ESG Disclosure: A Text Analysis of Mutual Fund Shareholder Letters*

Da Chen†, Tao Shu‡, Chelsea Yao§

March 26, 2025

Abstract: Fund companies regularly issue shareholder letters to communicate with investors. This study uses textual analysis to examine investor reactions to ESG (Environmental, Social, and Governance) information disclosed in these letters. We find that ESG disclosure attracts abnormal inflows compared to matched samples. These results remain robust across alternative controls, fixed effects and different estimation methods. Notably, the ESG flow effect is more pronounced among institutional funds and in the post-Paris Agreement period, aligning with investors' values-driven considerations. However, ESG disclosure is not linked to future fund performance, contradicting the notion that such disclosure is tied to profitable investments. Furthermore, distinguishing between ESG-specific and general information using AI reveals that funds providing ESG-specific disclosure enhance their ESG performance, whereas those offering only general information do not, highlighting that a failure to differentiate between types of ESG information may create a misleading impression of sustainability efforts. Last, we show that managers may face a trade-off in voluntarily disclosing ESG shareholder letters, as the inflow benefits come with the risk of greater outflows if ESG performance disappoints investors.

Keywords: ESG, Shareholder Letters, Mutual Funds, Textual Analysis, AI

JEL classification: G12, G14, G23

* For constructive comments, we thank Vikas Agarwal, Sean Cao, Pedro Matos, Dasha Smirnow, Miriam Schwartz-Ziv, and George Wang as well as conference and seminar participants at the 2023 FMA, 2024 Annual Corporate Finance Conference, 2023 Asian Finance Conference, 2023 ASFAAG Conference, Lancaster-WHU PhD workshop, Lancaster-Deakin PhD workshop, East China Normal University.

† PhD candidate in Finance, Department of Accounting and Finance, Lancaster University Management School, Lancaster, LA1 4YX, UK. Email address: d.chen6@lancaster.ac.uk.

‡ Professor of Finance, Department of Finance at The Chinese University of Hong Kong (CUHK) Business School and ABFER. Email address: taoshu@cuhk.edu.hk.

§ Associate Professor, Department of Accounting and Finance, Lancaster University Management School, Lancaster, LA1 4YX, UK. Email address: chelsea.yao@lancaster.ac.uk.

Greenwashing, defined as the exaggeration of ESG strategies or considerations in investment products to attract business, has raised concerns among practitioners and regulators. This phenomenon is driven by information asymmetry (Wu, Zhang and Xie, 2020), which makes it difficult for investors to assess whether a fund's ESG marketing statements translate into concrete and specific measures addressing ESG goals and portfolio allocation. As a result, regulators have begun taking action against misleading ESG claims (SEC 2022). [1] For example, BNY Mellon has been fined $1.5 million for ESG misstatements and omissions by the US Securities and Exchange Commission (SEC) in May 2022.[2] Goldman Sachs has also been fined $4.0 million for misleading customers about ESG investment in November 2022.[3] Such misleading ESG claims can lead to capital misallocation, ultimately affecting market efficiency. For instance, Kim and Yoon (2023) find that mutual funds signing the Principal for Responsible Investment (PRI) [4] attract more inflows, despite showing no significant improvement in ESG performance. Likewise, Liang, Sun, and Teo (2022) document a similar flow effect for hedge funds signing PRI. Given that mutual funds are one of the most significant investment vehicles, with over 50% of households holding them, understanding greenwashing behavior in the mutual fund industry is crucial.

As a potential channel of ESG information delivery, shareholder letters – typically included in mutual fund reports (Forms N-CSR and N-CSRS filings) – provide valuable information that may influence decision making and capital flows (Hillert, Niessen-Ruenzi and Ruenzi, 2024; Cao,

[1] The document is available at https://www.sec.gov/files/rules/proposed/2022/ia-6034.pdf
[2] Patrick Temple-West and Stefania Palma, May 23 2022, "SEC fines BNY Mellon over ESG in first case of its kind," *Financial Times*.
[3] Joshua Franklin, Patrick Temple-West, November 222022, "Goldman Sachs to pay $4mn penalty over ESG fund claims", *Financial Times*.
[4] The United Nations Principles for Responsible Investment (PRI) is the largest global initiative to incorporate ESG.

Yang and Zhang, 2024). Managers usually use these letters to communicate with both shareholders and potential clients, covering a wide range of topics, including discussions on the broader economic environment and outlook, rationales behind specific holdings, investment strategies, and comments on wins and losses. Among these topics, ESG-related information has become increasingly important, as investors incorporate sustainability considerations into their decision-making process (Ilhan et al., 2023; Amel-Zadeh and Serafeim, 2018; Cheema-Fox et al., 2021). While several papers study the impact of ESG signals on fund flows based on Morningstar Sustainable rating (Hartzmark and Sussman, 2019) or signatory of PRI (Kim and Yoon, 2023; Gibson, Glossner, Krueger, Matos and Steffan, 2022), it is surprising that ESG information in shareholder letters has received little attention.[5] In this paper, we make the first attempt to systematically study how ESG-related information in shareholder letters affects capital allocation and potential greenwashing behavior.

We begin by analyzing shareholder letters of U.S. domestic actively managed equity mutual funds from 2006 to 2022. To detect ESG-related content in shareholder letters, we apply a sentence-based textual analysis model called "ESG-BERT" model (Huang, Wang and Yang, 2023). We find evidence that fund managers disclose ESG-related information, and the disclosure is not limited to self-labeled ESG funds, but also other funds. Specifically, among the 32,996 shareholder letters, we identify 18% (6,025 letters) that mention ESG-related information. More importantly, we use ChatGPT to analyze the ESG content and find that only 20% (1,244 letters) provide specific

[5] Mutual funds are one of the most important investment vehicles and amount to $27 trillion dollars in the US. In 2021, the Investment Company Institute (ICI) reported that nearly 48% of U.S. households hold mutual funds and receive shareholder letters.

ESG information (i.e., specific ESG-related holdings or activities), while the rest 4,781 letters mention the general ESG information (i.e., meeting the ESG criteria or considering ESG strategies).

To investigate fund managers' incentives to disclose ESG-related information, we examine how investors may respond to such disclosures. Managers' compensation largely depends on the fees they earn, which in turn, are driven by the funds' asset under management. Accordingly, fund managers have an incentive to boost net flows in order to maximize their fees (Chevalier and Ellison, 1997). To explore, we first conduct event-based regressions and find evidence that investors react strongly to ESG-related information disclosed in mutual fund shareholder letters over the following six months. Specifically, we find that disclosing ESG-related information increases cumulative flows over the following six months by 1%, with a *t*-statistic of 3.26. More importantly, this effect is economically large, given that the sample average monthly flow is -0.16% (equivalent to -0.96% over six months). For a fund with $1 billion in assets and a 1% expense ratio, this translates into an additional $100K in management fees.

We further employ several specifications to address econometric concerns that may bias the baseline results. To better estimate the flow effect, we first utilize the propensity score matching (PSM) method, which has been widely used to examine flow effects in event studies (Agarwal, Lu and Ray, 2021; Hartzmark and Sussman, 2019; Cooper, Gulen and Rau, 2005). We consider the following matching variables - cumulative flow and Carhart alpha over the prior six months, age, size and Carhart-4 factor exposures - to construct our treatment group (i.e., funds with ESG-related information in shareholder letters) and control group (i.e., similar funds without ESG-related

information in shareholder letters).[6] We find consistent results with PSM sample from event-based regressions.

Next, we assess the impact of disclosing ESG-related shareholder letters on fund flows using a difference-in-differences (DID) framework. Extending the sample period to five months before and after the disclosure date, we continue to find a statistically significant flow effect (with a *t*-statistic of 2.80) following ESG-related disclosures. To address concerns regarding parallel trends, we implement a dynamic DID approach. The flow effects are insignificant in the pre-event months, supporting the parallel trends assumption,[7] and become significant in the five months following disclosure. Moreover, recent studies have criticized the staggered DID method for incorporating already-treated units and assigning negative weights, which can lead to biased estimates (Baker, Larcker, and Wang, 2022; Callaway and Sant'Anna, 2021; Sun and Abraham, 2021). To mitigate these concerns, we apply the methods proposed by Dube, Girardi, Jordà and Taylor (2024) and de Chaisemartin and D'Haultfoeuille (2024), and confirm that our results remain robust using two alternative control methods (i.e., not-yet treated or never treated) control group.[8] Last, we construct a set of counterfactual events by keeping the original distribution and randomly

[6] For robust, we consider two sets of matching variables to construct our control group. Results are shown in Online Appendix Table A3.

[7] The parallel trend is further supported by Figure 1, which plots the differences in residual flows between treated funds and matched counterparts before and after the disclosure date as the figure does not indicate a pre-trend in investor flows.

