

ESG Commitment and the Value of “Walking the Talk”: Evidence from Closed-End Funds*

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Abstract

We investigate the impact of a firm’s credible commitment to ESG on firm value. Using closed-end funds as an empirical laboratory, we find that a fund signing the U.N. Principles for Responsible Investment (PRI) is traded at a higher market price compared to its portfolio value only when the fund actually increases the ESG scores of its portfolio. The result is more pronounced for funds facing higher hurdles to take actions to honor their ESG commitments. Importantly, the positive impact is stronger when ESG-related regulations become more stringent. Overall, our analysis suggests that firms’ commitment to ESG can lead to higher firm value when they can credibly “walk their talk” and this benefit is related to the direction of ESG regulations.

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1. Introduction

Concerns on climate changes, social justice, and sustainable growth have spurred the interest in ESG (Environmental, Social, and Governance). However, a much-debated question is whether ESG increases the firm value and subsequently leads to an increase in shareholder wealth. Although simple, the question is not easy to answer (Gillan et al. (2021)). The extant literature provides contradictory findings on the impact of ESG on firm value. Some prior studies (e.g., Edmans (2011); Lins et al. (2017)) find that ESG increases firm value, whereas some others find that ESG does not affect or even decreases firm value (e.g., Masulis and Reza (2015); Buchanan et al. (2018)). The issue has grown in importance in light of recent development in investment firms' pledges for socially responsible investing. The asset under management for such funds increased to \$17 trillion in 2021 from \$570 billion in 2010 (US SIF (2020)).

In this paper, using closed-end funds (CEFs) as a laboratory, we investigate how ESG can increase (or decrease) firm value. In particular, we focus on the role of credible commitment to ESG in determining the impact of ESG on firm value. ESG initiative is a long-term investment requiring large expenses without immediate returns. Thus, a firm's ability to communicate its commitment to ESG is a crucial condition for the success of the ESG efforts, potentially leading to an increased firm value. However, not all ESG commitments are credible, and there is a growing concern for "Greenwashing" in the industry. We hypothesize that only those closed-end funds which pledge their commitment to ESG and actually increase the ESG score in their portfolio holdings will trade at a higher market value relative to its portfolio value (henceforth, the "walking the talk" effect).

The conflicting findings on the impact of ESG on firm value in the literature are partly due to an empirical challenge in measuring the market value of a firm relative to its fundamental value. Moreover, it is hard, if not impossible, to compare different firms' ESG exposure in different industries and to evaluate their impact on the firm value. Using CEF as an empirical laboratory, we can objectively observe a firm's market value relative to its fundamental value

based on its portfolio holdings. At the same time, unlike other regular public corporations, we can directly measure a CEF's ESG footprint based on its investment holdings. We measure a CEF's ESG score based on its portfolio stocks' ESG scores. Put simply, we can objectively measure a firm value and its ESG activities in this novel empirical setting not explored in the literature.

We focus on the U.N. Principles for Responsible Investment (PRI) as a uniform platform to showcase a fund's commitment to ESG. The PRI is the largest global initiative on ESG investment launched in 2006, and it is considered as the most influential platform where financial institutions can pledge their commitment to socially responsible investment (Kim and Yoon (2021)). Pledging ESG is heavily dependent on a firm's business model and changing environment of the industry (Bolton and Kacperczyk (2021)). For example, Costco Wholesale Corp. and Exxon Mobil Corp. would not have exactly the same goals and actions for their ESG initiatives. Compared to these regular public firms, CEFs are more uniform in their goals and business models and the U.N. PRI serves as an equal-footing venue for investment firms to pledge their commitment to ESG. In addition, closed-end funds are better positioned to sustain their long-term CEF commitment without concerns about a temporary fund flow shock, which is often a major concern for open-end funds (Coval and Stafford (2007)).

To preview our analysis result, we find that a closed-end fund trades at a higher premium (i.e., lower discount) when it enrolls in the U.N. PRI *and* increases the ESG scores in its portfolio holdings. Signing the U.N. PRI or increasing the ESG score alone does not significantly increase the CEF's premium. This "walking the talk" effect highlights the positive complementing effect of the pledged ESG commitment and actual ESG efforts in improving firm value. The result is statistically and economically significant even after controlling for a host of determinants of closed-end funds premia/discounts. A one-standard-deviation increase in a fund's portfolio ESG score leads to an increase in CEF premium by 19.22% of its standard deviation for the U.N. PRI signatories. Consistent with prior studies in the literature (e.g., Lins et al. (2017)), the result is largely driven by the environmental and social component of

ESG rather than the governance component.

We find that the complementing effects of the ESG commitment and actions are greater for funds facing higher hurdles to make their ESG commitment credible. Specifically, the “walking the talk” effect is greater when the stock market condition is not favorable to CEFs keeping their pledge to the ESG investment (e.g., energy stock returns are higher than ESG stock returns).

Regarding a specific channel of firm value improvement, our analysis shows that “walking the talk” provides a firm with an advantageous position when ESG-related regulations become more stringent. Figure 1 presents the trend of the cumulative number of policy interventions related to sustainable finance and investment around the world since 1980. The figure clearly shows that regulatory interventions are becoming more frequent and investors would be increasingly concerned about potential regulatory sanctions on their firms. A firm with a credible commitment to its long-term improvement in ESG would be less exposed to ESG regulatory sanctions and this beneficial effect would be more favorably perceived by investors when the ESG regulations become more stringent. To test this conjecture, we consider several ESG regulatory stringency indexes related to environmental and social issues. For the environmental regulatory stringency changes, we examine the Environment Policy Stringency Index (EPSI) developed by the OECD, the number of enforcement actions by the U.S. Environmental Protection Agency, and the U.S. announcement of withdrawal from the Paris Agreement in June 2017. For the social regulatory stringency changes, we consider the amount of penalties imposed by the Occupational Safety and Health Administration (OSHA). Our analysis shows that the “walking the talk” increases a CEF’s premium when the environmental and social regulations become more stringent.

To address an endogeneity concern about the signatory timing of the U.N. PRI, we conduct a two-stage least squared regression analysis. We use a Google Search Volume about ESG (and related terms) near the headquarter of a closed-end fund’s investment firm as an instrumental variable for the signatory status of the fund. The first stage regression confirms

the relevance condition that a fund is more likely to sign the U.N. PRI when more people around the headquarter of the fund’s investment firm search about ESG. We presume that a fund’s executives could have been influenced by the increased interest in ESG among the local population. However, it is not immediately obvious how the local population’s interest in ESG could have directly affected the closed-end fund’s premia after controlling for relevant confounding factors and we suppose the exclusion restriction condition reasonably holds. The second-stage regression analysis result confirms the “walking the talk” effect; a closed-end fund with high ESG scores in its portfolio has a higher premium after it becomes a U.N. PRI signatory.

Additionally, we offer several robustness check analyses. We conduct a placebo test by replacing the actual enrollment dates of the U.N. PRI with randomly chosen dates which are drawn from the empirical distribution of the signing dates. The placebo test result is insignificant, confirming that the actual signing date of the U.N. PRI carries useful information about a CEF’s expressed commitment to ESG. We also provide a robustness check of the main analysis using an alternative database of corporate ESG scores, Thomson Reuters ASSET4. The “walking the talk” effect is robust to using this alternative ESG database.

This paper contributes to the large literature on the controversial impact of corporate social responsibility (CSR) and ESG on firm value. Many prior studies have explored how corporate ESG leads to firm value in various settings, but the empirical results are contradicting. Some studies document positive effects whereas others report negative effects as discussed in the recent literature review by Gillan et al. (2021). By relying on a novel empirical setting of closed-end funds, this paper aims to identify the impact of corporate ESG on firm value and provide evidence on the important role of credible commitment to ESG in determining the beneficial impact of ESG on firm value, termed “walking the talk” effect. Our findings also suggest that the positive effect of “walking the talk” is related to investors’ expectation about the stringency of ESG regulations.

This study is also related to the fast-growing literature on socially responsible investing

(SRI). The existing literature offers both positive and negative implications of SRI-based investment strategies. Some studies find that SRI strategies would lead to superior investment performance (e.g., Bauer et al. (2005); Derwall et al. (2005); Kempf and Osthoff (2007); Edmans (2011)) but others provide opposite implications (e.g., Geczy et al. (2005); Fabozzi et al. (2008); Hong and Kacperczyk (2009); Renneboog et al. (2008b)). We provide novel empirical evidence on the complementing association between an investment firm’s expressed commitment to SRI and its actual implementation of the SRI strategies.

The remainder of the paper is organized as follows. Section 2 develops our main hypothesis following the recent literature’s findings and discusses the empirical setting. Section 3 describes our main variables of interest and presents the empirical methodology to test our hypothesis. Section 4 reports main empirical results and also presents additional analyses based on instrumental variable analysis and placebo tests. Section 5 concludes.

