Fung and Hsieh, 2009), 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 driven neither by backfill bias nor by incubation bias.

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 risk factors

To cater for omitted risk factors, we separately augment the Fung and Hsieh (2004) model with the excess returns from factor-mimicking stock portfolios for ESG, CO₂ emissions, and toxic emissions. The ESG factor is constructed by going long and short stocks with ESG

scores in the top and bottom 30th percentiles, respectively. The CO₂ and toxic emissions factors are similarly constructed. CO₂ emissions are based on Trucost data on direct emissions from production (scope 1) as per Bolton and Kacperczyk (2020). Toxic emissions are based on Toxic Release Inventory pollution data maintained by the Environmental Pollution Agency as per Hsu, Li, and Tsou (2020). 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 factor 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. Delisted signatories

We obtain the list of former signatories from PRI annual reports. We 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. To identify pure play 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) and include it in our pure play 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.” Of the 307 signatories in our sample, 279 are pure play hedge fund firms. 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 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

Despite the unprecedented demand for responsible investment, the concerns raised by practitioners and regulators about greenwashing, and the implications that greenwashing has for investor welfare, we know little about greenwashing. This paper sheds light on greenwashing by analyzing hedge funds that publicly endorse responsible investment but exhibit low ESG exposures. An integral part of the portfolios of institutional investors who have embraced responsible investing, hedge funds are particularly susceptible to greenwashing given their low levels of transparency, disclosure, and regulatory oversight.

We establish three main facts. First, hedge funds that greenwash underperform both genuinely green and nongreen funds after adjusting for risk. The underperformance of hedge funds that indulge in greenwash explains the inferior performance of hedge funds that endorse responsible investment in general. Consistent with the agency view, the underperformance is stronger among funds for whom the incentives of fund managers and investors are misaligned. Following the adoption of stewardship codes in the countries where hedge funds are based, the relative performance of funds that heretofore engaged in greenwashing improves, suggesting that relation between greenwashing and fund underperformance is likely causal.

Second, hedge funds that greenwash reap tangible and pecuniary benefits. After controlling for the usual suspects, funds that endorse responsible investment attract substantially larger inflows than do other funds. Investors do not appear to discriminate between hedge funds that greenwash and those that do not. Consequently, hedge funds that greenwash gar-

ner as much inflows as do those that are genuinely green. Fund management companies that greenwash attract less sophisticated investors who are less likely to have the wherewithal to accurately assess ESG exposure.

Third, greenwashing provides insight into other aspects of managerial opportunism. Hedge funds that endorse responsible investment but do not walk the talk 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 exposures, 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 greenwashing in the asset management context. Given the inherent subjectivity and substantial information acquisition costs associated with ESG assessment as well as the significant heterogeneity in sophistication levels among hedge fund investors, greenwashing is likely to persist. Nevertheless, environmentally and socially conscious asset owners can take comfort in the fact that regulatory and societal pressures either via the adoption of stewardship codes or via social norms can help fund managers internalize their investors' preferences for responsible investment.

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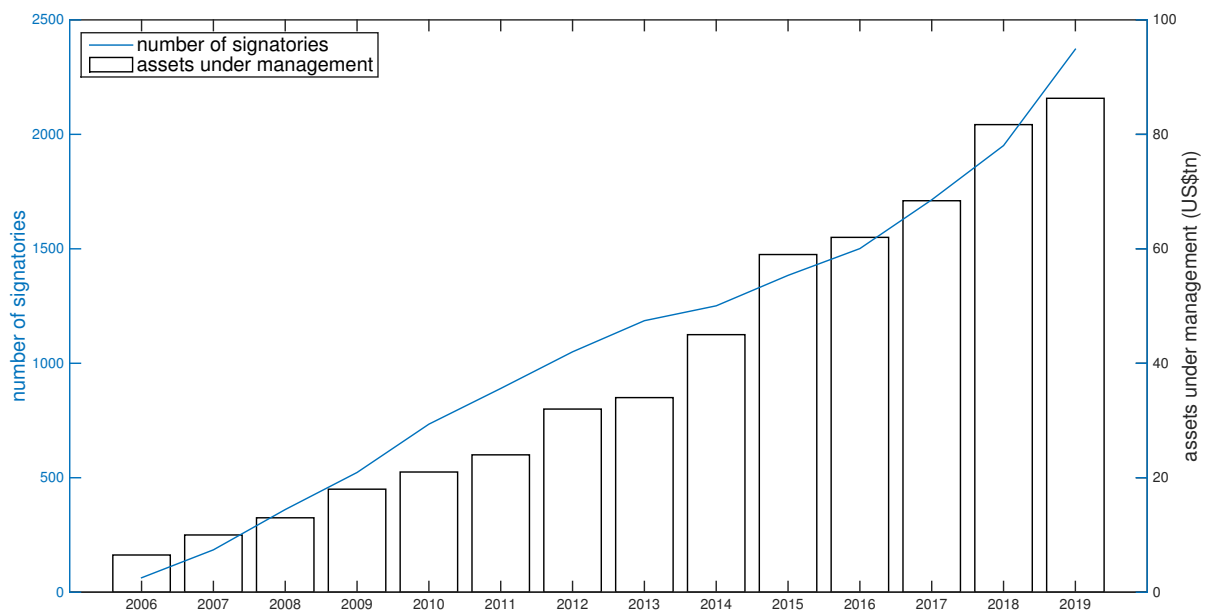