[8] Since our treatment is non-absorbing, both Callaway and Sant'Anna (2021) estimator and Sun and Abraham (2021) estimator are not applicable, as their assumptions require absorbing treatment effect. See Assumption 1 of Callaway and Sant'Anna (2020), which states that "Once a unit becomes treated, that unit will remain treated in the next period". And section 2 of Sun and Abraham (2020) states that "For any treatment that is not absorbing, if we replace the treatment status $D_{i,t}$ with an indicator for ever having received the treatment, the new treatment is absorbing by construction. Oftentimes the effect of having ever received the treatment is of interest, as it captures the path of treatment effects even though the treatment itself may be transient".

assigning the DID interaction terms. The distribution of coefficients from 500 runs of falsification tests suggests that our findings are unlikely to be observed by chance.

The large flow response we document raises a mechanism question of why investors pay for this ESG-related information. We examine this through two key factors: *value* and *values* (Starks, 2023). Some investors are motivated by financial *value*, believing that ESG considerations enhance returns (Edmans, 2011; Lins, Servaes and Tamayo, 2017; Pedersen, Fitzgibbons, and Pomorski, 2021; Edmans, Pu, Zhang, Li, 2023). Other investors are driven by *values*, meaning nonpecuniary preferences or moral motivations, independent of financial outcomes (Renneboog, Horst and Zhang, 2011).

We first examine whether the flow effect is primarily driven by institutional funds or retail funds. Prior research suggests institutional investors are more *values*-driven in ESG investments (Ilhan, Krueger, Sautner and Starks, 2023; Krueger, Sautner and Starks, 2020), whereas retail investors tend to focus more on financial *value* (Li, Watts and Zhu, 2024). Our findings indicate that the ESG flow effect is largely concentrated in institutional funds, with ESG disclosures attracting 1.1% more inflows to institutional funds compared to retail funds over the following six months. Next, we test whether ESG flow effect is more pronounced after the Paris Agreement, which serves as a key event driving values-based motivation. We find that the ESG flow effect is only significant in the post-Paris Agreement period, suggesting a shift toward *values*-driven investment behavior. Finally, we test whether investors perceive sustainability as a positive predictor of future performance. Consistent with existing papers, we find no significant relation

between ESG disclosures and subsequent financial performance (Kim and Yoon, 2023; Hartzmark and Sussman, 2019), indicating that the flow effect is less likely to be driven by financial motivation. Taken together, our results suggest that investors' positive responses to ESG disclosures are primarily driven by *values*-based motivations rather than financial *value* considerations.

An important question then arises: do these funds significantly improve their ESG performance, or are they engaging in "cheap talk" and greenwashing? Instead of ESG ratings, which vary significantly across agencies (Berg, Kolbel and Rigobon, 2022), we evaluate ESG performance using ESG-related incidents and carbon emissions. We find no clear evidence that funds with shareholder letters significantly improve their ESG performance, which appears to be greenwashing, as documented in prior studies. However, when classfying ESG shareholder letters into specific (i.e., detailing ESG holdings or activities) and general information (i.e., broad statements on ESG performance) using ChatGPT, we find that funds providing ESG specific information significantly reduce ESG-related incidents and Scope 1 carbon emissions of holding stocks. Given that greenwashing is defined as failing to "walk the talk", we argue that neither type of fund engages in greenwashing: those with ESG specific disclosures follow through on their claims, while those with general disclosures make no concrete commitments. Different from previous papers, our findings suggest that greenwashing may be less prevalent when distinguishing between specific and general ESG disclosures.

Finally, we show that the flow effect does not differ between ESG-specific and general

disclosures, indicating that investors may misinterpret the ESG information disclosed in shareholder letters. We further propose an equilibrium to explain why not all funds engage in cheap talk. While disclosing ESG shareholder letters helps attract more inflows, it also exposes funds to a higher risk of flow punishment. Specifically, funds that disclose ESG shareholder letters experience 1.6% more outflows in the following quarter (equivalent to 3.2% outflows over the six months) if investors find that these funds perform poorly on ESG in the quarter after disclosure. Compared to the inflows gained from disclosing ESG shareholder letters, these funds quickly lose their benefits within three months if their ESG performance fails to meet investors' expectations.

Our paper contributes primarily to the literature on market reactions and the real impacts of mutual fund ESG disclosures. Existing papers concentrate largely on company's ESG disclosures (Kolbel, Leippold, Rillaerts and Wang, 2024; Li, Shan, Tang and Yao, 2024; Hail, Kim and Zhang, 2022; Sautner, Van Lent, Vilkov, and Zhang, 2023). Despite some papers that study ESG issues in mutual fund industry (Di Giuli, Garel, Michaely and Petit-Romec, 2024; Ceccarelli, Ramelli and Wagner, 2024; Ceccarelli, Glossner and Homanen, 2023), few directly analyze the content of ESG disclosure and how investors react to this textual information. Our paper contributes to this area by directly detecting the flow effects of ESG-related information in mutual funds' shareholder letters.

Second, our paper contributes to the discussion on greenwashing behavior in mutual funds. Unlike previous studies that widely document greenwashing behavior by analyzing discrepancies between ESG prospectuses and holding-based ESG scores (Andrikogiannopoulou, Krueger, Mitali

and Papakonstantinou, 2022) or between sustainable ratings and self-labeling behavior (Dumitrescu, Gil-Bazo and Zhou, 2023; Kaustia and Yu, 2021), we provide a new insight by directly examining whether ESG information is specific using ChatGPT. We find that mutual fund greenwashing behavior may not be as prevalent as previously documented. When mixing both types of funds, we do not observe significant ESG improvements. However, when separating them into general and specific ESG information, we find that funds with specific ESG information significantly reduce ESG incidents and Scope 1 carbon emissions, while funds with general ESG information do not engage in greenwashing, as they have not committed to specific actions or ESG-related holdings. Therefore, we argue that when examining the behavior of greenwashing, it is important to consider whether ESG information is specific. Our method is also more applicable since investors, especially retail investors, face high searching costs across various databases, particularly given the strong discrepancies in ESG ratings. Analyzing ESG-related information directly from shareholder letters could therefore be a potential solution for sustainable investors seeking funds with real ESG impacts.

Our paper also contributes to the literature on the relation between ESG finance and mutual funds. To the best of our knowledge, our work is among the first to analyze ESG-related information disclosed in mutual funds' shareholder letters. Shareholder letters, an important communication channel between fund managers and investors, contain rich and spontaneous information that may affect investment decision and capital flows (Hillert, Niessen-Ruenzi and Ruenzi, 2024; Cao, Yang and Zhang, 2024). However, limited research has focused on mutual fund

shareholder letters, leaving this area underexplored. Our paper fills this gap by examining the disclosure of an increasingly important type of information – ESG – in mutual fund shareholder letters.

Last, there is a strong debate on the investor's tradeoff between financial performance and sustainability in the mutual fund industry. Some papers argue that socially responsible investors are generally believed to put sustainability before performance (Bauer, Ruof and Smeets, 2021; Barber et al., 2021; Riedl and Smeets, 2017). In contrast, Gantchev, Giannetti and Li (2024) show that too few US mutual fund investors value sustainability over performance. Although some papers argue that sustainability improves performance and limits downside risk (Albuquerque et al., 2019; Lins et al, 2017; Edmans, 2011), there is no consensus on the clear relation (either positively or negatively or no relation) between ESG disclosure and mutual fund financial performance. Our paper discusses this debate by showing two important results. First, investors, especially institutional investors do care about ESG information disclosed in mutual fund shareholder letters. Second, there is not an obvious relation between disclosing such information and following financial performance.

1. INSTITUTIONAL BACKGROUND

1.1 ESG Disclosures of Mutual Funds and Greenwashing Behavior

Greenwashing has become a pressing concern in the asset management industry, drawing increasing scrutiny from regulators such as the U.S. Security and Exchange Commission (SEC) and the European Securities and Markets Authority (ESMA). As investors demand more transparency on ESG issues, regulators have intensified efforts to ensure that funds' ESG claims

are substantiated. Despite these efforts, concerns remain that some funds strategically disclose ESG-related information to attract investors without making meaningful changes.

This issue is closely tied to the voluntary nature of ESG disclosures. According to classic voluntary disclosure theories, such disclosures can be viewed as a persuasion game (Milgrom, 1981) where interested parties (i.e., fund managers) provide information to decision makers (i.e., investors) in an attempt to influence their decisions. Verrecchia (1983) suggests that managers face a threshold when deciding whether to disclose or withhold information. They choose to disclose only when the potential benefits outweigh the proprietary costs.