2. Related Literature, Empirical Setting and Hypothesis Development

2.1. Literature on the Impact of ESG on Firm Value

The literature on ESG or corporate social responsibility (CSR) is extensive. In this literature, a central question is whether ESG increases firm value but prior studies offer equivocal answers.¹

ESG can increase firm value due to reduced litigation risk (Hong and Kacperczyk (2009); Hong and Liskovich (2015)), regulatory risk (Krueger et al. (2020); Seltzer et al. (2021)), systematic risk (Albuquerque et al. (2019)), and downside risk (Kim et al. (2014); Ilhan et al. (2021); Hoepner et al. (2021)). Reduced risk leads to lower cost of capital (e.g., Chava (2014); El Ghouli et al. (2011)) and results in higher firm value. Investors’ non-pecuniary utility

¹For the more extensive literature review, please refer to Renneboog et al. (2008a); Liang and Renneboog (2020); Gillan et al. (2021)

from investing ESG firms also reduces the required rate of return (Pástor et al. (2021)), leading to higher market valuation of ESG firms. Empirical studies document that higher ESG activities are associated with higher Tobin's Q (Gao and Zhang (2015); Ferrell et al. (2016)) and positive stock market reactions (Statman and Glushkov (2009); Krüger (2015); Flammer (2015); Deng et al. (2013); Tang and Zhang (2020)). ESG can also improve firm value via employee satisfaction (Edmans (2011)) and customers' loyalty (Lins et al. (2017)).

Some other studies, however, find negative or insignificant relation between ESG and firm value. Self-serving managers may want to engage in ESG activities to earn them a favorable public image at the expense of shareholders' wealth (Chen et al. (2020)). In this view, ESG is simply a manifestation of agency problems. Di Giuli and Kostovetsky (2014) provide evidence on the negative relation between ESG and long-run ROA or stock returns, supporting the negative view on ESG. Hsu et al. (2021) find no significant relation between ESG and firm performance. Masulis and Reza (2015) show that the announcement of corporate philanthropic activities reduces stock returns. Buchanan et al. (2018) find that firms with high ESG experience more loss in firm value during the financial crisis. This result is in contrast to Lins et al. (2017) who argue that ESG adds value during the crisis when trust is low. Humphrey et al. (2012) find no significant relation between corporate social performance and risk-adjusted performance of firms in the U.K.

Overall, the literature offers conflicting empirical evidence on the causal impact of ESG on firm value. These conflicting findings can be at least partly due to empirical challenges that researchers face when investigating this question. Measuring the firm value and its ESG footprints in an objective manner is an important challenge to overcome. There are a host of confounding factors influencing the relation between ESG and firm value as the literature documents. In this paper, we aim to overcome these challenges by using the closed-end funds as a laboratory, and we explain this setting in the following section.

2.2. Closed-End Funds as a Laboratory

To investigate the role of a firm’s commitment to ESG in determining the impact of ESG on firm value, we exploit closed-end funds as an empirical laboratory. Although firm value is the single most important measure of corporate performance, it is notoriously hard to measure. Most studies in the literature focus on Tobin’s Q (e.g., Gao et al. (2014); Borghesi et al. (2014)), stock market reaction (e.g., Statman and Glushkov (2009); Deng et al. (2013); Krüger (2015); Flammer (2015); Tang and Zhang (2020)) or operating performance measured by accounting ratios (e.g., Ferrell et al. (2016)). Although these measures have their own place in the literature, they are only inaccurately capturing the market values of firms relative to their fundamentals. The CEFs provide a useful setting to address this important empirical challenge. Like all other public corporations, CEFs raise capital from IPOs and subsequent SEOs. CEFs invest the proceeds in stocks and other financial securities. An important feature of closed-end funds is that we can regularly observe their underlying assets’ market value because these are also publicly traded financial securities. In addition, we can also observe the market price for CEFs’ own shares. Thus, we can objectively measure a CEF’s market value relative to its underlying assets, which is often not possible in other regular public corporations.

Another advantage of using CEFs is that we can measure a fund’s ESG footprint based on its investment holdings. It is hard to compare ESG scores across regular public corporations as their business models may have different goals and characteristics. However, unlike other regular corporations, a closed-end fund’s main business is relatively uniform; investing its capital in stocks and other securities. The uniform business model within the industry makes the ESG scores across closed-end funds highly comparable while minimizing industry-specific characteristics of the ESG of underlying firms through portfolio formation. And they report their underlying holdings on a quarterly basis. To the extent that we can observe the ESG ratings of underlying firms included in a CEF’s portfolio, we can measure a CEF’s exposure to ESG based on its actual investment activities, which is described in detail in Section 3 below.

An additional benefit of using the CEFs as an empirical setting is that we can avoid various confounding factors influencing the relation between ESG and firm value. The literature documents that corporate ESG activities are influenced by geographic locations (Cai et al. (2016); Liang and Renneboog (2017)), industries (Stellner et al. (2015); Breuer et al. (2018)) and ownership structure (Dimson et al. (2015); Hsu et al. (2021)).² In the empirical setting of closed-end funds, the various confounders of specific firms could be diversified away by portfolio formation at the fund level. Thus, by focusing on the uniform industry of closed-end funds in the U.S., we can minimize possible confounding factors influencing the effect of ESG on firm value.

Compared to open-end funds, closed-end funds are better positioned to keep their commitment to long-term goals at their discretion. For open-end funds, however, fund flows can trigger involuntary tradings of portfolio holdings, making it hard for them to use their own judgment to keep their ESG commitment (Coval and Stafford (2007)). Therefore, the empirical laboratory of closed-end funds offers a useful setting to test the impact of a fund’s commitment to ESG.

A potential drawback of studying CEFs is that a CEF’s premium/discount is influenced by a host of other factors such as fund liquidity, arbitrage opportunities, and market-level liquidity. It is thus crucial to properly control for these factors, which we explain in Section 4.

2.3. Hypothesis Development

ESG initiative is inherently a long-term investment without immediate returns. Thus, communicating a firm’s commitment to ESG is an important move to showcase that a desired course of actions will be followed. Flammer (2021) argues that firms issue “Green bonds” as a commitment device for their ESG initiatives although “Green bonds” do not have favorable

²There is an extensive literature on the impact of ownership on ESG activities such as family ownership (Abeysekera and Fernando (2020)), state ownership (e.g., McGuinness et al. (2017)) and institutional investor ownership (Chen et al. (2020); Iliev and Roth (2020))

financing terms compared to conventional bonds. Gao et al. (2014) find that insiders do not engage in profitable insider trading to avoid breaking their commitment to the socially responsible practices. Servaes and Tamayo (2013) show that ESG activities enhance firm values only when a firm can convincingly communicate its ESG activities to customers.

In the investment industry, the United Nations Principles for Responsible Investment (U.N. PRI) is considered the most influential platform where financial institutions can pledge their commitment to socially responsible investment. The PRI is the largest global initiative on ESG investment launched in 2006, describing six principles for responsible investment highlighting the signatories' active decision to incorporate ESG issues into their investment.³ The PRI is the most cited event in the literature showcasing an investment firm's commitment to ESG (e.g., Kim and Yoon (2021); Liang et al. (2020); Brandon et al. (2021)). PRI signatories are often considered to be committed to ESG (regardless of being genuine or pseudo) because signing the PRI is often made by top officials of investment firms and their responsible investment activities are publicly disclosed to the international audience via U.N. reporting network.

However, not all commitments are credible. Pledges to ESG and real ESG-enhancing activities are not always synced. Unlike explicit contracts, ESG commitment is an implicit contract that has little legal bindings. Firms can renege on their ESG commitment without legal actions from other stakeholders. Investment funds frequently deviate from their commitment to ESG investment. Kim and Yoon (2021) find that mutual funds often do not “walk their talk” on environmental issues but still experience substantial fund flows. Some hedge funds engage in a similar behavior of “Greenwashing” (Liang et al. (2020)). Therefore, as Cornell and Shapiro (1987) puts it, the value of implicit ESG commitment depends on its credibility

³More specifically, the U.N. PRI signatories agree to incorporate the following six principles into their investment practices: 1) incorporate ESG issues into investment analysis and decision-making processes, 2) be active owners and incorporate ESG issues into their ownership policies and practices, 3) seek appropriate disclosure on ESG issues by the entities in which we invest, 4) promote acceptance and implementation of the Principles within the investment industry, 5) work together to enhance their effectiveness in implementing the Principles, and 6) report on their activities and progress towards implementing the Principles (<https://www.unpri.org/>).

and other stakeholders' expectations about a firm's intention to honor its commitments.

We can consider a firm to be credibly committed to ESG when it pledges its willingness to exert effort in increasing ESG exposures *and* its ESG actually increases. "Greenwashing" is the case when a firm pledges its ESG commitment but there are no resulting actions. A simple pledge without actions would not be considered as a serious move and the firm value would not increase. On the other hand, "Pseudo ESG" refers to an increase in ESG scores although the firm has not publicly committed to ESG. The "Pseudo ESG" might not be a genuine or intended action of a firm but seemingly related to ESG activities. When there is no public commitment, the isolated action of increasing ESG would not be perceived as a firm's ESG initiative by investors but they rather consider it as a temporary move. Contrary to these ephemeral actions, ESG enhancement followed by a formal pledge, "walking the talk" would be considered as a more serious move.

To summarize, we hypothesize that a firm's public commitment to ESG followed by deliberate and intentional actions of increasing ESG would increase firm value.

Hypothesis ("Walking the Talk"): A closed-end fund would trade at a higher premium when it becomes a signatory of the U.N. PRI *and* its ESG score increases.

The hypothesis highlights the complementing role of a firm's public commitment to ESG and its actual actions of increasing ESG.

A possible channel of the positive impact of "walking the talk" is related to ESG regulations. Regulatory interventions carry a material risk to a firm's business (Hsu et al. (2020)). A firm with a credible commitment to its long-term improvement in ESG would be less exposed to serious regulatory sanctions (Hong and Liskovich (2015)) especially when the ESG regulations become more stringent. This potential benefit of protecting investors from regulatory interventions would be more favorably perceived by investors, leading to an increase in firm value.