Figure 1: PRI signatory growth. PRI denotes the United Nations Principles for Responsible Investment. PRI signatories include asset owners, investment managers, and service providers. The line graph depicts the number of PRI signatories (y-axis on the left). The bar graph depicts the assets under management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

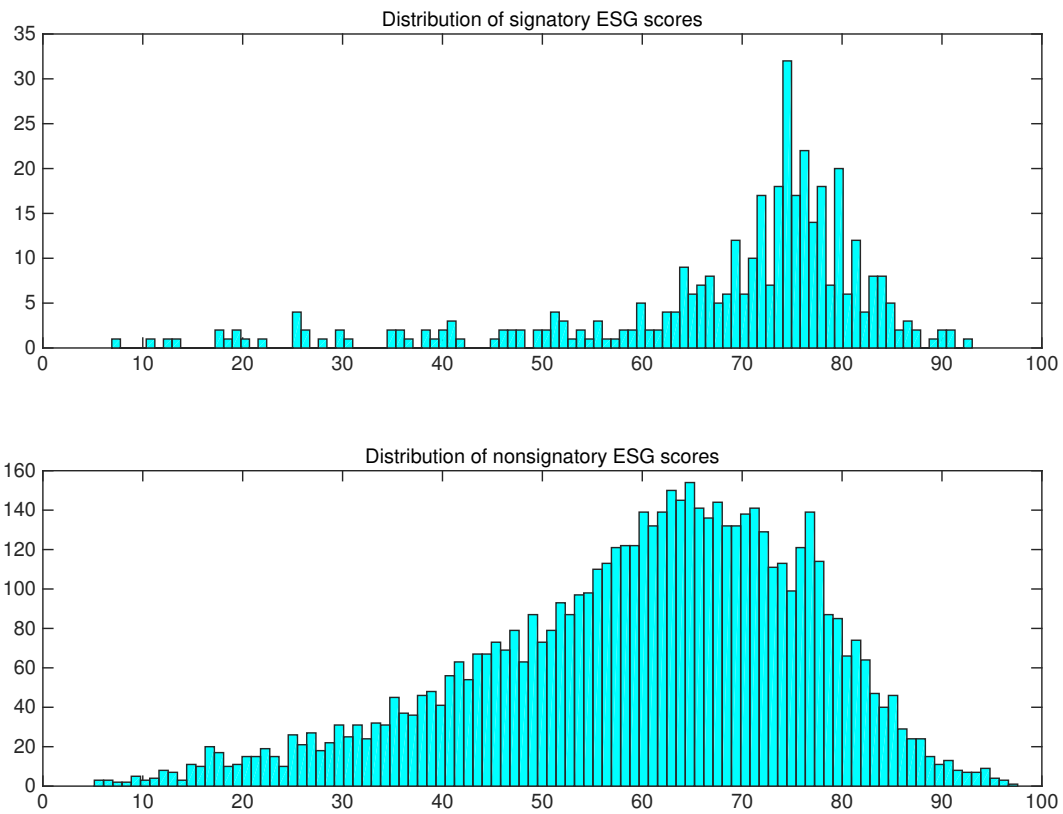


Figure 2: Firm ESG scores for PRI signatories and nonsignatories. PRI denotes the United Nations Principles for Responsible Investment. Firm ESG scores are the value-weighted average of the Refinitiv ESG scores of the stocks held by hedge fund firms computed quarterly and averaged over the year. The sample period is from May 2006 to April 2019.