On the benefits side, prior studies document that ESG signals may enable funds to attract greater inflows from investors (Andrikogiannopoulou, Krueger, Mitali and Papakonstantinou, 2024; Kim and Yoon, 2023; Gibson, Glossner, Krueger, Matos and Steffan, 2022; Hartzmark and Sussman, 2019), providing fund managers with a strong incentive to disclose ESG information to maximize management fees (Chevalier and Ellison, 1997). However, voluntary disclosures also come with risks. First, funds may face litigation risks if they disclose ESG-related information but fail to demonstrate real efforts. Second, disclosing ESG-related information may potentially generate outflows from clients who are concerned that ESG investments may hurt financial performance (Liang, Sun and Teo, 2022; Raghunandan and Rajgopal, 2022; Gantchev, Giannetti, and Li, 2024).

While greenwashing has been widely documented (Abouarab, Mishra and Wolfe, 2024; Cochardt, Heller and Orlov, 2023; Dumitrescu, Gil-Bazo and Zhou, 2023; Kim and Yoon, 2023; Liang, Sun and Teo, 2022), most studies focus on ESG signals such as PRI signatory or fund name changes. Andrikogiannopoulou, Krueger, Mitali and Papakonstantinou (2024) is among the few papers that analyze ESG-related keywords in prospectuses, yet limited attention has been paid to

the actual content of ESG disclosures. This represents a critical gap in the literature. Given that greenwashing is defined as failing to "walk to talk", existing studies largely focus on the "walk" side, while few explore the "talk" itself – that is, the specific ESG information being communicated.

1.2 Mutual Fund Shareholder Letters

According to section 30(e) of the Investment Company Act of 1940, the US Securities and Exchange Commission (the "SEC") require all registered investment companies to disclose financial reports to their shareholders semiannually. These reports are formally called N-CSR (annual report) and N-CSRS (semi-annual report), which include information on portfolio composition, fund's performance, details of fund expenses, statements of income and balance sheets. More importantly, over 89% of these financial reports include a letter directly addressing the fund's shareholders (Hillert, Niessen-Ruenzi and Ruenzi, 2024).

Based on the ICI Shareholder Report Survey, 63% of mutual fund investors read at least some parts of the report, and more than half of them read at least a substantial portion of the report.[9] Given that shareholder letters are typically placed at the beginning of these reports, the survey suggests that a significant number of investors are likely to pay attention to and potentially react to these letters. However, relatively few studies have examined how the content of mutual fund shareholder letters influences investor decision making and fund flows, making this an underexplored area in the existing literature.[10]

[9] The survey is available at https://www.ici.org/system/files/ attachments/ppr_18_summary_shareholder.pdf.
[10] A recent study by Hillert, Niessen-Ruenzi and Ruenzi (2024) examines the writing styles of shareholder letters and shows that the tone of shareholder letters is positively associated with future fund flows. Additionally, Cao, Yang, and Zhang (2024) use machine learning to identify private information of shareholder letters.

2. DATA AND SAMPLE CONSTRUCTION

2.1 Mutual Fund Shareholder Letters

We develop a web crawler to download certificated annual shareholder reports (Form N-CSR) and certified semi-annual shareholder reports (Form N-CSRS) filed by U.S. mutual fund management companies from the SEC's EDGAR database, covering the period from 2006 to 2022. A registered investment company (e.g., mutual fund companies) must electronically file Form N-CSR/NCSRS to the SEC within 10 days of sending the corresponding reports to shareholders.

After downloading all the N-CSR and N-CSRS filings from 2006 to 2022, we have 111,009 documents in total. Then we apply keyword search method to extract all the key information including series id (fund identifier), ticker (share-class identifier), class id (share-class identifier), central index key (CIK, company identifier), filing date (the date when the document was filed), conformed period of report (the end date of reporting period of the filing), company's name and fund's name (series name) for each document.

Next, we extract shareholder letters from the N-CSR/N-CSRS reports. We apply the following steps to extract them. First, we use some common phrases to locate the beginning and the ending of the letter. The most common phrases for the beginning and the ending of the letter are "Dear Shareholder" and "Thank you".[11] Second, for those reports that are failed to extract a letter, we then identify whether there is a section called "Management's Discussion and Analysis of Fund Performance".[12] Third, if we are still unable to identify shareholder letters we consider

[11] In total, we have summarized 26 start phrases and 14 end phrases, for example, "Dear investor", "Dear fellow", "Note to shareholder", "Sincerely", "Yours truly" and "Respectfully". Additionally, based on the writing styles of different companies, we have also constructed firm-specific phrases, such as "Chairman's letter" and "Management's discussion".

[12] Since some fund managers will not directly attach a letter and instead, they will talk about the market overview and explain their fund performance in this section, we also consider this part as a kind of shareholder letter followed by Hillert, Niessen-Ruenzi and Ruenzi (2021).

Item1 as the start of their shareholder letters[13]. Since the automatic extraction results in some implausibly short or long letters, we remove the shareholder letters with fewer than 50 words and more than 132,359 words (i.e., the 5%- and 95%-percentile cutoff points).

We then merge the SEC EDGAR data with mutual fund data from the Center for Research on Security Prices (CRSP) survivorship bias free mutual fund database by using the "CRSP_cik_map" table from CRSP Mutual Fund Database. Despite mutual funds starting to file N-CSR in 2003, the series and class identification information is not mandatory until 2006 and thus our sample period starts from January 2006.

We aggregate all share classes data at the fund level and our analysis is based on fund-letter level observations. As we focus on actively managed domestic U.S. equity mutual funds, we delete ETFs, pension, annuities and index funds following Bessembinder, Cooper, and Zhang (2023).[14]

2.2 Identifying ESG-Related Information in Shareholder Letters

In order to identify ESG-related content in shareholder letters, we employ a textual analysis model called FinBERT (Huang, Wang and Yang, 2022), which is based on Google's BERT algorithm (Devlin, Chang, Lee and Toutanova, 2019). BERT model is a sentence-based textual analysis model. BERT-based models are much more powerful than most of the traditional models in natural language processing and recent papers have already successfully applied them in finance

[13] In general, an N-CSR filing includes the following items: a report to shareholders (Item 1), the company's code of ethics (Item 2), the names of the financial experts in the company's audit committee (Item 3), the disclosure of principal accountant fees and services for the previous two fiscal year (Item 4), the disclosure of listed registrants or reason for exemption from the audit committee (Item 5), the firm's security holdings (Item 6) and the disclosure of proxy voting policies (Item 7).

[14] In specific, we exclude exchange traded funds, exchange traded notes (those with CRSP et_flag equal to "F" or "N"), funds that take short positions (with CRSP fund style "EDYS"), commodity funds (with CRSP fund style "EDSC"), real estate funds (with CRSP fund style "EDSR"), hedged funds (with CRSP fund style "EDYH" or Lipper objective code "LSE"), market neutral funds (with CRSP fund style "EDYH" or Lipper objective code "EMN") and absolute return funds(with CRSP fund style "EDYH" or Lipper objective code "ABR"). Next, we exclude target date funds with names that contain a four digit number between 1990 and 2050 and the word "target". Last, we manually check and exclude funds with names that contain "VIX", "Long/Short", "Long-Short", "OTC/Short", "ETF", "ETN", "1.25x", "1.5x", "2x", "2.5x", "3x", or "4x".

research (Kolbel, Leippold, Rillaerts and Wang, 2024; Rajan, Ramella and Zingales, 2023). Different from the traditional BERT model, FinBERT is pretrained based on financial materials (e.g., 10-Q, analyst reports and earning conference call transcripts), which has a better performance when understanding financial reports. More important, FinBERT can also identify ESG-related information in financial disclosures. And our main variable, ESG_{it}, is a dummy variable which equals one if a fund shareholder letter contains ESG information at month t, and zero otherwise.

The content of those shareholder letters that disclose ESG related issues varies largely. Some shareholder letters highlight the specific ESG-related holdings or activities. For example, a shareholder letter from T. Rowe Price Blue Chip Growth fund on August 27, 2012 (filing date) contains such a paragraph "We also established a new position in IHS, a leading provider of safety environmental mechanical and energy specifications for various industries".

Some of them focus on the effort they have made for the planet's sustainable development. For example, on March 10, 2006, a letter from Forward funds states that "Forward Funds has been committed to providing our investors transparent, clear and ethical investment practices since the beginning…All securities are consistent with the qualitative environmental criteria… In addition, we have an obligation to raise pertinent environmental issues with the management of companies in which we hold stock. The study encourages responsible land use and provides guidelines for minimization of sprawl among other things". More examples are provided in Appendix B.

2.3 Fund-Level Variables

Our fund-level information comes from two databases. We obtain fund characteristic data such as monthly return, assets under management, expense ratio, 12b-1 fees, turnover ratio, and institutional flag from the Center for Research in Security Prices (CRSP) Survivorship-Bias-Free U.S. Mutual Fund Database. Following Sirri and Tufano (1998), we compute flows as the monthly

growth of assets under management, net of reinvested returns.