Hypothesis (Regulatory Intervention): The positive impact of "walking the

talk” on a closed-end fund premium is stronger when ESG-related regulations become more stringent.

3. Data and Key Variables

3.1. Closed-End Funds Premia/Discounts

For our analysis, we get the list of CEFs from the Center for Research in Securities Prices (CRSP) by selecting securities with a share code ending in 4. In doing so, we exclude several non-CEF securities such as depository units, units of beneficial interest (share code of 74), and certificates (share code of 24). From CRSP, we collect monthly prices of CEFs’ shares traded on the stock exchanges. From Compustat, we obtain monthly data on the market value of a CEF’s underlying assets per share (NAV). These two datasets are merged via PERMNO, a security identifier in both CRSP and Compustat.

Among the CEFs, we focus on CEFs investing mainly in equity. We merge our CEF sample from CRSP with the 13F institutional holdings data from Thomson Reuters by the CEF’s name. As a result, our sample includes 106 CEFs from January 2007 through March 2020.

We calculate monthly CEF’s premia (discount) using its share price and NAV:

$$Y_{i,t} = \frac{Price_{i,t} - NAV_{i,t}}{NAV_{i,t}}, \quad (1)$$

for a CEF i on year-month t . A positive (negative) number indicates that a CEF’s share is traded at a premium (discount) relative to its underlying asset value.

Table 1 reports the summary statistics of CEF’s premia (discount). There are 8,681 CEF/year-month observations in our data. CEF’s premia (discount) has an average of -6.6% with a standard deviation of 7.2%. That is, the average CEF is at a discount of 6.6%, which is similar to those reported in other studies on CEFs (e.g., Klibanoff et al. (1998); Chan et al. (2008); Hwang (2011); Hwang and Kim (2017)).

In our empirical analysis, we also control for several characteristics of CEFs that may influence the CEF premia (discounts). We obtain CEF’s net expense ratio and leverage from the Morningstar Direct database. From CRSP/Compustat, we obtain data of CEFs’ payout ratio and dividend yield. Based on the CEFs’ holdings information obtained from the 13F database, we derive the characteristics of underlying stocks in a CEF’s portfolio such as market capitalization and book-to-market ratio. Other control variables include CEF-level liquidity (trading volume, bid-ask spreads), ownership (retail holdings), and market-level liquidity such as Pástor and Stambaugh (2003) liquidity factor and term spread. A full description of the control variables is provided in Table A.1. Table 1 reports the summary statistics of control variables.

3.2. Closed-End Fund’s ESG Score and its Commitment to Responsible Investment

We build a closed-end fund’s ESG score based on its portfolio holdings. We first obtain underlying companies’ ESG scores from the MSCI ESG KLD STATS (KLD) database. The KLD database contains annual ESG performance indicators of seven categories: Environment (ENV), Community (COM), Human Rights (HUM), Employee Relations (EMP), Diversity (DIV), Product (PRO), and Governance (CGOV).⁴ For each category, the database include “strengths” and “concerns” items. For example, “Toxic Emissions and Waste” is an item of environmental concerns.

To measure underlying firms’ ESG scores held by CEF, we construct a normalized net ESG score as in Lins et al. (2017). For each ESG category, we count the number of strengths (concerns) available for each year. We then calculate the scaled number of strengths (concerns) for a firm by dividing the firm’s number of strengths(concerns) by the total number of strengths(concerns) available in that year. Finally, our net ESG score is calculated by sub-

⁴The MSCI KLD database is widely adopted in the investment industry to screen socially responsible firms (WSJ (2021b)), and the literature documents its timely relevance to real ESG activities of firms (e.g., Chen et al. (2020)).

tracting the scaled number of concerns from the scaled number of strengths. By construction, the net score for each category ranges from -1 to 1.

Note that we sum the net scores of all seven categories to calculate the ESG score. We include all categories in our analysis, which is different from the previous literature (Lins et al. (2017), Albuquerque et al. (2019)) that excludes corporate governance category and studies a firm’s CSR(Corporate Social Responsibility), not overall ESG as our paper. For the robustness of our result, we also provide our results by the components of the ESG score, which are Environmental (ENV), Social (COM, DIV, EMP, HUM, PRO), and Governance (CGOV) score.

Given the firms’ ESG scores, we calculate a value-weighted average of underlying holdings’ ESG scores as a measure of CEF’s ESG score:

$$Fund\ ESG_{i,t} = \sum_j w_{i,j,t} \times Holding\ ESG_{i,j,t}, \quad (2)$$

where $Holding\ ESG_{i,j,t}$ represents an ESG score for a company j held in a fund i ’s portfolio at quarter t . $w_{i,j,t}$ is a portfolio weight of the stock holding in the CEF. While the CEF premia (discounts) are available monthly, the ESG score is only available for every quarter. We merge monthly CEF information with the most recent $Fund\ ESG$ information reported in the past quarter-end.⁵ For example, CEFs’ ESG scores in the fourth quarter of 2019 are matched to CEF premia (discounts) from January 2020 to March 2020.

In Table 1, we report the summary statistics of the scores. Fund ESG has a mean of 0.057 with a standard deviation of 0.331, showing a considerable heterogeneity in the fund ESG scores. For example, from the 10th percentile of the distribution being -0.268 and the 90th percentile being 0.557, we find the heterogeneity in CEFs that some funds invest more in low-ESG firms and others invest more in high-ESG firms. We also report the subcomponents of ESG scores. The average score of environmental(E) and social(S) components are higher

⁵We assign a neutral ESG score to a company whose ESG score is not reported in the database. An alternative treatment of dropping these companies from constructing our fund-level ESG measure does not change the implication of our main analysis (untabulated, available upon request)

than the average score of governance(G) among our CEF sample.

While we use the KLD database to construct our main measure of the firm’s ESG scores, another widely used ESG database is from Thomson Reuters ASSET4. For checking the robustness of our results, we also use the ESG scores from ASSET4 to construct the fund ESG score in Section 4.5. In Table 1, we report that the average fund ESG score using ASSET4 has a mean of 27.711 with a standard deviation of 29.589.

As a measure for the commitment to responsible investment, we collect all investment firms’ signing date of PRI from the signatory directory of PRI⁶ and match our sample with the signing date by CEF’s affiliation. We restrict our focus on the U.S. domiciled PRI signatories to minimize potential biases arising from different motivations to enroll in PRI (Brandon et al. (2021)).

In Table 1, *Sign* is the variable that identifies the enrollment status of a fund in the U.N. PRI. It is an indicator variable that equals one if a CEF is managed by a PRI signatory in the month(quarter) and zero otherwise. During our sample period, 32.1% of CEF/year-month observations were enrolled in the U.N. PRI.

4. Empirical Results

4.1. The Impact of ESG and U.N. PRI on CEF Premium

To investigate the effect of a fund’s ESG scores and its commitment to ESG on a fund’s premia(discounts), we estimate the following regression model:

$$Y_{i,t} = \beta_1(\text{Sign}_{i,t} \times \text{Fund ESG}_{i,t}) + \beta_2\text{Fund ESG}_{i,t} + \beta_3\text{Sign}_{i,t} + \gamma X_{i,t} + f_i + \epsilon_{i,t}, \quad (3)$$

where $Y_{i,t}$ is the monthly CEF premium(discount) as in Equation (1). $\text{Sign}_{i,t}$ is an indicator variable that equals to one if the CEF i is a PRI signatory in month t and zero otherwise.

⁶More details can be found on the PRI website: <https://www.unpri.org/signatories/signatory-resources/signatory-directory>

$Fund ESG_{i,t}$ is the CEF i 's latest available ESG score in month t . $X_{i,t}$ is a set of CEF-level and macro-level control variables that are possibly correlated with the CEF premia(discounts). We also include fund fixed effects to control for all time-invariant characteristics of the funds (e.g., fund styles). Standard errors are clustered at the CEF level.

Our main variable of interest is the estimated coefficient on the interaction term between $Sign_{i,t}$ and $Fund ESG_{i,t}$. Our hypothesis states that the estimated coefficient on $Sign_{i,t} \times Fund ESG_{i,t}$ should be positive. Table 2 reports the estimated coefficients in the above regression model. In Column (1), we find that the estimated coefficient on $Sign_{i,t} \times Fund ESG_{i,t}$ is positive and statistically significant without controlling other variables. The economic significance of the estimated coefficient on $Sign_{i,t} \times Fund ESG_{i,t}$ is also large. When associated with the PRI signatory, a one-standard-deviation increase in $Fund ESG$ increases CEF premium by 19.22% of a standard deviation, which is about 1.39% of CEF premium.

Note that the coefficient on $Sign$ is negative but statistically insignificant. This result contrasts with the coefficient on the interaction term that the PRI signature itself does not affect the CEF premium. However, the estimated coefficient on $Fund ESG_{i,t}$ is negative and statistically significant, suggesting that $Fund ESG_{i,t}$ itself has a significantly negative effect on CEF premium without PRI signature. Note that the magnitude of the interaction term (0.042) is larger than the coefficient on $Fund ESG_{i,t}$ (-0.018), indicating that the effect of ESG on CEF premium indeed turns to a positive effect with PRI signatory. That is, while “Pseudo ESG” ($Fund ESG$) negatively affects CEF premium and “Greenwashing” ($Sign$) has no significant effect on CEF premium, we observe the positive impact on CEF premium only when the commitment on ESG is combined with the action on ESG, which supports our hypothesis of “walking the talk.”