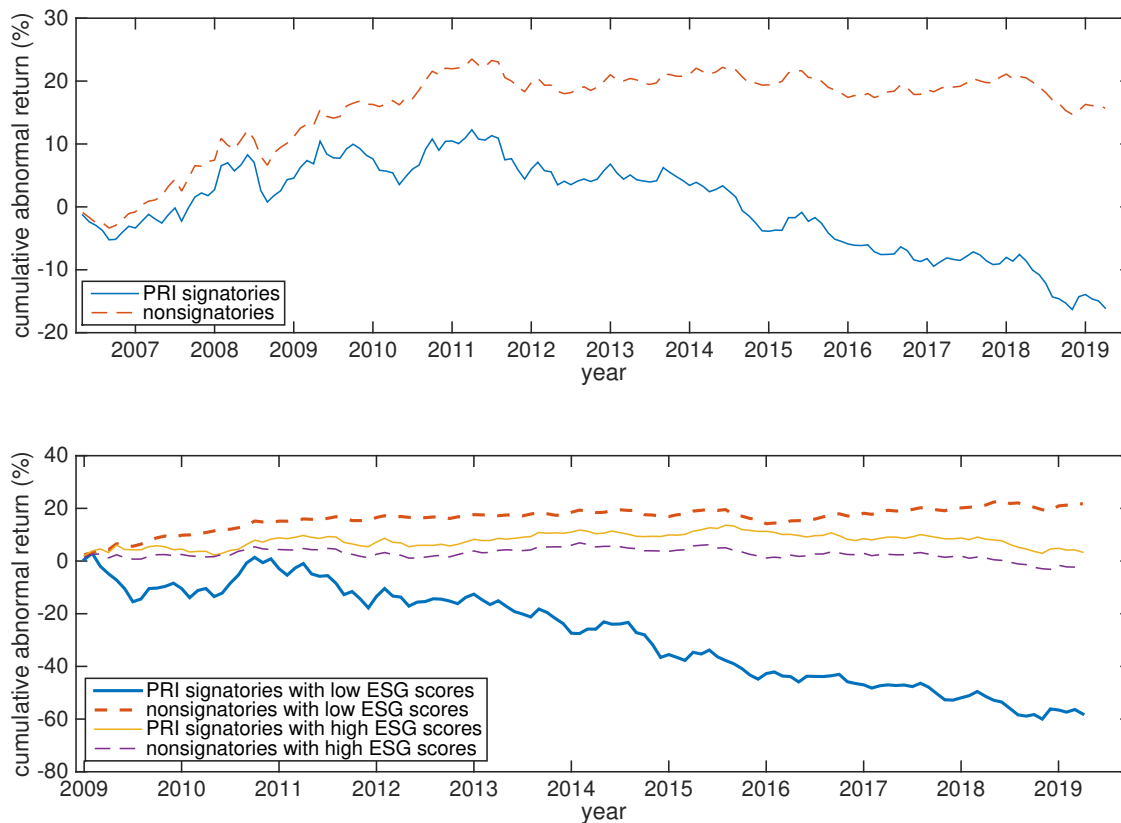


Figure 3: Cumulative abnormal returns of hedge funds sorted on PRI endorsement and firm ESG scores. Every month, hedge funds are sorted into two portfolios based on PRI endorsement (top graph) or sorted independently into 2 x 3 portfolios based on PRI endorsement and firm ESG scores (bottom graph). The 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 fund management companies with bottom-tercile and top-tercile ESG scores, respectively. PRI denotes the United Nations Principles for Responsible Investment. Firm ESG scores are the value-weighted average of the Refinitiv 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 period is from May 2006 to April 2019. To ensure that there is at least one hedge fund in each of the sub-portfolios for the independent double sort, the double sort is conducted only starting in January 2009.

Table 1: **Summary statistics**

Panel A 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 and nonsignatory firms at the end of each year. PRI denotes the Principles for Responsible Investment. Panel B reports fund characteristics for PRI signatory and nonsignatory firms and for low- and high-ESG signatory firms. Low- and high-ESG signatories are those with bottom and top tercile ESG scores, respectively. Firm ESG scores are the value-weighted average of the Refinitiv ESG scores of the stocks held by hedge fund firms. The sample period is from May 2006 to April 2019. *, ** denote significance at the 5% and 1% levels, respectively.