We obtain Morningstar rating data and ESG self-label data from Morningstar. We define self-labelled ESG funds based on Morningstar Sustainable Funds U.S. Landscape Report. Then we extract the inception date and repurpose date for the funds listed in the report. We compare the filing date of shareholder letter and the repurpose date of the fund (if there is no repurpose date, we use inception date) to identify whether a fund is ESG self-labeled on the filing date.

Finally, we merge these two databases using tickers and aggregate all data at the fund level. Our sample covers the period from January 2006 to December 2022 and includes 32,996 shareholder letters from 1,740 U.S. actively managed equity mutual funds. Among these letters, 6,025 contain ESG related information. Table 1 presents the summary statistics. The variables are consistent with those in exiting studies. For example, the average monthly flow in our sample is -0.15%, which aligns with Ben-David, Li, Rossi and Song (2022), who also document a slightly negative average flow.[15] The average expense ratio and cumulative Carhart alpha in our sample are 1.10% and -0.83%, respectively, similar to the findings of Hillert, Niessen-Ruenzi and Ruenzi (2024). Detailed definitions of these variables are provided in Appendix A.

[Insert Table 1 here]

3. EMPIRICAL RESULTS

3.1 ESG Disclosure in Shareholder Letters and Future Fund Flows

Managers' compensation primarily determined by the fees they generate, which are closely tied to the assets under management of the funds they oversee. This creates an incentive for fund managers to potentially simulate inflows in order to maximize their fees (Chevalier and Ellison,

[15] Note that our average monthly flow amount is smaller than that reported in Ben-David, Li, Rossi, and Song (2022), as our sample includes only observations with shareholder letters.

1997). The impact of disclosing ESG information in shareholder letters on fund flows remains uncertain. On one hand, such disclosure may attract more inflows. Previous studies find that mutual funds that have signed the PRI tend to experience higher inflows (Kim and Yoon, 2023; Gibson, Glossner, Krueger, Matos and Steffan, 2022). On the other hand, the disclosure of ESG-related information may prompt outflows from investors who either oppose ESG or prioritize short-term financial returns. Recent studies suggest that ESG engagement could negatively affect short-term financial performance (Raghunandan and Rajgopal, 2022), possibly leading investors to shift their capital to funds with a more immediate financial focus.

3.1.1 ESG Flow Effects: Event-based Regression

To test whether fund managers benefit from disclosing ESG-related information in fund shareholder letters, we first examine how fund flows respond to the ESG-related disclosure by estimating the following event-study regression:

$$Flow_{i,t,t+6} = \alpha + \beta_1 ESG_{i,t} + \beta_2 Performance_{i,t,t-6} + \beta_3 Controls + FE + \varepsilon_{i,t}, \quad (1)$$

where the dependent variable, $Flow_{i,t,t+6}$, is the cumulative flow for fund i over the following six months (from month t to month $t + 6$). The main independent variable of interest, $ESG_{i,t}$, is an indicator variable that equals one if mutual fund i includes ESG-related information in its shareholder letter in month t, and zero otherwise. Considering the nonlinearities in the relation between fund performance and flows, we include both continuous and ranking-based performance measures as control variables (see also, Agarwal, Lu and Ray, 2021). Specifically, we use the cumulative Carhart alpha over the prior six months, and an indicator variable for the quartiles of the past six-month cumulative Carhart alpha. Furthermore, we include a dummy variable, High msrating, which equals one if the fund's Morningstar star rating is 4 or 5, and zero otherwise (see also, Gantchev, Giannetti and Li, 2024; Ben-David, Li, Rossi and Song, 2022). We also control for

fund characteristics (i.e., fund size, fund age and expense ratio) and fund family characteristics (i.e., fund family size and fund family age). Other controls include ESG Self-Labelled, an indicator that equals one if the fund is listed as an ESG fund in Morningstar's annual Sustainable Fund U.S. Landscape Report, and zero otherwise, as well as Letter Length defined as the natural logarithm of the number of words in a shareholder letter (Andrikogiannopoulou, Krueger, Mitali and Papakonstantinou, 2022). We impose fund and year-month fixed effects to account for fund- or time-specific unobserved heterogeneity, respectively. Detailed definitions of these variables are provided in Appendix 1. Based on our hypothesis, if disclosing ESG-related information in shareholder letters could attract inflows, we should expect a positive and significant β_1.

Panel A of Table 2 presents the regression results based on the full sample. Columns (1) and (2) report the results using continuous Carhart alpha and quartile indicators, respectively, as measures of past performance. The coefficients on the ESG dummy in both columns are positive and significant at the 1% level, indicating that disclosing ESG-related information in shareholder letters attract more inflows. Specifically, funds with ESG-related shareholder letters attract 1% more inflows than funds without such information over the following six months. This effect is also economically large, given that the sample average monthly flow is -0.16% (equivalent to -0.96% over six months). For a fund with $1 billion in assets and a 1% expense ratio, this translates into an additional $100K in management fees. Furthermore, our estimation results for the control variables align with prior studies. For example, the coefficient on cumulative Carhart Alpha is positive and significant, in line with the literature documenting a positive flow-performance relation (Chevalier and Ellison, 1997). The effect of expense ratio on fund flow is negative and significant, which is consistent with Barber, Odean and Zheng (2005).

To mitigate potential concerns regarding selection bias and endogeneity and to better

estimate the treatment effect, we use the propensity score matching (PSM) method to construct a matched sample (see also, Agarwal, Lu and Ray, 2021; Hartzmark and Sussman, 2019; Cooper, Gulen and Rau, 2005). For each fund that disclose ESG-related information in its shareholder letter at a given time, we select a matched fund that produces a shareholder letter in the same quarter but does not contain ESG-related information. To construct propensity scores, we run probit regressions using the following matching variables, fund size, fund age, flow and Carhart alpha over the prior 6 months, and the Carhart 4-factor loadings.[16] For treated funds with ESG-related shareholder letters, matched control funds are those with the highest propensity scores.[17]

We repeat the regressions from equation (1) using the PSM sample, with the results presented in columns (3) and (4) of Table 2. Consistent with our previous analyses using the full sample, the coefficients on the ESG dummy are positive and significant at the 1% level, confirming the flow effect following the disclosure of ESG-related shareholder letters.

We further present visual evidence on the effects of ESG-related shareholder letters on fund flows. Figure 1 plots the differences in residual flows between treatment funds (i.e., funds with ESG-related shareholder letters) and matched funds before and after the disclosure dates.[18] This visual evidence further corroborates our finding from the event-based regressions, that disclosing ESG information in shareholder letters attracts inflows.

[Insert Figure 1 here]

[16] Since PSM results are sensitive to the choice of matching variables (Heckman, Ichimura and Todd, 1998), we consider alternative set of matching variables to construct our control group. As evident in Table A3 in the Online Appendix, our results remain consistent.

[17] Following suggestions from Shipman, Swanquist and Whited (2017), we match our sample with replacement, as this approach reduces bias as each treated observation is matched with the most similar (closest propensity score) control observation. We also impose the Caliper Distance (set to be 0.05) to improve covariate balance and "One-to-One" matching, as a commonly used PSM setting in accounting and finance research. Our results remain robust using different matching settings.

[18] Residual flows are calculated by taking the regression residuals when regressing flows on fund characteristics and other controls used in column 1 of Table 2.

[Insert Table 2 here]

3.1.2 ESG Flow Effects: Difference-in-Differences

In this section, to better assess the effect of disclosing ESG-related shareholder letters on fund flow, we extend our data to five months before and after the disclosure date for both treatment and control funds.[19] We implement the Difference-in-Differences (DID) approach by regressing the following specification:

$$Flow_{i,t} = \alpha + \beta_1 ESG_i \times After_t + \beta_2 ESG_i + \beta_3 After_t + \beta_4 controls + FE + \varepsilon_{i,t}, \quad (2)$$

Where dependent variable $Flow_{i,t}$ is mutual fund *i*'s flow at month *t*, ESG_i takes a value of one if shareholder letter of fund *i* contains ESG-related information, and zero otherwise. $After_t$ takes a value of one for the following five months after the disclosure date, and zero otherwise.[20]The interaction term, $ESG_i \times After_t$, is the key independent variable of interest that captures the DID in fund flows before and after the disclosure of ESG information. Controls are the same as those used earlier in equation (1). If the disclosure of ESG information attracts inflows, we would expect the coefficient of the interaction term β_1 to be positive and significant, indicating the effect of disclosing ESG shareholder letters on fund flows.