In Column (2), we additionally control for variables related to the characteristics of CEFs and the underlying stocks of the CEFs. For example, we control CEF characteristics, such as Payout ratio, Net expense ratio and Leverage. To control CEF liquidity, which may relate to the CEF premium, we include Relative trading volume, Relative bid-ask spread, and Retail

holdings. For the characteristics of underlying stocks, we control for the Underlying market cap and Underlying BM. We continue to observe the positive and statistically significant coefficient on $Sign_{i,t} \times Fund\ ESG_{i,t}$.

In Column (3), we add control variables related to arbitrage opportunities, such as Inverse price (premium), Inverse price (discount), Dividend yield (premium), and Dividend yield (discount). The estimated coefficient on $Sign_{i,t} \times Fund\ ESG_{i,t}$ is positive and statistically significant at 1% level but the coefficient on $Fund\ ESG_{i,t}$ becomes insignificant. In Column (4), we add market-level liquidity variables, such as PS liquidity factor and term spread, as additional control variables. We find the coefficient on $Sign_{i,t} \times Fund\ ESG_{i,t}$ is still positive and statistically significant at 1% level. The coefficient estimates of the control variables are generally in line with expectations.

Alternatively, we examine the ESG effect on CEF premia by components of the ESG score. We replace the $Fund\ ESG_{i,t}$ with its individual components in the Equation (3). Table 3 reports the estimated coefficients. We find that the environmental (E) and social (S) components largely drive our results. While the statistical significance is larger at the social component, the magnitude of the effects is comparable since the standard deviation is much larger in the social component, as in Table 1. Considering the fact that “Socialwashing” becomes another concern to ESG investors in addition to “Greenwashing”(Marsh (2020)), it is reasonable to find our “waking the talk” results in both the environmental and social components.

4.2. Challenges of Keeping the ESG Commitment and the Value of “Walking the Talk”

In the above section, we report a positive impact of signing the U.N. PRI on a CEF’s premium when a fund actually increases its ESG footprint in its portfolio holdings (“walking the talk” effect). In this section, we investigate how varying degrees of costs for keeping the ESG pledge affects the positive impact of the “walking the talk.”

The “walking the talk” hypothesis is based on the idea that the value of implicit ESG commitment depends on its credibility and other stakeholders’ expectations about a firm’s intention to honor its commitments. The hypothesis has unique predictions by the stock market conditions related to the hurdles of taking actions aligned with the ESG commitment.

Specifically, we expect that the value of “walking the talk” would be more significant during periods when the stock market condition is not favorable to CEFs keeping their pledge to the ESG investment and thus harder for them to keep their commitment to ESG. In an environment with higher returns of non-ESG firms compared to ESG firms (e.g., higher returns from the oil industry due to higher energy prices), it would be more challenging for CEFs to honor their commitment to ESG. During this period, if a CEF keeps its commitment by investing in high ESG stocks, investors would take its ESG commitment more seriously and the value of “walking the talk” might be more pronounced. To test this conjecture, we divide the sample period based on the relative performance of high ESG stocks and low ESG stocks. Specifically, we consider the returns of ESG ETF (iShares MSCI USA ESG Select ETF, Ticker: SUSA), and the return of Energy ETF (iShares U.S. Energy ETF, Ticker: IYE).⁷ For each month, we calculate the cumulative return of “SUSA” and “IYE” for the past 3 months. We divide our sample period by whether the cumulative return of “SUSA” is less than that of “IYE.”⁸

We first test whether the U.N. PRI signatory funds with high ESG scores (i.e., funds “walking the talk”) are actually less opportunistic in managing their ESG portfolio holdings compared to the non-signatory funds with high ESG scores (i.e., “Pseudo ESG” funds). In Table A.2. in the Appendix, we report that the signatory funds are less likely to reduce their ESG portfolio holdings compared to non-signatory funds when the energy stocks perform

⁷“SUSA” is an exchange-traded fund (ETF) that tracks the investment performance of MSCI USA Extended ESG Select Index. “IYE” is an ETF that tracks the investment performance of Russell 1000 Energy RIC 22.5/45 Capped Gross Index. Its biggest holdings are Exxon Mobil Corp. and Chevron Corp. These are among the most representative ETFs that invest in U.S. stocks related to ESG and the U.S. energy sector, respectively. See WSJ (2021a), Bloomberg (2021) for recent discussions on the relationship between ESG and energy stocks.

⁸The results are robust to longer windows of cumulative return - for example, past 6 months or 12 months.

better than ESG stocks.

Next, we estimate our baseline regression model (Equation (3)) for periods when energy stocks perform better (worse) than ESG stocks. Table 4 reports the results. We find that the coefficient on $Sign_{i,t} \times Fund\ ESG_{i,t}$ is greater when ESG investment is less attractive than the Energy sector (i.e., it is challenging for CEFs to keep investing in high ESG stocks). The CEF premia associated with $Sign_{i,t} \times Fund\ ESG_{i,t}$ is 2.0% higher during periods when the return of high ESG investment is lower than that of low ESG investment, with statistical significance ($t=2.18$). In terms of economic significance, for a U.N. PRI signatory fund, a one-standard-deviation increase in $Fund\ ESG$ increases CEF premium by 14.25% of its standard deviation during periods when ESG investment underperforms. When ESG investment outperforms, however, the increase in $Fund\ ESG$ increases CEF premium by 5.93% of its standard deviation. This result supports the idea that the value of “walking the talk” is greater when it is hard for a CEF to keep its commitment to ESG.

Overall, the above result suggests that the positive effect of “walking the talk” is greater when funds face higher hurdles to make their ESG commitment more credible.

4.3. Regulatory Interventions and the Value of “Walking the Talk”

An important channel of the positive impact of “walking the talk” is related to ESG regulations (Krueger et al. (2020); Seltzer et al. (2021)). A firm with a credible commitment to its long-term improvement in ESG would be less exposed to ESG regulatory sanctions and this beneficial effect would be more favorably perceived by investors when the ESG regulations are more stringent. To test this channel, we consider several ESG regulatory stringency indexes related to environmental and social issues. For the environmental regulation, we examine the Environment Policy Stringency Index (EPSI) of the U.S. developed by the OECD.⁹ We also consider the enforcement actions by the U.S. Environmental Protection Agency (EPA)

⁹The Environmental Policy Stringency Index (EPSI) is an international index that measures the regulatory cost of environmentally harmful behavior. The sample used in the analysis (Panel A of Table 5) is limited to the year 2007 to 2015, because the index is available up to 2015.

and the U.S. announcement of withdrawal from the Paris Agreement in June 2017. We conjecture that the positive effect of “walking the talk” would be more pronounced when the environmental regulation becomes more stringent proxied by an increase in the Environment Policy Stringency Index (EPSI) or the number of EPA’s enforcement actions aggregated at the CEF level.¹⁰ In a similar vein, we expect that the effect would be less pronounced after June 2017 when the U.S. announced to withdraw from the Paris Agreement and the market expected the environmental regulation would be less stringent. We test the above hypotheses by re-estimating the Equation 3 with replacement of $Fund\ ESG_{i,t}$ with $Fund\ E_{i,t}$.

Table 5 reports the estimated coefficient on $Sign_{i,t} \times Fund\ E_{i,t}$ for subsamples with varying degrees of environmental regulatory stringency. In Panel A, we observe that the coefficient on $Sign_{i,t} \times Fund\ E_{i,t}$ is positive and statistically significant for periods when the EPSI increases (Column (1)) and this result is robust to controlling for other ESG component (Column (3)). The estimated coefficient is not statistically significant during periods when the EPSI decreases. And the difference of the coefficients is statistically significant with t -statistics of 2.69. For a U.N. PRI signatory fund, a one-standard-deviation increase in $Fund\ E$ increases CEF premium by 9.43% of its standard deviation when the EPSI increases. When the EPSI decreases, however, the increase in $Fund\ ESG$ decreases CEF premium by 1.86% of its standard deviation.

In Panel B, the estimated coefficient on $Sign_{i,t} \times Fund\ E_{i,t}$ is positive and statistically significant only when the CEF is in an environment with a large number of the U.S. EPA enforcement actions (Column (1)). The result is again robust to controlling for other ESG components (Column (3)) with statistical significance in the difference of the coefficients ($t=1.78$). In terms of economic significance, for a U.N. PRI signatory fund, a one-standard-deviation increase in $Fund\ E$ increases CEF premium by 14.13% and 0.74% of its standard deviation

¹⁰For each underlying firm that a CEF holds, the environmental regulatory stringency is measured by the number of informal, formal, and judicial enforcement actions by the EPA in a given year in the state the firm’s headquarter is located in. A CEF-level stringency is calculated as a value-weighted average of its underlying firms’ stringency. For each quarter, we define a CEF-level stringency as “high” depending on whether it is higher than top quintile of the distribution in that quarter or not.

when high and low level of regulatory stringency is imposed by the EPA, respectively.