Panel A: Funds and fund management companies by year						
Year	PRI signatories			nonsignatories		
	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

Panel B: Fund characteristics						
Fund characteristics	PRI signatories	nonsignatories	spread	Low-ESG signatories	High-ESG signatories	spread
Management fee (%)	1.25	1.50	-0.25**	1.34	1.16	0.18**
Performance fee (%)	14.12	17.75	-3.64**	14.54	13.94	0.60
Notice period (months)	1.08	1.74	-0.66**	1.17	1.22	-0.05
Minimum investment (US\$m)	1.67	1.21	0.46*	1.83	1.63	0.20
Age (decades)	0.62	0.49	0.13**	0.84	0.62	0.21*
AUM (US\$m)	452.31	157.16	295.15**	691.58	649.84	41.74

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 United Nations 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 duration (BAAMTSY), bond PTFS (PTFSBD), currency PTFS (PTFSFX), and commodities PTFS (PTFSCOM), bond appropriately adjusted for duration (BAAMTSY), bond PTFS (PTFSBD), change in the spread of Moody's BAA bond over ten-year Treasury 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	BD10RET	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**

In Panel A, 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 United Nations Principles for Responsible Investment. Firm ESG scores are the value-weighted average of the Refinitiv 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 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 followed strategy. In Panel B, 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)	-0.13 (-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 B: 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: **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 United Nations 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 Refinitiv, MSCI, and Sustainalytics. E&S and CG scores refer to the environmental and social as well as corporate governance components, respectively, of the Refinitiv 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	Refinitiv (E&S score)						Refinitiv (CG score)			MSCI			Sustainalytics		
	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)	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)	-6.66* (-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 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 Refinitiv. The other independent variables are hedge fund 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*) 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)	(9)	(10)	(11)	(12)
<i>PRI</i>	-0.130** (-6.71)	-0.057** (-2.80)	0.047 (1.28)	-0.188** (-9.31)	-0.138** (-6.45)	0.041 (1.08)	-0.133* (-2.25)	-0.071 (-1.64)	0.045 (0.95)	-0.167** (-2.92)	-0.135** (-2.95)	0.040 (0.80)
<i>ESG-LOW</i>			0.222** (7.23)		0.173** (5.62)	0.173** (5.62)		0.215** (2.96)		0.215** (2.96)		0.173** (3.82)
<i>PRI*ESG-LOW</i>			-0.291** (-3.11)		-0.341** (-3.62)	-0.341** (-3.62)		-0.378 (-1.70)		-0.378 (-1.70)		-0.491* (-2.55)
<i>MGTFFEE</i> (percent)		0.006 (0.52)	0.027 (0.81)		-0.000 (-0.01)	0.008 (0.23)		-0.004 (-0.12)		-0.003 (-0.07)		-0.012 (-0.09)
<i>PERFFEE</i> (percent)		0.001 (0.51)	-0.010** (-4.31)		0.008** (7.55)	0.007** (3.25)		0.000 (0.08)		-0.010* (-2.03)		0.008* (1.83)
<i>NOTICE</i> (months)		0.042** (10.34)	0.047** (4.95)		0.041** (9.43)	0.046** (4.30)		0.046** (3.77)		0.051** (4.18)		0.050** (3.57)
<i>MININV</i> (US\$m)		0.004** (5.54)	0.005* (2.07)		0.008** (9.44)	0.008** (3.65)		0.005 (1.49)		0.003 (0.94)		0.009** (2.38)
<i>log(SIZE)</i>		-0.041** (-10.54)	-0.021** (-2.58)		0.004 (1.07)	0.008 (0.97)		-0.032** (-2.89)		-0.009 (-0.65)		0.010 (0.72)
<i>AGE</i> (decades)		-0.113** (-9.44)	0.005 (0.20)		-0.031* (-2.38)	-0.055* (-2.32)		-0.122** (-4.05)		-0.024 (-0.63)		-0.065* (-2.21)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No
Strategy dummies	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	0.005	0.060	0.073	0.072	0.027	0.037	0.036
Number of observations	661,764	597,523	73,572	489,535	457,103	63,822	156	156	124	156	156	124

Table 6: 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 (i) fund manager total delta (Agarwal, Daniel, and Naik, 2009) computed over the previous year (Panel A), (ii) the ratio of fund management fee to performance fee (Panel B) or (iii) their Ozik and Sadka (2015) governance scores (Panel C). Weak incentive alignment funds are funds with low manager total delta, high ratio of 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 ratio of 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 United Nations Principles for Responsible Investment. Firm ESG scores are the value-weighted average of the Refinitiv 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: **Endogeneity tests**