We present the results of this DID regression in Table 3. Column (1) presents the result without covariates, whereas columns (2) and (3) show the results with continuous performance and quartile performance as controls, respectively. We cluster standard errors by fund to allow for correlation between repeated observations from the same fund across all specifications. The

[19] This ensures that each event period contains only one shareholder letter for each mutual fund, thereby mitigating the potential influence of subsequent shareholder letter on the current one. Our results remain consistent with longer event windows.

[20] We assume that the treatment effect (i.e., ESG information) exists in the following five months, until the next event, similar to Guest (2021).

coefficient of our interaction term is positive and significant in all columns. This consistency is in line with our hypothesis, providing evidence of a positive relation between disclosing ESG-related information in shareholder letters and mutual fund flows.

[Insert Table 3 here]

3.1.3 ESG Flow Effects: Parallel Trends Assumption and Dynamic Effects

In this section, we test the parallel trends underlying the DID design and examine the dynamic effects. Our DID setting differs from the traditional 2x2 DID design in two key aspects. First, funds disclose ESG information in their shareholder letters at different times, making our DID staggered (i.e., treatment occurs at different time points). Second, funds may disclose ESG information continuously (i.e., a fund can receive multiple treatments over time) or stop doing so (i.e., the treatment is terminated). We refer to this as a non-absorbing treatment, where units can enter, exit, or switch between treated and untreated states during the study period. Thus, the treatment in our setting is binary and non-absorbing.

Two recent studies provide comprehensive frameworks for non-absorbing DID (Dude, Girardi, Jorda and Taylor, 2024; de Chaisemartin and d'Haultfoeuille, 2024). In our baseline analysis, we apply the estimator proposed by Dude, Girardi, Jorda and Taylor (2024), known as Local-Projection DID (LP-DID), and use the approach proposed by de Chaisemartin and d'Haultfoeuille (2024) as a robust test.[21]

Table 4 presents the estimation results from LP-DID with regressions conducted at the fund-month level. The dependent variable is fund *i*'s flow in month *t*. ESG^{Pre} and ESG^{Post} represent the pooled estimates before and after fund *i* discloses ESG information in its shareholder letter,

[21] Since the approach proposed by de Chaisemartin and d'Haultfoeuille (2024) smooths parallel trend assumption, we use it for a robustness test and the result is shown in Online Appendix Figure A1.

respectively. ESG is an indicator variable for mutual funds with ESG-related shareholder letters (treatment group). Pre(5) through Pre(2) are indicator variables for observations occurring 2 to 5 months before the disclosure date, with Pre(1) excluded to avoid collinearity. Post(1)-Post(5) indicate observations occurring 1 to 5 months after disclosure. Columns (1) and (2) report the pooled estimates without and with control variables, respectively, whereas columns (3) and (4) present the event study estimates under the same conditions. All specifications support the parallel trends assumption and all interaction terms after the disclosure date (i.e., coefficients on ESG x Post(0) to ESG x Post(5)) are positive and significant, which are consistent with the notion that disclosing ESG-related information in shareholder letters may attract inflows.

[Insert Table 4 here]

Figure 2 plots the estimated coefficients for the five months before and after the disclosure date. Consistent with the parallel trend assumption, the figure shows no statistically significant difference in fund flows between treated and control funds prior to the disclosure date.

[Insert Figure 2 here]

3.2 Robustness Tests

3.2.1 DID with Alternative Control Samples

In recent years, staggered DID applications have been criticized for two main issues: using already-treated units as controls and the problem of negative weighting (Baker et al., 2022; Goodman-Bacon, 2021; Sun and Abraham, 2021). When treatment effects are heterogeneous, comparing earlier- and later-treated groups can introduce estimation bias. Negative weighting occurs when some control observations are reweighted in a way that gives them a negative influence on the estimated treatment effect, which is common in staggered treatment adoption.

Since the LP-DID model has already addressed the negative weighting issue, our remaining

concern is the use of already-treated units as controls. To mitigate this concern, we take two different approaches by using 1) not-yet-treated units as controls in columns (1) and (2) of Table 5; 2) never-treated units as controls in columns (3) and (4). Panel A reports the pooled estimates, whereas Panel B presents the event study estimates. Regardless which approach employed, we obtain the same inferences.

[Insert Table 5 here]

3.2.2 Alternative Fixed Effects

We include additional fixed effects to mitigate concerns about omitted variables that may affect our baseline results. The results are presented in Table A1 in the Online Appendix. We consider the category fixed effect in column (1), category-by-year-month fixed effect in column (2), and the reporting year-month fixed effect in column (3) (see also, Hillert, Niessen-Ruenzi and Ruenzi, 2023). Finally, we control for fund, category-by-year-month and reporting year-month fixed effects in column (4). Panel A presents the results from the event-based regression, whereas Panel B reports the results from the DID regression. Our inferences remain robust to these alternative fixed effects.

3.2.3 Alternative Control Variables

To investigate whether the observed flow effect is specific to a particular model specification, we use alternative control variables. Similarly with our setting to assess the potential flow effect following a specific event, Hartzmark and Sussman (2019) examine the flow effect responding to the publication of fund-level sustainability ratings from Morningstar, and Krueger et al., (2024) test the flow effect after the disclosure of ESG-related information in fund prospectuses. First, we follow Hartzmark and Sussman (2019) by including both short-term and

long-term performance.[22] Specifically, we rerun equation (1) including the Carhart four-factor alpha for the past 3 months, 12 months, and 36 months as additional control variables. The results are shown in columns (1) and (3) of Table A2, respectively. The coefficients on the interaction term, ESG x After, are all positive and significant, which is consistent with the nation of the positive flow effect after funds disclose ESG-related information in their shareholder letters. Second, we follow Krueger et al., (2024) to include both raw returns and alphas at the same time.[23] The results are presented in columns (2) to (4) of Table A2, where we obtain the same inferences.

3.2.4 Alternative Matching Variables for PSM

PSM results may be sensitive to the choice of matching variables (Heckman, Ichimura and Todd, 1998). To investigate whether our observed treatment effect is not an artifact of a particular set of matching variables, we consider two sets of matching variables to construct our control group, and test whether our results remain consistent. Instead of using the cumulative Carhart alpha as a matching variable, we use the cumulative raw return. All the other matching variables are the same as used in our baseline analysis. The results are presented in columns (1) and (3) of Table A3. Second, in addition to the matching variables used in our baseline analysis, we add two more matching variables: expense ratio and turnover ratio. The results are shown in columns (2) and (4) of Table A3. In all cases, our DID interaction terms are statistically significant, indicating that our result is not driven by a particular set of matching variables.

[22] In their paper, they use the prior month's raw return, the prior 12-month raw return, and the prior 24-month raw return. Instead of using raw return, we use alpha based on Carhart-4 factor model.
[23] Krueger et al., (2024) include ranking performance based on past 12-month raw return and alpha. Different from theirs, we use continuous past 6-month raw return and alpha based on Carhart-4 factor model as shareholder letters are disclosed semi-annually.

3.2.5 DID with Full Sample

We also test whether our baseline analysis remains robust if we do not bin or truncate any relative-time indicators. Singing a sample within a specific event window may cause contamination (Baker et al., 2022; Sun and Abraham, 2021). We rerun our DID regression and LP-DID with the full PSM sample of all available observations between 2006 and 2022. Table A4 shows the regression results, and our baseline result remains robust.

3.2.6 DID-Placebo Tests

The ESG flow effect may be driven by unobserved shocks that coincide with the disclosure of ESG shareholder letters. To eliminate this potential coincidence, we follow Cornaggia, Mao, Tian and Wolfe (2015) and conduct falsification tests. In each iteration, we keep the actual distribution and randomly assign both the treatment group and treatment time, then re-estimate our DID regressions 500 times. Since the interaction term, ESG x After, is randomly assigned, the distribution of the 500 estimated coefficients is expected to follow a standard normal distribution, and in most cases, these coefficients should be insignificant. Figure 3 presents the density of the estimated coefficients on the pseudo-DID interaction terms from 500 placebo tests. Consistent with our expectation, the estimated coefficients approximately follow a normal distribution centered around zero. More importantly, the estimated coefficients are far from the true coefficient, which is represented by the vertical line. Thus, we can confirm that the flow effect from ESG shareholder letters is not driven by coincidence.

[Insert Figure 3 here]

4. MECHANISM: VALUE OR VALUES

In this section, we explore why investors respond positively to ESG information in fund

shareholder letters. ESG motivations can be understood through two key factors: *value* and *values* (Friedman and Ormazabal, 2024; Starks, 2023). On one hand, some investors are motivated by financial *value*, where ESG decision-making is driven by the belief that considering a firm's ESG aspects can enhance returns (Edmans, 2011; Lins, Servaes and Tamayo, 2017; Pedersen, Fitzgibbons, and Pomorski, 2021; Edmans, Pu, Zhang, Li, 2024). One the other hand, some investors are driven by *values*, which are nonpecuniary preferences or moral motivations that guide their investment decisions, independent of financial outcomes. This notion is supported by research suggesting that fund investments in ESG dimensions are motivated by ethical considerations and personal values (Renneboog, Horst and Zhang, 2011).