In Panel C, we find that the estimated coefficient on $Sign_{i,t} \times Fund E_{i,t}$ becomes less significant after the U.S. announcement of withdrawal from the Paris Agreement (in Columns (1)-(2)), which is also robust to controlling for other ESG components (in Columns (3)-(4)). In terms of economic significance, for a U.N. PRI signatory fund, a one-standard-deviation increase in $Fund E$ with commitment increases CEF premium by 4.89% of its standard deviation before the announcement of withdrawal. However, the increase in $Fund E$ increases CEF premium by 0.37% of its standard deviation after the announcement of withdrawal. Overall, these analysis results suggest that the “walking the talk” in the environmental aspect improves firm value when the environmental regulation becomes more stringent.

In a similar manner with the environmental regulatory stringency, we test whether the “walking the talk” in the social aspect has a greater positive impact on firm value when its relevant regulations become more stringent. We examine a labor regulation stringency measure based on the amount of initial penalties imposed by the Occupational Safety and Health Administration (OSHA).¹¹ In Table 6, we observe that the estimated coefficient on $Sign_{i,t} \times Fund S_{i,t}$ is greater for funds in a more stringent labor regulation environment, and the difference is statistically significant with t -statistics of 1.88. In terms of economic significance, a one-standard-deviation increase in $Fund S$ for a U.N. PRI signatory increases CEF premium by 22.44% and 6.83% of its standard deviation for CEFs when high and low level of labor regulation stringency is imposed, respectively. This result is consistent with the idea that a firm with a credible commitment to social issues is more favorably viewed by its investors, resulting in an increase in firm value.

Taken together, the results in Tables 5 and 6 suggest that the “walking the talk” improves firm value by providing a firm with an advantageous position when ESG-related regulations become more stringent.

¹¹We construct a CEF-level labor regulation stringency measure based on the portfolio holdings as in Footnote 10. We divide the sample depending on whether the CEF’s labor regulation stringency for each quarter is higher than top quartile of the distribution in that quarter or not.

4.4. Instrumental Variable Analysis and Placebo Tests

Despite the results we provide so far, there can still be a potential concern that the timing of signing the PRI is endogenously determined by unobservable funds' characteristics. For example, funds with specific knowledge and skills tailored for ESG investment would decide to enroll early in the U.N. PRI. Then the complementing effect of the ESG investment and U.N. PRI would simply reflect the superior ESG-related investment skills among those funds signing the PRI.

We instrument a fund's choice of signing the PRI by the relative intensity of public attention to ESG in the investment firm's headquarter state. More specifically, we use Google Search Volume Index(SVI) of the topic "Environmental, social, and corporate governance(ESG)."¹² SVI is an index of Google search intensity available through the Google Trends platform. It is a measure of attention level widely used in the literature. For example, Ilhan et al. (2021) and Choi et al. (2020) use SVI of the topic "climate change" and "global warming" to measure attention to climate change and global warming. Chen et al. (2021) use state-level SVI of the topic "Lottery" to measure cross-sectional variation in gambling attitudes.¹³ As in Chen et al. (2021), we use a cross-sectional SVI across the U.S. states, which is available as "Interest by subregion" index of search trends in the U.S. For a selected time range, the SVI takes values scaled from 0 to 100, where 100 is the value for the state with the highest fraction of searches related to ESG. We obtain the cross-sectional SVI calculated with state-level search volume over the past 12 months for each month.

We argue that the SVI is a valid instrumental variable for PRI enrollment. For the relevance condition (which we test below), it is reasonable to expect that the public attention to ESG in an investment firm's headquarter state is positively correlated with its commitment to ESG investment. For the exclusion restriction to satisfy, the SVI needs to affect the CEF premium only through the propensity to sign the PRI. As long as the fund investors are

¹²SVI of a topic include all search results that have the same meaning as the topic. Searches with different languages are included as well.

¹³See Da et al. (2011), Baker and Fradkin (2017), or Gao et al. (2020) for more examples of using SVI.

widely spread geographically and not concentrated in its headquarter state, the market value of a CEF is not likely to be affected by investors in the headquarter state only and it is not plausible that the SVI directly changes the CEF’s premium. For this reason, we expect the exclusion restriction condition reasonably holds.

Panel A of Table 7 reports the estimated coefficients from instrumental variable regression of our main regression model (Equation (3)). Column (1) shows the estimated coefficients from the first-stage regression of *Sign* on *SVI*, where *SVI* is the state-level Google Search Volume Index(SVI) explained above. As expected, the estimated coefficient on *SVI* is positive and statistically significant at the 1% level, suggesting that the relative search intensity for ESG in the headquarter state increases the probability for the CEF to sign the PRI. Column (2) reports estimated coefficients from the second-stage regression. In the regression, *Sign* and $Sign \times Fund\ ESG$ are instrumented by *SVI* and $SVI \times Fund\ ESG$, respectively. The estimated coefficient on $Sign \times Fund\ ESG$ is positive and statistically significant at the 5% level. Moreover, the economic significance of the estimated coefficient is larger than that of the OLS coefficient estimate in Table 2.

In addition to the instrumental variable analysis, we conduct placebo tests to examine whether enrollment in U.N. PRI indeed is the factor that affects CEF premia. To this end, we replace the actual signing dates of U.N. PRI with dates randomly drawn from the sample distribution of the *Sign* variable. In Panel B of Table 7, we estimate the regression coefficients with 100 random samples and report the average coefficient estimates. The coefficient on $Sign \times Fund\ ESG$ is neither statistically nor economically significant, supporting our main findings.

4.5. Robustness Checks

It is well known that there exists a substantial divergence in the ESG ratings among ESG databases (Berg et al. (2020)). The KLD and Thomson Reuters ASSET4 are the most frequently used data in the literature and both databases have their own unique strengths.

The main difference between the two databases comes from their benchmark to evaluate each firm’s ESG performance. As described in section 3.2, the KLD reports all positive and negative ESG performance indicators(strengths and weaknesses) from a common list of ESG issues. However, ASSET4 employs a relative measure of ESG score against a firm’s industry-benchmark. Therefore, if we construct a fund-level ESG score with ASSET4, we cannot capture the systematic difference of ESG performance across firms in different industries. In our empirical setting of CEFs, it is important to have comparable scores across industries at a fund-level where the portfolio consists of stocks from various industries. Therefore, the KLD database suits the purpose of this paper.

Nevertheless, we use the ASSET4 database to build the CEF’s ESG score and replicate our main regression model (Equation (3)). Table 8 reports the estimated coefficients from regressions of CEF premia on $Sign \times Fund\ ESG$ and other control variables. We continue to observe the estimated coefficients on $Sign \times Fund\ ESG$ are positive and statistically significant at 1% level. This result further supports our main hypothesis that a firm’s ESG activities increase firm value only when it can credibly commit itself to ESG initiatives.

5. Conclusion

Although the literature on the impact of ESG/CSR on firm value is extensive, the causal relation between ESG activities and firm value is still ambiguous due to measurement issues and various confounding factors (Gillan et al. (2021)). In this paper, we use a novel empirical setting of the closed-end funds (CEFs) as a laboratory to substantiate the causal impact of ESG on firm value. Our empirical findings are not biased by the measurement error of a firm value and we address additional endogeneity concerns based on instrumental variable analysis. We find that closed-end funds pledging to ESG by becoming signatories of the U.N. Principles for Responsible Investment (PRI) trade at a higher price compared to their net asset values (NAVs) only when they increase their ESG scores subsequently. The results are more

pronounced when funds face higher hurdles to take actions to honor their ESG commitment. The positive impact is also greater when ESG-related regulations become more stringent. We argue that communicating a firm's credible commitment to ESG is an important step to ensure the favorable impact of ESG on firm value and this benefit is related to an advantageous position when ESG regulations become more stringent.

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Figure 1: Trend of ESG Regulations

This figure plots the cumulative number of policy interventions related to sustainable finance and investment around the world since 1980. The trend of regulations is fitted by a third order polynomial regression (red line) and predicted up to 2030 (blue line). The shaded area represents the 95% confidence interval for the regression line. The source of the data is the regulation database in the U.N. Principles for Responsible Investment (PRI).