This table reports results from OLS multivariate regressions on hedge fund investment performance and ESG exposure with exogenous shock variables. The dependent variables are hedge fund monthly return (*RETURN*), monthly alpha (*ALPHA*), and annual ESG exposure (*ESG*). *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. *ESG* is fund management company ESG score which is the value-weighted average of the ESG scores of the stocks held by the hedge fund firm. Stock ESG scores are obtained from the Refinitiv database. The primary independent variables of interest are the PRI dummy (*PRI*) and the interaction of the PRI dummy with the exogenous shock. The PRI dummy (*PRI*) takes a value of one if the hedge fund is managed by a PRI signatory firm. The exogenous shock variable is *STEWARDSHIP* where *STEWARDSHIP* takes a value of one during the 12 months that coincide with and follow the adoption of stewardship codes in the country where the hedge fund firm is based. The other independent variables are hedge fund 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*) as well as dummy variables for year and fund investment strategy. The coefficient estimates on these fund control variables are omitted for brevity. The regressions are estimated separately for low and high ESG funds. Low ESG funds belong to fund management companies that exhibit bottom tercile ESG scores. High ESG funds belong to fund management companies that exhibit top tercile ESG scores. 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. * Denotes significance at the 5% level; ** Denotes significance at the 1% level.

Independent variable	Dependent variable					
	Low ESG funds			High ESG funds		
	<i>ESG</i> (1)	<i>RETURN</i> (2)	<i>ALPHA</i> (3)	<i>ESG</i> (4)	<i>RETURN</i> (5)	<i>ALPHA</i> (6)
<i>PRI</i>	-5.917** (-3.90)	-0.336** (-3.46)	-0.415** (-4.17)	0.365* (2.43)	0.043 (1.05)	0.057 (1.36)
<i>STEWARDSHIP</i>	-3.015** (-5.36)	-1.051** (-7.42)	-0.383** (-2.61)	1.064* (2.11)	-0.210* (-2.48)	-0.106 (-1.18)
<i>PRI</i> * <i>STEWARDSHIP</i>	3.579* (1.98)	1.033** (3.55)	0.913** (3.69)	0.585** (2.85)	-0.009 (-0.09)	-0.064 (-0.61)
Fund controls	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Strategy dummies	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.185	0.050	0.006	0.129	0.033	0.005
Number of observations	5,283	31,869	28,453	7,696	41,703	35,369

Table 8: **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 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 Refinitiv. 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 (*MGTFEE*), performance fee (*PERFEE*), 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 coefficient estimates on these variables (except for the performance rank variables) are omitted for brevity. 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											
	FLOW						FIRM_FLOW					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>PRI</i>	0.110** (5.19)	0.077** (4.05)	0.073** (3.83)	0.076* (2.14)	0.078* (2.32)	0.073* (2.19)	0.202** (6.31)	0.151** (4.93)	0.148** (4.82)	0.145* (2.29)	0.169** (2.68)	0.149* (2.35)
<i>LOW_ESG</i>				-0.022 (-1.11)	-0.016 (-0.85)	-0.020 (-1.08)				-0.010 (-0.39)	-0.012 (-0.46)	-0.013 (-0.49)
<i>PRI*LOW_ESG</i>				0.142 (1.33)	0.112 (1.06)	0.121 (1.15)				0.133 (0.66)	0.118 (0.57)	0.132 (0.63)
<i>RANK</i>	0.467** (27.04)			0.426** (11.13)			0.473** (22.80)			0.314** (4.86)		
<i>RANK_CAPM</i>		0.287** (19.23)			0.310** (8.94)			0.298** (16.43)			0.284** (5.42)	
<i>RANK_FH</i>			0.327** (22.34)			0.338** (9.80)			0.343** (19.22)			0.229** (4.36)
Fund controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Strategy dummies	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No
Adj. R ²	0.094	0.048	0.053	0.077	0.060	0.065	0.104	0.055	0.061	0.062	0.058	0.054
Number of observations	32,486	25,278	25,278	4,870	4,435	4,435	19,646	16,103	16,103	2,431	2,338	2,338