4.1 Who Drives the Flow Effect: Institutional vs. Retail Investors

Previous research suggests that institutional investors consider the *values* associated with ESG investments (Ilhan, Krueger, Sautner and Starks, 2023; Krueger, Sautner and Starks, 2020) and integrate ESG information into their decision-making process (Pedersen, Fitzgibbons and Pomorski, 2021). In contrast, retail investors primarily trade on ESG information for financial *value* alone (Li, Watts and Zhu, 2024). To better understand whether the flow effect is driven by ESG investment *values* or financial *value* considerations, we analyze institutional funds and retail funds separately.

We divide our sample into institutional funds and retail funds based on two different approaches: the CRSP institutional flag and the marketing fee fraction. A fund is classified as institutional (retail) if the percentage of institutional shares, as indicated by the CRSP flag, exceeds

(or falls below) 50%. We also employ an alternative classification approach, where a fund is considered institutional (retail) if its marketing fee fraction is below (or above) than the median value in a given year. We then repeat regressions of equation (1) separately for institutional and retail funds. The results are presented in columns (1) and (2) using the CRSP flag, and in columns (3) and (4) using the marketing fee fraction of Table 6. The coefficient on the ESG dummy for institutional funds is positive and highly significant at the 1% level, whereas for retail investors, the coefficient is insignificant in column (2) and weakly significant in column (4). Moreover, the coefficient difference between the two subsamples is significant, indicating that the flow effect primarily comes from funds with a higher proportion of institutional clients. This flow difference is also economically significant, as disclosing ESG-related information in shareholder letters attracts 1.1% more inflows for institutional funds compared to retail funds over the following six months. Our results are different from Andrikogiannopoulou, Krueger, Mitali and Papakonstantinou (2024), who study ESG prospectuses and find no difference between institutional and retail funds. Based on this finding, we argue that the ESG flow effect is more likely driven by the *values* side.

[Insert Table 6 here]

4.2 Flow Effects After the Paris Agreement

When it comes to the values of ESG investment, a key event is the Paris Agreement reached in December 2015, which is a pivotal international treaty on climate change. Following the Paris Agreement, there has been a noticeable increase in attention to ESG issues. For example, investors

have increasingly incorporated ESG criteria into their decision-making processes, while more companies have been motivated to disclose ESG-related information. Overall, the Paris Agreement can be considered as a key event driving values-based motivation. If the motivation for ESG investments is indeed driven by *values*, we would expect the flow effect to be more pronounced after the Paris Agreement.

To test this, we divide our sample into pre- and post-Paris Agreement periods and present visual evidence by plotting the differences in residual flows between these two subsamples. As shown in Figure 4, prior to the Paris Agreement, there is no significant difference in residual flows between the treatment and control groups, both before and after the disclosure date. This suggests that limited attention is paid to ESG-related information in shareholder letters before the agreement. However, after the Paris Agreement, we can see a significant difference between the two groups, indicating that investors pay more attention to ESG-related issues.

[Insert Figure 4 here]

We rerun equation (1) with pre- and post- Paris Agreement subsamples. The results are presented in Table 7. The coefficient on ESG dummy becomes significant after the Paris Agreement, as shown in columns (2) and (4). Furthermore, the coefficient difference between the two periods is also significant. Our results suggest that investors are indeed driven by values-based motivations.

[Insert Table 7 Here]

4.3 ESG Disclosure in Shareholder Letters and Future Fund Performance

It is possible that investors may perceive sustainability as a positive predictor of future

performance. However, it remains unclear whether ESG-related disclosures signal fund managers' great ideas that could generate superior returns. Two possibilities exist. First, such disclosure may reflect that fund managers possess the skills to identify ESG stocks that outperform traditional asset pricing models. Indeed, prior studies argue that sustainability is associated with abnormal returns (Albuquerque et al., 2019; Lins et al, 2017; Edmans, 2011). Importantly, fund managers have a fiduciary duty to prioritize returns over ESG considerations, meaning they may disclose information about highly profitable investments rather than ESG concerns. Second, fund managers may reference ESG-related investments in shareholder letters for marketing purposes, aiming to attract ESG conscious investors. These investments, however, may not necessarily generate superior returns. For instance, Brandon, Glossner, Krueger, Matos and Steffen (2020) find that responsible investing does not enhance portfolio returns. To address this question, we analyze future performance following ESG-related disclosures.

We conduct event-based regression similar to equation (1). Specifically, we run the following regression:

$$Alpha_{i,t,t+6} = \alpha + \beta_1 ESG_{i,t} + \beta_2 Performance_{i,t,t-6} + \beta_3 Controls + FE + \varepsilon_{i,t}, \quad (3)$$

Where $Alpha_{i,t,t+6}$ is the cumulative Carhart Alpha over the following six months. The main independent variable of interest is a dummy variable, $ESG_{i,t}$, which equals to one if mutual fund *i* has mentioned ESG-related information in shareholder letter at month *t*, and zero otherwise. Past performance, controls are the same as defined in equation (1). If disclosing ESG-related information is a signal of superior financial performance, we should expect a positive and significant β_1.

The estimation results are shown in Table 8. The coefficients on the ESG dummy in all

columns are insignificant, indicating that disclosing ESG shareholder letters does not necessarily correlate with better financial performance. This evidence further supports our argument that the ESG flow effect is more likely driven by the *values* side, rather than the financial *value* side.

[Insert Table 8 here]

5. GREENWAHSING OR REAL IMPROVEMENTS?

5.1 Do ESG Shareholder Letters Improve Future ESG Performance?

Greenwashing, which is defined as the practice of misleading investors by exaggerating a company's ESG efforts to appear more sustainable than it actually is, has been widely documented in existing papers (Andrikogiannopoulou, Krueger, Mitali and Papakonstantinou, 2024; Kim and Yoon, 2023; Liang, Sun, and Teo, 2022; Wu, Zhang and Xie, 2020). Such misleading ESG claims can lead to capital misallocation, ultimately affecting market efficiency. In our previous test, we show that the flow effect of ESG shareholder letters is primarily driven by values-based motivations. An important question then arises: do these funds significantly improve their ESG performance, or are they engaging in "cheap talk" and greenwashing?

To investigate this, we evaluate a mutual fund's ESG performance by using ESG-related incidents and carbon emissions instead of ESG ratings, given the significant divergence among ESG rating agencies (Berg, Kolbel and Rigobon, 2022). For each fund, we aggregate the ESG incidents of its holding stocks. We further construct fund level carbon emissions by aggregating value-weighted GHG emissions (see also, Atta-Darkua, Glossner, Krueger and Matos, 2023). We then test whether the disclosure of ESG-related shareholder letters is associated with a significant decrease in ESG incidents or GHG emissions. Specifically, we run the regression where the

dependent variable, ESG Performance$_{i,t,t+6}$, is measured by either the number of ESG-related incidents for fund *i* over the following six months or fund-level GHG emissions (Scope1, Scope 2 and Scope 3). The independent variable, ESG$_{i,t}$, and the control variables are the same as defined in equation (1). Both fund and year-month fixed effects are included. Panel A of Table 9 presents the regression results, showing that the coefficient for ESG is not statistically significant. This suggests that disclosing ESG-related information is not clearly associated with subsequent improvements in ESG performance, which appears be greenwashing, as documented by previous papers. Given that greenwashing is defined as failing to "walk the talk", it is important to consider what exactly is being "talked" about. If funds vaguely mention that they will consider ESG-related factors without committing to any specific actions, they should not be labeled as engaging in greenwashing, even if no ESG improvements are observed. Conversely, if they claim that they will improve the ESG performance of their holding companies but fail to do so, they should be considered as engaging in greenwashing. Based on this idea, we manually read some ESG shareholder letters and classify these letters mainly into two categories: 1) General Information, defined as the letters merely highlighting the importance of ESG; 2) "Specific Information", defined as the letter mentioning specific holdings and activities. We then feed some shots to ChatGPT (GPT-4) and use it to help us classify all ESG shareholder letters into the two categories mentioned above.