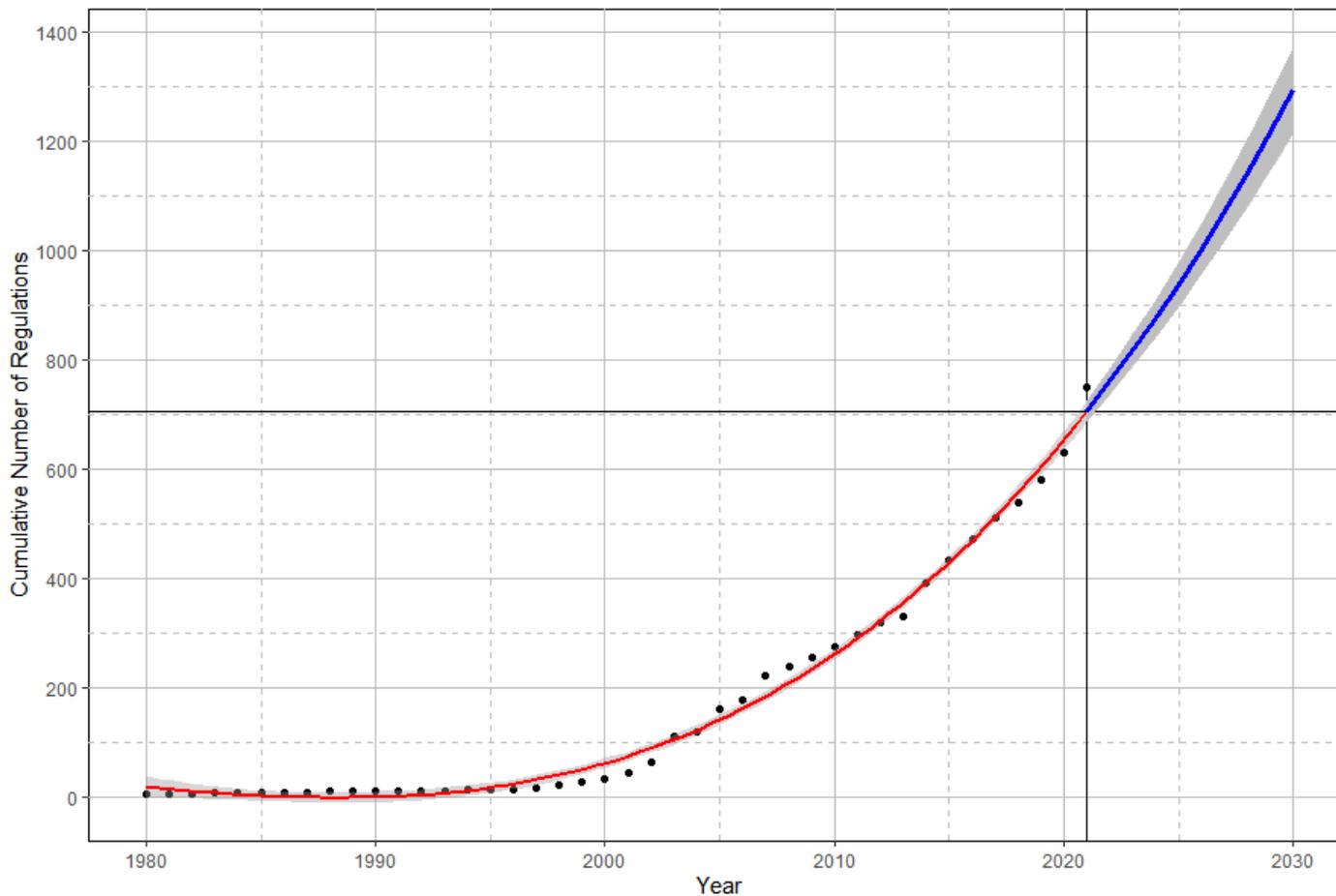


Table 1: Summary Statistics

This table reports the summary statistics for variables used in the analysis. The sample consists of 106 closed-end funds from 2007 to March 2020 and is on a fund/year-month level. All variables are defined in Table A.1. All variables except for *Sign* are winsorized at the 1% and 99% level.

| | N | Mean | Std.Dev | 10th Perc | Median | 90th Perc |
|---------------------------|-------|--------|---------|-----------|--------|-----------|
| CEF premium | 8,681 | -0.066 | 0.072 | -0.148 | -0.078 | 0.036 |
| Sign | 8,681 | 0.321 | 0.467 | 0.000 | 0.000 | 1.000 |
| Fund ESG | 8,681 | 0.057 | 0.331 | -0.268 | 0.000 | 0.557 |
| Fund E | 8,681 | 0.026 | 0.060 | -0.008 | 0.000 | 0.094 |
| Fund S | 8,681 | 0.043 | 0.273 | -0.206 | 0.000 | 0.420 |
| Fund G | 8,681 | -0.011 | 0.066 | -0.099 | 0.000 | 0.051 |
| Payout ratio | 8,681 | 1.079 | 0.742 | 0.318 | 0.930 | 1.960 |
| Net expense ratio | 8,681 | 0.014 | 0.006 | 0.008 | 0.012 | 0.021 |
| Leverage | 8,681 | 0.163 | 0.150 | 0.000 | 0.168 | 0.362 |
| Relative trading volume | 8,681 | -0.311 | 0.392 | -0.720 | -0.280 | 0.061 |
| Relative bid-ask spread | 8,681 | 0.001 | 0.003 | 0.000 | 0.001 | 0.004 |
| Retail holdings | 8,681 | 0.871 | 0.150 | 0.687 | 0.908 | 1.000 |
| Underlying market cap | 8,681 | 25.784 | 37.401 | 0.000 | 3.080 | 82.937 |
| Underlying BM | 8,681 | 0.143 | 0.481 | 0.000 | 0.167 | 0.420 |
| Inverse price (premium) | 8,681 | 0.016 | 0.037 | 0.000 | 0.000 | 0.066 |
| Inverse price (discount) | 8,681 | 0.083 | 0.067 | 0.000 | 0.072 | 0.163 |
| Dividend yield (premium) | 8,681 | 0.016 | 0.036 | 0.000 | 0.000 | 0.083 |
| Dividend yield (discount) | 8,681 | 0.070 | 0.058 | 0.000 | 0.072 | 0.123 |
| PS liquidity factor | 8,681 | -0.015 | 0.061 | -0.081 | -0.006 | 0.048 |
| Term spread | 8,681 | 0.024 | 0.012 | 0.005 | 0.026 | 0.040 |
| Fund ESG (ASSET4) | 8,681 | 27.711 | 29.589 | 0.000 | 14.842 | 73.734 |

Table 2: The Effect of U.N. PRI Signature and ESG on CEF Premium

This table reports the coefficient estimates from the CEF-panel regressions of monthly CEF premia/(discounts) on the CEF's ESG score and an indicator for whether the CEF is a PRI signatory in a month. All variables are defined in Table A.1. All regressions include CEF fixed effects. t -statistics are reported in parentheses and are based on standard errors clustered at the CEF level. ***, **, and * denote statistical significance at the 1%, 5%, and 10%, respectively.

| | (1) | (2) | (3) | (4) |
|---------------------------|------------------------|---------------------|----------------------|----------------------|
| | Dep. var = CEF Premium | | | |
| Sign \times Fund ESG | 0.042** (2.48) | 0.043** (2.62) | 0.020*** (2.96) | 0.021*** (3.13) |
| Fund ESG | -0.018*** (-2.97) | -0.015** (-2.55) | -0.006 (-1.18) | -0.007 (-1.34) |
| Sign | -0.011 (-1.22) | -0.008 (-0.96) | -0.001 (-0.27) | -0.001 (-0.25) |
| Payout ratio | | 0.011*** (4.55) | 0.006*** (3.26) | 0.006*** (3.55) |
| Net expense ratio | | -0.842 (-1.12) | -0.001 (0.00) | 0.027 (0.06) |
| Leverage | | -0.054 (-1.43) | -0.048* (-1.96) | -0.048** (-1.99) |
| Relative trading volume | | 0.006 (1.00) | 0.002 (0.69) | 0.002 (0.52) |
| Relative bid-ask spread | | -0.264 (-0.72) | 0.365 (1.28) | 0.381 (1.44) |
| Retail holdings | | 0.004 (0.30) | 0.005 (0.53) | 0.002 (0.24) |
| Underlying market cap | | -0.000 (-0.23) | -0.000 (-0.72) | -0.000 (-0.62) |
| Underlying BM | | 0.002 (0.62) | 0.002 (1.46) | 0.002 (1.37) |
| Inverse price (premium) | | | -0.207 (-1.09) | -0.210 (-1.07) |
| Inverse price (discount) | | | -0.469*** (-4.45) | -0.472*** (-4.21) |
| Dividend yield (premium) | | | 0.788*** (5.19) | 0.793*** (5.22) |
| Dividend yield (discount) | | | -0.020 (-0.67) | -0.009 (-0.32) |
| PS liquidity factor | | | | 0.042*** (5.18) |
| Term spread | | | | 0.033 (0.24) |
| Observations | 8,681 | 8,681 | 8,681 | 8,681 |
| R ² | 0.488 | 0.500 | 0.761 | 0.762 |
| CEF FE | Yes | Yes | Yes | Yes |

Table 3: Components of ESG

This table replicates column (4) of Table 2 with separating Fund ESG into Fund E, S, and G scores. All variables are defined in Table A.1. All regressions include CEF fixed effects. t -statistics are reported in parentheses and are based on standard errors clustered at the CEF level. ***, **, and * denote statistical significance at the 1%, 5%, and 10%, respectively.

| | (1) | (2) | (3) | (4) |
|----------------------|------------------------|----------|--------|---------|
| | Dep. var = CEF Premium | | | |
| Sign \times Fund E | 0.090* | | | 0.046 |
| | (1.79) | | | (0.97) |
| Fund E | -0.018 | | | -0.014 |
| | (-0.75) | | | (-0.63) |
| Sign \times Fund S | | 0.026*** | | 0.022** |
| | | (3.05) | | (2.20) |
| Fund S | | -0.009 | | -0.010* |
| | | (-1.61) | | (-1.86) |
| Sign \times Fund G | | | 0.041 | -0.012 |
| | | | (1.45) | (-0.30) |
| Fund G | | | 0.006 | 0.022 |
| | | | (0.30) | (1.21) |
| Sign | -0.001 | -0.001 | 0.001 | -0.002 |
| | (-0.28) | (-0.16) | (0.30) | (-0.42) |
| Observations | 8,681 | 8,681 | 8,681 | 8,681 |
| R ² | 0.761 | 0.762 | 0.761 | 0.762 |
| CEF FE | Yes | Yes | Yes | Yes |
| Controls | Yes | Yes | Yes | Yes |