Table 9: Fund management company 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 reports 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 Refinitiv. 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. 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)	0.104 (0.48)	-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)	-0.506** (-3.70)	-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)	1.051* (2.27)	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]	[0.068]	[0.071]	[0.485]	[0.269]	[0.439]	[0.364]
<i>PERFFEE</i> (percent)	0.203 (1.71)	0.188 (1.52)	0.092 (0.69)	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 (-1.22)	-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)	0.085 (1.69)	-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)	0.010 (0.70)	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)	0.156** (4.14)	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)	-0.166 (-1.75)	-0.554** (-4.22)	0.111 (1.32)	0.054 (0.47)	-0.260** (-3.04)	0.042 (0.50)
Pseudo R ²	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	0.019 2,252	0.095 2,252	0.105 2,029	0.014 2,029	0.063 824	0.121 824	0.090 824	0.045 824

Table 10: **Social norms**

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 United Nations 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. *, ** denote significance at the 5% and 1% levels, respectively.

	Country-level social norms measured using					
	Environmental Performance Index		Employment Laws Index		E&S Index from survey data	
	Excess return (percent/year)	Alpha (percent/year)	Excess return (percent/year)	Alpha (percent/year)	Excess return (percent/year)	Alpha (percent/year)
	(1)	(2)	(3)	(4)	(5)	(6)
Hedge fund portfolio						
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)

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 United Nations Principles for Responsible Investment. Firm ESG scores are the value-weighted average of the Refinitiv 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	Low ESG	High ESG		All funds	Low ESG	High ESG
	(1)	(2)	(3)		(4)	(5)	(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 + ESG factor				Panel L: Including delisted signatories			
PRI signatories	-1.26 (-0.99)	-5.61* (-2.26)	0.19 (0.18)	PRI signatories	-0.62 (-0.48)	-5.62* (-2.29)	0.42 (0.41)
nonsignatories	1.18 (1.23)	1.81* (2.59)	-0.31 (-0.42)	nonsignatories	1.40 (1.46)	2.10* (2.57)	-0.24 (-0.31)
Spread (PRI minus non-PRI)	-2.44** (-3.92)	-7.42** (-3.07)	0.50 (0.67)	Spread (PRI minus non-PRI)	-2.02** (-3.36)	-7.72** (-3.18)	0.66 (0.99)
Panel F: FH model + Bolton and Kacperczyk (2020) CO ₂ emissions factor				Panel M: Pure play hedge fund firms			
PRI signatories	-0.67 (-0.51)	-5.10* (-2.03)	0.52 (0.47)	PRI signatories	-1.46 (-1.10)	-6.24* (-2.49)	0.51 (0.46)
nonsignatories	1.55 (1.60)	2.08* (2.45)	-0.01 (-0.01)	nonsignatories	1.25 (1.29)	2.38** (2.81)	0.28 (0.36)
Spread (PRI minus non-PRI)	-2.23** (-3.37)	-7.18** (-2.86)	0.53 (0.71)	Spread (PRI minus non-PRI)	-2.70** (-4.07)	-8.62** (-3.49)	0.23 (0.27)
Panel G: FH model + Hsu, Li, and Tsou (2020) toxic emissions factor				Panel N: Stock holdings from 13F + FactSet			
PRI signatories	-1.26 (-0.98)	-5.62* (-2.29)	0.32 (0.29)	PRI signatories	-1.24 (-0.97)	-4.82* (-2.04)	0.01 (0.01)
nonsignatories	1.20 (1.24)	2.10* (2.61)	-0.23 (-0.31)	nonsignatories	1.21 (1.26)	1.62 (1.90)	-0.95 (-1.11)
Spread (PRI minus non-PRI)	-2.45** (-3.94)	-7.72** (-3.18)	0.55 (0.76)	Spread (PRI minus non-PRI)	-2.45** (-3.93)	-6.45** (-2.84)	0.96 (1.47)

Internet Appendix: Greenwashing

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. Panel B of Table A1 reveals that our findings remain qualitatively unchanged when we do not allow for 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 doing so.

1.5. Liquidity risk

To ensure that our findings are not driven by liquidity risk, we redo the tests after augmenting the Fung and Hsieh (2004) model with the excess return from the Pástor and Stambaugh (2003) liquidity factor. Panel E of Table A1 reveals that inferences remain unchanged with this adjustment.

1.6. 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 F of Table A1 suggests that our findings are not driven by founding PRI signatories.

References

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- Mitchell, M., Pulvino, T., 2001. Characteristics of risk and return in risk arbitrage. *Journal of Finance* 56, 2135–2175.
- Pástor, L., Stambaugh, R., 2003. Liquidity risk and expected stock returns. *Journal of Political Economy* 111, 642–685.