To explore, we construct two indicator variables: ESG Specific, which equals one if shareholder letter contains specific information (i.e., ESG-related activities or holdings) and zero

otherwise, and ESG General, which equals one if shareholder letter contains ESG-related information but not specific information and zero otherwise. We rerun the regression using these two indicator variables as the main independent variables to test the following ESG performance. The results are shown on Panel B of Table 9. The coefficients on *ESG Specific* are negative and significant in columns (1) and (2), indicating that funds with ESG specific information significantly improve their ESG performance, as evidenced by the decrease in ESG-related incidents and Scope 1 carbon emissions. Regarding the *ESG general information*, we do not find a significant relation. Our results suggest that neither of these two types of funds engage in greenwashing. Funds with ESG specific information significantly improve their ESG performance, while funds with general information make no promises, and therefore, do not necessarily have ESG improvement. Different from existing papers, we argue that greenwashing may not be as prevalent when we consider whether the ESG information is specific or not.

[Insert Table 9 here]

5.2 Investors' Perception and Long-term Implication

Given that only shareholder letters with specific ESG information significantly improve their ESG performance, an important question is how investors perceive these two types of ESG information. If investors are able to clearly distinguish between them, the flow effect should primarily come from shareholder letters with ESG specific information. However, it is also possible that investors are unable to distinguish between the two types, leading to misinterpretation. If this is the case, we should expect no significant difference between them. We rerun equation (1) with these two indicators as the main independent variables. The results are shown in Table 10,

where we do not find a significant difference between these two types of letters across all specifications. Based on this finding, we argue that investors may misinterpret the ESG information disclosed in shareholder letters.

[Insert Table 10 here]

This misinterpretation raises another important question: if the flow effect is indifferent between specific and general ESG information, why don't all funds engage in cheap talk by disclosing only general ESG information rather than providing specific ESG information, which may require greater engagement and entail additional costs? Given that the ESG flow effect is primarily driven by *values*-based motivation, we explore whether investors react negatively when their *values*-based expectations are not met. Specifically, if a fund discloses an ESG shareholder letter but fails to improve its ESG performance afterward, investors may become disappointed, potentially leading to more outflows. We estimate the following regression:

$$Flow_{i,q+2} = \alpha + \beta_1 ESG_{i,t} \times High\ Incidents_{i,q+1} + \beta_2 ESG_{i,t} + \beta_3 High\ Incidents_{i,q+1} + \beta_4 Controls + FE + \varepsilon_{i,t}, \quad (4)$$

Where the dependent variable $Flow_{i,q+2}$ is the cumulative flow in the second quarter after the disclosure date. $ESG_{i,t}$ is an indicator variable that equals one if mutual fund *i* includes ESG-related information in its shareholder letter in month *t*, and zero otherwise. High $Incidents_{i,q+1}$ is an indicator variable which equals one if fund *i*'s ESG incidents of holding stocks are in the top 25% in the quarter following disclosure, and zero otherwise. The key explanatory variable of interest, $ESG_{i,t}$×High $Incidents_{i,q+1}$, captures whether a fund that discloses an ESG shareholder letter still experiences poor ESG performance, as measured by being in the top 25% of ESG

incidents. The control variables are the same as those in Table 2.

We present the results of this analysis in Table 11. Across all four columns, the coefficients on the interaction term, $ESG_{i,t} \times High\ Incidents_{i,q+1}$, are significantly negative, indicating that funds with ESG shareholder letters are more severely punished for poor ESG performance. Specifically, funds that disclose ESG shareholder letters experience 1.6% more outflows in the following quarter if investors find that these funds perform poorly on ESG in the quarter after disclosure. This translates to a cumulative 3.2% outflow over six months. Compared to the inflows gained from disclosing ESG shareholder letters, these funds quickly lose their benefits within three months if their ESG performance fails to meet investors' expectations. Notably, the coefficient on $High\ Incidents_{i,q+1}$ itself is insignificant, suggesting that investors do not inherently penalize ESG incidents or may not closely monitor them in the short term. However, when funds attempt to attract inflows by drawing investors' attention to ESG through shareholder letters, investors become more attentive to the fund's ESG performance.

This equilibrium dynamic helps explain why not all funds engage in cheap talk to attract inflows. Managers face a tradeoff: One the one hand, voluntarily disclosing ESG information can generate inflows as a benefit. On the other hand, such disclosure shifts investor focus toward ESG performance, exposing funds to higher risks of potential punishment if their ESG performance is poor.

[Insert Table 11 here]

6. CONCLUSIONS

In this paper, we analyze ESG-related information disclosed in mutual funds' shareholder letters and examine investor reactions to this disclosure. Empirically, we find that funds providing ESG information in their shareholder letters are, on average, associated with 1% abnormal inflows over the following six months compared to funds without disclosing such information in their shareholder letters. Furthermore, we document that the ESG flow effect is more pronounced for institutional funds and in the post-Paris Agreement period, suggesting that investors' responses are mainly driven by *values*-based motivations.

By distinguishing between ESG-specific and general disclosures using AI, we find that funds providing ESG-specific information significantly improve their ESG performance, as evidenced by fewer ESG-related incidents and lower GHG carbon emissions, whereas funds offering only general ESG information do not. Our findings suggest that greenwashing in the mutual fund industry may be less prevalent than documented when considering the specificity of ESG disclosures. We further show that the flow effect does not differ between ESG-specific and general disclosures, indicating that investors may misinterpret the ESG information disclosed in shareholder letters. Finally, we propose an equilibrium to explain why not all funds engage in cheap talk. While disclosing ESG shareholder letters helps attract more inflows, it also exposes funds to a higher risk of flow punishment if their ESG performance fails to meet investors' expectations.

REREFERENCES:

Abouarab, Rabab, Tapas Mishra, and Simon Wolfe, 2024, Spotting Portfolio Greenwashing in Environmental Funds. Journal of Business Ethics, 1–29.

Agarwal, Vikas, Honglin Ren, Ke Shen, and Haibei Zhao, 2023, Redemption in Kind and Mutual Fund Liquidity Management, The Review of Financial Studies, 36, 2274–2318.

Agarwal, Vikas, Yan Lu, and Sugata Ray, 2021, Are Hedge Funds' Charitable Donations Strategic?, Journal of Corporate Finance, 66, 101842-.

Albuquerque, Rui, Yrjö Koskinen, and Chendi Zhang, 2019, Corporate Social Responsibility and Firm Risk: Theory and Empirical Evidence, Management Science, 65, 4451–4469.

Amel-Zadeh, Amir, and George Serafeim, 2018, Why and How Investors Use ESG Information: Evidence from a Global Survey, Financial Analysts Journal, 74, 87–103.

Andrikogiannopoulou, Angie, Philipp Krueger, Shema Frédéric Mitali, and Filippos Papakonstantinou, 2024, Discretionary Information in ESG Investing: A Text Analysis of Mutual Fund Prospectuses, Working Paper.

Baker, Andrew C., David F. Larcker, and Charles C.Y. Wang, 2022, How Much Should We Trust Staggered Difference-in-Differences Estimates?, Journal of Financial Economics, 144, 370–395.

Barber, Brad M., Adair Morse, and Ayako Yasuda, 2021, Impact Investing, Journal of Financial Economics, 139, 162–185.

Barber, Brad M., Terrance Odean, and Lu Zheng, 2005, Out of Sight, Out of Mind: The Effects of Expenses on Mutual Fund Flows, The Journal of Business, 78, 2095–2120.

Bauer, Rob, Tobias Ruof, and Paul Smeets, 2021, Get Real! Individuals Prefer More Sustainable Investments, The Review of Financial Studies, 34, 3976–4043.

Berg, Florian, Julian F Kölbel, and Roberto Rigobon, 2022, Aggregate Confusion: The Divergence of ESG Ratings, Review of Finance, 26, 1315–1344.

Bessembinder, Hendrik, Michael J. Cooper, and Feng Zhang, 2023, Mutual Fund Performance at Long Horizons, Journal of Financial Economics, 147, 132–158.

Ben-David, Itzhak, Jiacui Li, Andrea Rossi, and Yang Song, 2022, What Do Mutual Fund Investors Really Care About?, The Review of Financial Studies, 35, 1723–1774.

Callaway, Brantly, and Pedro H.C. Sant'Anna, 2021, Difference-in-Differences with Multiple

Time Periods, Journal of Econometrics, 225, 200–230.

Cao, Sean, Baozhong Yang, and Alan Zhang, 2024, Beyond the Lines: Uncovering Private Information from Fund Managers' Disclosures, Working Paper.

Ceccarelli, Macro, Stefano Ramelli, and Alexander F. Wagner, 2024, Low Carbon Mutual Funds, Review of Finance, 28, 45–74.

Ceccarelli, Marco, Simon Glossner, and Mikael Homanen, 2023, Catering through Transparency: Voluntary ESG Disclosure by Asset Managers and Fund Flows, Working Paper.

Cheema-Fox, Alexander, Bridget R. LaPerla, George Serafeim, David Turkington, and Hui Wang, Decarbonizing Everything, 2021, Financial Analysts Journal, 77, 93–108.