Table 4: Heterogeneity Analysis by Periods of ESG vs. Energy Stocks Performance

This table replicates column (4) of Table 2 for sub-periods based on relative performance of ESG vs. Energy stocks. For each month, we calculate cumulative return of iShares MSCI USA ESG Select ETF (ticker=“SUSA”) and iShares U.S. Energy ETF (ticker=“IYE”) for the past 3 months. Column (1) and (2) divide the sample depending on whether the cumulative return of “SUSA” is lower than that of “IYE.” For each subsample, *Economic Significance (%)* indicates the percentage change in the standard deviation of CEF premium associated with a one-standard-deviation change in Fund ESG for the PRI signatory. All variables are defined in Table A.1. All regressions include CEF fixed effects. *t*-statistics are reported in parentheses and are based on standard errors clustered at the CEF level. ***, **, and * denote statistical significance at the 1%, 5%, and 10%, respectively.

| Period: | ESG < Energy (1) | ESG ≥ Energy (2) |
|----------------------------------|------------------------------|---------------------|
| | Dep. var = CEF Premium | |
| Sign × Fund ESG | 0.033*** (3.20) | 0.013* (1.91) |
| <i>Economic Significance (%)</i> | [14.25] | [5.93] |
| Fund ESG | -0.011* (-1.89) | -0.003 (-0.55) |
| Sign | -0.001 (-0.15) | -0.001 (-0.21) |
| Observations | 3,564 | 5,117 |
| R ² | 0.777 | 0.764 |
| CEF FE | Yes | Yes |
| Controls | Yes | Yes |
| Difference in Sign × Fund ESG | 0.020** (<i>t</i> =2.18) | |

Table 5: Heterogeneity Analysis by Environmental Regulatory Stringency

This table replicates column (4) of Table 2 for subsamples based on environmental regulatory stringency. In Panel A, the stringency is measured by Environmental Policy Stringency Index (EPSI) of the U.S. provided by the OECD. Panel A divides the sample depending on whether the change in EPSI (Δ EPSI) is positive or not. In Panel B, for each underlying firm that a CEF holds, the stringency is measured by the number of informal, formal, and judicial enforcement actions by the Environmental Protection Agency (EPA) in a given year in the state the firm's headquarter is located in. A CEF's stringency is then calculated as a value-weighted average of its underlying firms' stringency. Panel B divides the sample depending on whether the CEF's stringency for each quarter is higher than top quintile of the distribution in that quarter or not. In Panel C, the subsamples are divided by the U.S. announcement of withdrawal from the Paris Agreement in June 2017. For each subsample, *Economic Significance (%)* indicates the percentage change in the standard deviation of CEF premium associated with a one-standard-deviation change in Fund E for the PRI signatory. All variables are defined in Table A.1. All regressions include CEF fixed effects. *t*-statistics are reported in parentheses and are based on standard errors clustered at the CEF level. ***, **, and * denote statistical significance at the 1%, 5%, and 10%, respectively.

| Panel A: Change in Environmental Policy Stringency Index (ΔEPSI) | | | | |
|---|------------------------------|------------------------|-------------------------------|------------------------|
| Period: | Δ EPSI > 0 | Δ EPSI \leq 0 | Δ EPSI > 0 | Δ EPSI \leq 0 |
| | (1) | (2) | (3) | (4) |
| | Dep. var = CEF Premium | | | |
| Sign \times Fund E | 0.119** (2.57) | 0.006 (0.21) | 0.116** (2.41) | -0.020 (-0.78) |
| <i>Economic Significance (%)</i> | [9.70] | [0.53] | [9.43] | [-1.86] |
| Fund E | 0.000 (0.00) | -0.062*** (-2.81) | 0.000 (0.01) | -0.074*** (-3.41) |
| Fund S | | | -0.011* (-1.74) | -0.023*** (-5.10) |
| Fund G | | | 0.021 (0.74) | 0.036* (1.89) |
| Sign | -0.013* (-1.88) | -0.015*** (-2.82) | -0.013* (-1.81) | -0.014** (-2.30) |
| Observations | 3,218 | 2,849 | 3,218 | 2,849 |
| R ² | 0.783 | 0.833 | 0.784 | 0.839 |
| CEF FE | Yes | Yes | Yes | Yes |
| Controls | Yes | Yes | Yes | Yes |
| Difference in Sign \times Fund E | 0.114** (<i>t</i> =2.29) | | 0.136*** (<i>t</i> =2.69) | |

Table 5 continues

| Panel B: Enforcement Actions by the EPA | | | | |
|--|-----------------|---------|-----------------|---------|
| Fund Characteristic: | High | Low | High | Low |
| | (1) | (2) | (3) | (4) |
| Dep. var = CEF Premium | | | | |
| Sign \times Fund E | 0.147* | 0.011 | 0.148** | 0.009 |
| | (1.97) | (0.17) | (2.03) | (0.15) |
| <i>Economic Significance (%)</i> | [14.05] | [0.83] | [14.13] | [0.74] |
| Fund E | -0.052* | 0.021 | -0.047 | 0.015 |
| | (-1.77) | (0.81) | (-1.62) | (0.62) |
| Fund S | | | -0.004 | -0.005 |
| | | | (-0.75) | (-0.70) |
| Fund G | | | -0.005 | 0.019 |
| | | | (-0.23) | (0.99) |
| Sign | -0.006 | -0.000 | -0.005 | -0.000 |
| | (-0.47) | (-0.06) | (-0.43) | (-0.02) |
| Observations | 1,686 | 6,995 | 1,686 | 6,995 |
| R ² | 0.829 | 0.755 | 0.829 | 0.756 |
| CEF FE | Yes | Yes | Yes | Yes |
| Controls | Yes | Yes | Yes | Yes |
| Difference in Sign \times Fund E | 0.136* | | 0.138* | |
| | <i>(t=1.73)</i> | | <i>(t=1.78)</i> | |

Table 5 continues

| Panel C: U.S. Announcement of Withdrawal from the Paris Agreement | | | | |
|--|------------------------|----------------------------|---------------|----------------------------|
| Period: | Pre-June 2017 | Post-June 2017 | Pre-June 2017 | Post-June 2017 |
| | (1) | (2) | (3) | (4) |
| | Dep. var = CEF Premium | | | |
| Sign \times Fund E | 0.066** | 0.003 | 0.058* | 0.006 |
| | (2.05) | (0.04) | (1.76) | (0.06) |
| <i>Economic Significance (%)</i> | [5.58] | [0.23] | [4.89] | [0.37] |
| Fund E | -0.022 | 0.101 | -0.026 | 0.115 |
| | (-0.89) | (0.89) | (-1.07) | (0.86) |
| Fund S | | | -0.010* | -0.012 |
| | | | (-1.97) | (-0.89) |
| Fund G | | | 0.025 | 0.040 |
| | | | (1.52) | (0.78) |
| Sign | -0.009** | -0.010 | -0.009* | -0.010 |
| | (-1.99) | (-1.41) | (-1.90) | (-1.35) |
| Observations | 7,085 | 1,596 | 7,085 | 1,596 |
| R ² | 0.776 | 0.829 | 0.777 | 0.829 |
| CEF FE | Yes | Yes | Yes | Yes |
| Controls | Yes | Yes | Yes | Yes |
| Difference in Sign \times Fund E | | 0.062 (<i>t</i> =0.64) | | 0.052 (<i>t</i> =0.53) |

Table 6: Heterogeneity Analysis by Labor Regulation Stringency

This table replicates column (4) of Table 2 with subsamples based on labor regulation stringency. For each underlying firm that a CEF holds, the labor regulation stringency is measured by the amount of initial penalties imposed by the Occupational Safety and Health Administration(OSHA) in a given year in the state the firm's headquarter is located in. A CEF's labor regulation stringency is then calculated as a value-weighted average of its underlying firms' labor regulation stringency. The sample is divided by whether the CEF's labor regulation stringency for each quarter is higher than top quartile of the distribution in that quarter or not. For each subsample, *Economic Significance (%)* indicates the percentage change in the standard deviation of CEF premium associated with a one-standard-deviation change in Fund S for the PRI signatory. All variables are defined in Table A.1. All regressions include CEF fixed effects. *t*-statistics are reported in parentheses and are based on standard errors clustered at the CEF level. ***, **, and * denote statistical significance at the 1%, 5%, and 10%, respectively.

| Fund Characteristic: | By Labor Regulation Stringency | | | |
|---------------------------------------|--------------------------------|-------------------|-----------------------------|-------------------|
| | High (1) | Low (2) | High (3) | Low (4) |
| | Dep. var = CEF Premium | | | |
| Sign \times Fund S | 0.052*** (3.92) | 0.023** (2.00) | 0.052*** (3.87) | 0.020* (1.66) |
| <i>Economic Significance (%)</i> | [22.65] | [7.61] | [22.44] | [6.83] |
| Fund S | -0.012*** (-2.77) | -0.012 (-1.35) | -0.012** (-2.64) | -0.012 (-1.40) |
| Fund E | | | 0.014 (0.48) | -0.037 (-1.15) |
| Fund G | | | 0.006 (0.24) | 0.025 (1.19) |
| Sign | -0.012 (-1.53) | -0.000 (-0.01) | -0.011 (-1.39) | -0.000 (-0.03) |
| Observations | 2,118 | 6,563 | 2,118 | 6,563 |
| R ² | 0.847 | 0.742 | 0.847 | 0.742 |
| CEF FE | Yes | Yes | Yes | Yes |
| Controls | Yes | Yes | Yes | Yes |
| Difference in Sign \times Fund S | 0.030* (<i>t</i> =1.79) | | 0.032* (<i>t</i> =1.88) | |