Fig A1: UK Stewardship Code (July 2010)

Principle 1: Institutional investors should publicly disclose their policy on how they will discharge their stewardship responsibilities.

The disclosure should include:

- how investee companies will be monitored. In order for monitoring to be effective an active dialogue may, where necessary, need to be entered into with the investee company's board;
- the strategy on intervention;
- internal arrangements, including how stewardship is integrated with the wider investment process;
- the policy on voting and the use made of, if any, proxy voting or other voting advisory service, including information on how they are used; and
- the policy on considering explanations made in relation to the UK Corporate Governance Code.

Principle 2: Institutional investors should have a robust policy on managing conflicts of interest in relation to stewardship and this policy should be publicly disclosed.

An institutional investor's duty is to act in the interests of all clients and/or beneficiaries when considering matters such as engagement and voting.

Conflicts of interest will inevitably arise from time to time, which may include when voting on matters affecting a parent company or client.

Institutional investors should put in place and maintain a policy for managing conflicts of interest.

Principle 3: Institutional investors should monitor their investee companies.

Investee companies should be monitored to determine when it is necessary to enter into an active dialogue with their boards. This monitoring should be regular, and the process clearly communicable and checked periodically for its effectiveness.

As part of this monitoring, institutional investors should:

- seek to satisfy themselves, to the extent possible, that the investee company's board and committee structures are effective, and that independent directors provide adequate oversight, including by meeting the chairman and, where appropriate, other board members;

- maintain a clear audit trail, for example, records of private meetings held with companies, of votes cast, and of reasons for voting against the investee company's management, for abstaining, or for voting with management in a contentious situation; and
- attend the General Meetings of companies in which they have a major holding, where appropriate and practicable.

Institutional investors should consider carefully explanations given for departure from the UK Corporate Governance Code and make reasoned judgements in each case. They should give a timely explanation to the company, in writing where appropriate, and be prepared to enter a dialogue if they do not accept the company's position.

Institutional investors should endeavour to identify problems at an early stage to minimise any loss of shareholder value. If they have concerns they should seek to ensure that the appropriate members of the investee company's board are made aware of them.

Institutional investors may not wish to be made insiders. They will expect investee companies and their advisers to ensure that information that could affect their ability to deal in the shares of the company concerned is not conveyed to them without their agreement.

Principle 4: Institutional investors should establish clear guidelines on when and how they will escalate their activities as a method of protecting and enhancing shareholder value.

Institutional investors should set out the circumstances when they will actively intervene and regularly assess the outcomes of doing so. Intervention should be considered regardless of whether an active or passive investment policy is followed. In addition, being underweight is not, of itself, a reason for not intervening. Instances when institutional investors may want to intervene include when they have concerns about the company's strategy and performance, its governance or its approach to the risks arising from social and environmental matters.

Initial discussions should take place on a confidential basis. However, if boards do not respond constructively when institutional investors intervene, then institutional investors will consider whether to escalate their action, for example, by:

- holding additional meetings with management specifically to discuss concerns;
- expressing concerns through the company's advisers;
- meeting with the chairman, senior independent director, or with all independent directors;
- intervening jointly with other institutions on particular issues;
- making a public statement in advance of the AGM or an EGM;
- submitting resolutions at shareholders' meetings; and

- requisitioning an EGM, in some cases proposing to change board membership.

Principle 5: Institutional investors should be willing to act collectively with other investors where appropriate.

At times collaboration with other investors may be the most effective manner in which to engage.

Collaborative engagement may be most appropriate at times of significant corporate or wider economic stress, or when the risks posed threaten the ability of the company to continue.

Institutional investors should disclose their policy on collective engagement.

When participating in collective engagement, institutional investors should have due regard to their policies on conflicts of interest and insider information.

Principle 6: Institutional investors should have a clear policy on voting and disclosure of voting activity.

Institutional investors should seek to vote all shares held. They should not automatically support the board.

If they have been unable to reach a satisfactory outcome through active dialogue then they should register an abstention or vote against the resolution. In both instances, it is good practice to inform the company in advance of their intention and the reasons why.

Institutional investors should disclose publicly voting records and if they do not explain why.

Principle 7: Institutional investors should report periodically on their stewardship and voting activities.

Those that act as agents should regularly report to their clients details of how they have discharged their responsibilities. Such reports will be likely to comprise qualitative as well as quantitative information. The particular information reported, including the format in which details of how votes have been cast are presented, should be a matter for agreement between agents and their principals.

Transparency is an important feature of effective stewardship. Institutional investors should not, however, be expected to make disclosures that might be counterproductive. Confidentiality in specific situations may well be crucial to achieving a positive outcome.

Those that act as principals, or represent the interests of the end-investor, should report at least annually to those to whom they are accountable on their policy and its execution.

Those that sign up to this Code should consider obtaining an independent audit opinion on their engagement and voting processes having regard to the 12 standards in AAF 01/06 and SAS 70 . The existence of such assurance certification should be publicly disclosed.

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 United Nations 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)			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						
PRI signatories	-0.41 (-0.39)	-2.67 (-1.56)	0.71 (0.82)	-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)	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)	-2.78** (-4.18)	-7.69** (-3.47)	-0.43 (-0.64)
Panel B: No publication lag for stock ESG scores						
PRI signatories	-1.24 (-0.97)	-4.32 (-1.94)	-0.18 (-0.16)	-1.42 (-1.01)	-6.45* (-2.42)	0.72 (0.63)
nonsignatories	1.21 (1.26)	1.91* (2.38)	0.21 (0.28)	1.85 (1.72)	2.30** (2.92)	0.46 (0.55)
Spread (PRI minus non-PRI)	-2.45** (-3.93)	-6.23** (-2.85)	-0.39 (-0.60)	-3.27** (-5.49)	-8.75** (-3.44)	0.26 (0.34)
Panel C: Adjusted for fund termination						
PRI signatories	-2.91* (-2.02)	-5.34* (-2.44)	-1.87 (-1.31)	-1.06 (-0.85)	-4.39 (-1.96)	0.35 (0.37)
nonsignatories	-0.78 (-0.64)	0.04 (0.04)	-1.71 (-1.47)	1.36 (1.41)	1.90* (2.35)	0.21 (0.29)
Spread (PRI minus non-PRI)	-2.13** (-3.38)	-5.39* (-2.47)	-0.16 (-0.25)	-2.43** (-3.50)	-6.28** (-2.84)	0.14 (0.27)
Panel D: FH model + Agarwal and Naik (2004) option-based factors						
PRI signatories						
nonsignatories						
Spread (PRI minus non-PRI)						
Panel E: FH model + Pástor and Stambaugh (2003) liquidity factor						
PRI signatories						
nonsignatories						
Spread (PRI minus non-PRI)						
Panel F: Excluding founding PRI signatories						
PRI signatories						
nonsignatories						
Spread (PRI minus non-PRI)						

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 nonsignatory 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 United Nations 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 duration (BAAMTSY), bond PTFB (PTFSBD), currency PTFB (PTFSFX), and commodities PTFB (PTFSCOM), where PTFB 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)	2.54 (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 (future PRI signatories)	3.91 (1.83)	0.22 (0.19)	0.37** (13.44)	-0.04 (-1.00)	-1.18* (-2.43)	-2.66** (-3.68)	-0.01* (-1.98)	0.01 (0.80)	-0.01 (-0.92)	0.74
Portfolio C (neither future nor current signatories)	4.01* (2.33)	1.33 (1.41)	0.30** (12.49)	0.00 (0.14)	-0.55 (-1.37)	-2.09** (-3.47)	-0.01 (-1.50)	0.01 (1.50)	0.00 (-0.35)	0.74
Spread (A minus B)	-1.36** (-2.72)	-1.46** (-2.86)	-0.02 (-1.64)	-0.01 (-0.82)	-0.45 (-1.87)	-0.50 (-1.61)	-0.01 (-1.96)	0.00 (0.44)	0.00 (-0.15)	0.03
Spread (A minus C)	-1.47* (-1.98)	-2.57** (-3.94)	0.05** (2.73)	-0.06* (-2.57)	-1.07** (-3.74)	-1.107** (-2.97)	-0.01** (-3.14)	0.00 (-0.37)	0.00 (-1.32)	0.33
Spread (B minus C)	-0.11 (-0.19)	-1.12** (-2.65)	0.07** (5.86)	-0.05** (-2.88)	-0.63** (-3.66)	-0.57** (-2.94)	-0.01* (-2.11)	0.00 (-1.23)	0.00 (-1.94)	0.49

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 (*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. 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 (*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*), 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>MGTFFEE</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>PERFFEE</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)
$\log(\textit{SIZE})$	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