Table 7: IV Regression and Placebo Test

This table reports instrumental variable regression and placebo test results with full specification as in column (4) of Table 2. Panel A reports coefficient estimates from instrumental variable regression. Column (1) reports coefficient estimates from the first-stage regression of *Sign* on Google's Search Volume Index (SVI). Column (2) reports coefficient estimates from the second-stage regression, where *Sign* and *Sign* \times Fund ESG are instrumented by SVI and SVI \times Fund ESG. Panel B reports the average coefficient estimates from one hundred random samples that replaces the actual signing date of U.N. PRI with dates randomly drawn from the sample distribution of the signing dates. All variables are defined in Table A.1. All regressions include CEF fixed effects. *t*-statistics are reported in parentheses and are based on standard errors clustered at the CEF level. In Panel B, the reported *t*-statistics are the average *t*-statistics across the one hundred simulations. ***, **, and * denote statistical significance at the 1%, 5%, and 10%, respectively.

| Panel A: IV Regression | | |
|----------------------------------|----------------------|----------------------|
| | First Stage | Second Stage |
| Dep. var = | (1) | (2) |
| | Sign | CEF Premium |
| SVI | 0.004*** (8.14) | |
| $\widehat{Sign} \times$ Fund ESG | | 0.087** (2.08) |
| \widehat{Sign} | | -0.029* (-1.87) |
| Fund ESG | 0.117** (2.61) | -0.012 (-1.61) |
| Payout ratio | -0.038 (-1.57) | 0.004* (1.81) |
| Net expense ratio | 0.145 (0.04) | 0.013 (0.02) |
| Leverage | -0.046 (-0.15) | -0.061** (-2.04) |
| Relative trading volume | 0.108*** (2.77) | 0.003 (0.88) |
| Relative bid-ask spread | -0.251 (-0.09) | 0.331 (1.26) |
| Retail holdings | -0.027 (-0.33) | 0.010 (0.96) |
| Underlying market cap | 0.001 (1.36) | -0.000 (-1.05) |
| Underlying BM | -0.028 (-1.21) | 0.002 (1.18) |
| Inverse price (premium) | 2.206*** (2.96) | -0.193 (-0.99) |
| Inverse price (discount) | 1.564*** (3.89) | -0.453*** (-4.09) |
| Dividend yield (premium) | -0.324 (-0.36) | 0.787*** (5.08) |
| Dividend yield (discount) | -0.206 (-0.54) | -0.006 (-0.18) |
| PS liquidity factor | 0.060 (0.96) | 0.046*** (5.72) |
| Term spread | -8.200*** (-5.52) | -0.058 (-0.30) |
| Observations | 8,681 | 8,681 |
| R ² | 39 0.678 | 0.748 |
| CEF FE | Yes | Yes |

Table 7 continues

| Panel B: Placebo Test | |
|------------------------------|------------------------|
| | (1) |
| | Dep. var = CEF Premium |
| Sign × Fund ESG | 0.007 (0.84) |
| Sign | -0.005 (-0.82) |
| Fund ESG | -0.005 (-0.93) |
| Observations | 8,681 |
| CEF FE | Yes |
| Controls | Yes |

Table 8: Robustness Tests (ASSET4)

This table reports coefficient estimates from CEF-panel regressions of monthly CEF premia/(discounts) on the CEF's ESG score(ASSET4) and an indicator for whether the CEF is a PRI signatory in a month. All variables are defined in Table A.1. All regressions include CEF fixed effects. t -statistics are reported in parentheses and are based on standard errors clustered at the CEF level. ***, **, and * denote statistical significance at the 1%, 5%, and 10%, respectively.

| | (1) | (2) | (3) | (4) |
|---------------------------|------------------------|----------------------|-----------------------|-----------------------|
| | Dep. var = CEF Premium | | | |
| Sign \times Fund ESG | 0.0008*** (3.63) | 0.0008*** (3.55) | 0.0003*** (2.88) | 0.0003*** (2.92) |
| Fund ESG | -0.0005*** (-2.65) | -0.0004** (-2.04) | -0.0001 (-0.93) | -0.0001 (-1.07) |
| Sign | -0.0288** (-2.60) | -0.0244** (-2.15) | -0.0071 (-1.22) | -0.0071 (-1.19) |
| Payout ratio | | 0.0114*** (4.14) | 0.0060*** (3.43) | 0.0063*** (3.75) |
| Net expense ratio | | -0.7024 (-0.96) | 0.0328 (0.07) | 0.0623 (0.13) |
| Leverage | | -0.0445 (-1.22) | -0.0429* (-1.86) | -0.0433* (-1.87) |
| Relative trading volume | | 0.0036 (0.53) | 0.0016 (0.48) | 0.0010 (0.31) |
| Relative bid-ask spread | | -0.0570 (-0.15) | 0.4385 (1.57) | 0.4588* (1.76) |
| Retail holdings | | 0.0060 (0.50) | 0.0052 (0.58) | 0.0026 (0.30) |
| Underlying market cap | | -0.0000 (-0.28) | -0.0001 (-0.88) | -0.0001 (-0.77) |
| Underlying BM | | 0.0019 (0.58) | 0.0023 (1.46) | 0.0022 (1.38) |
| Inverse price (premium) | | | -0.1949 (-1.00) | -0.1979 (-0.98) |
| Inverse price (discount) | | | -0.4603*** (-4.18) | -0.4623*** (-3.95) |
| Dividend yield (premium) | | | 0.7782*** (5.07) | 0.7844*** (5.11) |
| Dividend yield (discount) | | | -0.0227 (-0.74) | -0.0127 (-0.43) |
| PS liquidity factor | | | | 0.0409*** (4.64) |
| Term spread | | | | 0.0325 (0.23) |
| Observations | 8,681 | 8,681 | 8,681 | 8,681 |
| R ² | 0.496 | 0.506 | 0.761 | 0.762 |
| CEF FE | Yes | Yes | Yes | Yes |

Table A.1: Variable definitions

| Variable | Description |
|-------------------------------------|--|
| CEF premium | CEF's share price minus its net asset value divided by its net asset value. |
| Sign | Indicator that equals one if a CEF is managed by a PRI signatory in the month. |
| Fund ESG | Value-weighted average of ESG scores of stocks held by CEF. |
| Fund E | Value-weighted average of E (Environmental) scores of stocks held by CEF. |
| Fund S | Value-weighted average of S (Social) scores of stocks held by CEF. |
| Fund G | Value-weighted average of G (Governance) scores of stocks held by CEF. |
| Payout ratio | CEF's dividend-per-share divided by its earnings-per-share |
| Net expense ratio | CEF's annual expense net of waivers as a percentage of average net assets. |
| Leverage | CEF's annual level of leverage as a percentage of total assets. |
| Relative trading volume | CEF's trading volume minus the portfolio-weighted average trading volume across the stocks held by the CEF. (Hwang and Kim (2017)) |
| Relative bid-ask spread | CEF's bid-ask spread minus the portfolio-weighted average bid-ask spread across the stocks held by the CEF. (Hwang and Kim (2017)) |
| Retail holdings | CEF's fraction of shares held by retail investors. |
| Underlying market cap | Value-weighted average of market capitalization of stocks held by CEF. |
| Underlying BM | Value-weighted average of book-to-market ratio of stocks held by CEF. |
| Inverse price (premium / discount) | One over the CEF's lagged month-end price if the CEF trades at premium (discount), and zero otherwise. (Hwang and Kim (2017)) |
| Dividend yield (premium / discount) | Dividend-per-share paid by the CEF over the previous 12 months scaled by the CEF's if the CEF trades at premium (discount), and zero otherwise. (Hwang and Kim (2017)) |
| PS liquidity factor | Pástor and Stambaugh (2003) liquidity factor. |
| Term spread | Yield spread between U.S. government bonds with 20 years of maturity and U.S. government bonds with 3 months of maturity. |
| Fund ESG (ASSET4) | Value-weighted average of ASSET4 ESG (Overall) scores of stocks held by CEF. |

Table A.2: Persistence of ESG scores by CEFs Walking Their Talks

This table reports the average ESG scores of signatory and non-signatory CEFs with *high* ESG scores for sub-periods based on relative performance of ESG vs. Energy stocks. For each quarter, the sample consists of CEFs with ESG scores higher than the median ESG score in that quarter. And for each quarter, we calculate cumulative return of iShares MSCI USA ESG Select ETF (ticker=“SUSA”) and iShares U.S. Energy ETF (ticker=“IYE”) in that quarter. The sample is divided by whether the cumulative return of “SUSA” is higher than that of “IYE.” The mean-difference and difference-in-differences test results of ESG scores are reported. ***, **, and * denote statistical significance at the 1%, 5%, and 10%, respectively.

| | ESG > Energy | ESG ≤ Energy | Difference in Fund ESG |
|---------------------------|----------------------------|-------------------------------|--------------------------------|
| Non-Signatory CEF | 0.345 (N=1501) | 0.182 (N=1254) | 0.163*** (<i>t</i> =12.27) |
| Signatory CEF | 0.329 (N=773) | 0.207 (N=344) | 0.122*** (<i>t</i> =7.85) |
| Difference in Fund ESG | 0.017 (<i>t</i> =1.19) | -0.025* (<i>t</i> =-1.66) | 0.041* (<i>t</i> =1.68) |