Chevalier, Judith, and Glenn Ellison, 1997, Risk Taking by Mutual Funds as a Response to Incentives, Journal of Political Economy, 105, 1167-1200.

Cooper, Michael J., Huseyin Gulen, and P. Raghavendra Rau, 2005, Changing Names with Style: Mutual Fund Name Changes and Their Effects on Fund Flows, The Journal of Finance, 60, 2825–2858.

Cornaggia Jess, Yifei Mao, Xuan Tian, and Brian Wolfe, 2015, Does Banking Competition Affect Innovation? Journal of Financial Economics, 115, 189−209.

Cochardt, Alexander, Stephan Heller, and Vitaly Orlov, 2023, Do Mutual Funds Greenwash? Evidence from Fund Name Changes, Swiss Finance Institute Research Paper No. 23-64.

De Chaisemartin, Clément, and d'Haultfoeuille, Xavier, 2024, Difference-in-Differences Estimators of Intertemporal Treatment Effects, NBER Working Paper.

Devlin, Jacob, Ming-Wei Chang, Kenton Lee, and Kristina Toutanova, 2019, BERT: Pre-training of Deep Bidirectional Transformers for Language Understanding, North American Chapter of the Association for Computational Linguistics.

Di Giuli, Alberta, Alexandre Garel, Roni Michaely, and Arthur Romec, 2024, Climate Change and Mutual Fund Voting on Climate Proposals, ECGI Working Paper.

Dube, Arindrajit, Daniele Girardi, Oscar Jorda, and Alan M. Taylor, 2023, A Local Projections Approach to Difference-in-Differences Event Studies, Federal Reserve Bank of San Francisco Working Paper.

Dumitrescu, Ariadna, Javier Gil-Bazo, and Feng Zhou, 2023, Defining Greenwashing, Working Paper.

Edmans, Alex, 2011, Does the stock market fully value intangibles? Employee satisfaction and equity prices, Journal of Financial Economics, 101, 621–640.

Edmans, Alex, Darcy Pu, Chendi Zhang and Lucius Li, 2024, Employee Satisfaction, Labor Market Flexibility, and Stock Returns Around the World, Management science, 70, 4357–4380.

Friedman, Milton, 1970, The Social Responsibility of Business Is to Increase Its Profits, New York Times Magazine, 122-126.

Friedman, Henry L., and Gaizka Ormazabal, 2024, The Role of Information in Building a More Sustainable Economy: A Supply and Demand Perspective, Journal of Accounting Research, 62, 1575-1609.

Gantchev, Nickolay, Mariassunta Giannetti, and Rachel Li, 2024, Sustainability or Performance? Ratings and Fund Managers' Incentives, Journal of Financial Economics, 155, 103831–.

Gibson B., Rajna, Simon Glossner, Philipp Krueger, Pedro Matos, and Tom Steffen, 2022, Do Responsible Investors Invest Responsibly?, Review of Finance, 26, 1389–1432.

Goodman-Bacon, Andrew, 2021, Difference-in-Differences with Variation in Treatment Timing, Journal of Econometrics, 225, 254–277.

Guest, Nicholas M., 2021, The Information Role of the Media in Earnings News, Journal of Accounting Research, 59, 1021–1076.

Hail, Luzi, Shawn Kim, and Rachel Xi Zhang, 2022, How do Managers Greenwash? Evidence from Earnings Conference Calls, Working Paper.

Hartzmark, Samuel M., and Abigail B. Sussman, 2019, Do Investors Value Sustainability? A Natural Experiment Examining Ranking and Fund Flows, The Journal of Finance, 74, 2789–2837.

Heckman, James J, Hidehiko Ichimura, and Petra Todd, 1998, Matching as an Econometric Evaluation Estimator, The Review of Economic Studies, 65, 261–294.

Hillert, Alexander, Alexandra Niessen-Ruenzi, and Stefan Ruenzi, 2024, Mutual Fund Shareholder Letters: Flows, Performance, and Managerial Behavior, Management Science, 1–21.

Huang, Allen H., Hui Wang, and Yi Yang, 2023, FinBERT: A Large Language Model for Extracting Information from Financial Text, Contemporary Accounting Research, 40, 806–841.

Ilhan, Emirhan, Philipp Krueger, Zacharias Sautner, and Laura T. Starks, 2023, Climate Risk Disclosure and Institutional Investors, The Review of Financial Studies, 36, 2617–2650.

Kaustia, Markku, and Wenjia Yu, 2021, Greenwashing in Mutual Funds, Working Paper.

Kim, Soohun, and Aaron Yoon, 2023, Analyzing Active Fund Managers' Commitment to ESG: Evidence from the United Nations Principles for Responsible Investment, Management Science, 69, 741–758.

Kölbel, Julian F., Markus Leippold, Jordy Rillaerts, and Qian Wang, 2024, Ask BERT: How Regulatory Disclosure of Transition and Physical Climate Risks Affects the CDS Term Structure, Journal of Financial Econometrics, 22, 30–69.

Krueger, Philipp, Zacharias Sautner, and Laura T. Starks, 2020, The Importance of Climate Risks for Institutional Investors, The Review of Financial Studies, 33, 1067–1111.

Krueger, Philipp, Zacharias Sautner, Dragon Yongjun Tang, and Rui Zhong, 2024, The Effects of Mandatory ESG Disclosure Around the World, Journal of Accounting Research, 62, 1795–1847.

Li, Qing, Hongyu Shan, Yuehua Tang, and Vincent Yao, 2024, Corporate Climate Risk: Measurements and Responses, The Review of Financial Studies, 37, 1778–1830.

Liang, Hao, Lin Sun, and Melvyn Teo, 2022, Responsible Hedge Funds, Review of Finance, 26, 1585–1633.

Lins, Karl V., Henri Servaes, and Ane Tamayo, 2017, Social Capital, Trust, and Firm Performance: The Value of Corporate Social Responsibility during the Financial Crisis, The Journal of Finance, 72, 1785–1823.

Li, Qianqian., Edward M. Watts, and Christina Zhu, 2024, Retail Investors and ESG News, Journal of Accounting and Economics, 78, 101719–.

Milgrom, Paul R, 1981, Good News and Bad News: Representation Theorems and Applications, Bell Journal of Economics, 12, 380–391.

Pedersen, Lasse Heje, Shaun Fitzgibbons, and Lukasz Pomorski, 2021, Responsible Investing: The ESG-efficient Frontier, Journal of Financial Economics, 142, 572–597.

Rajan, Raghuram, Pietro Ramella, and Luigi Zingales, 2023, What Purpose Do Corporations Purport? Evidence from Letters to Shareholders, NBER Working Paper.

Renneboog, Luc, Jenke Ter Horst, and Chendi Zhang, 2011, Is Ethical Money Financially Smart? Nonfinancial Attributes and Money Flows of Socially Responsible Investment Funds, Journal of Financial Intermediation, 20, 562–588.

Riedl, Arno, and Paul Smeets, 2017, Why Do Investors Hold Socially Responsible Mutual Funds? Journal of Finance, 72, 2505–2550.

Sautner, Zacharias, Laurence Van Lent, Grigory Vilkov, and Ruishen Zhang, 2023, Firm-level Climate Change Exposure, Journal of Finance, 78, 1449–1498.

Shipman, Jonathan E., Quinn T. Swanquist, and Robert L. Whited, 2017, Propensity Score Matching in Accounting Research, The Accounting Review, 92, 213–244.

Sirri, Erik R., and Peter Tufano, 1998, Costly Search and Mutual Fund Flows, The Journal of Finance, 53, 1589-1622.

Starks, Laura T., 2023, Presidential Address: Sustainable Finance and ESG Issues: Value Versus Values, Journal of Finance, 78, 1837–1872.

Sun, Liyang, and Sarah Abraham, 2021, Estimating Dynamic Treatment Effects in Event Studies with Heterogeneous Treatment Effects, Journal of Econometrics, 225, 175–199.

Verrecchia, Robert E., 1983, Discretionary Disclosure, Journal of Accounting and Economics, 5, 179–194.

Wu, Yue, Kaifu Zhang, and Jinhong Xie, 2020, Bad Greenwashing, Good Greenwashing: Corporate Social Responsibility and Information Transparency, Management Science, 66, 3095–3112.

Appendix A: Variable Definitions

Variable Name	Definition
ESG Disclosure Data (Source: Edgar)	
$ESG_{i,t}$	An indicator variable, which takes a value of one if mutual fund i has mentioned ESG-related information in its shareholder letters at time t, and 0 otherwise. We detect ESG-related information by using FinBERT (Huang, Wang and Yang, 2022).
ESG Specific	An indicator variable, which takes a value of one if ESG shareholder letter of fund i has been classified as specific information (i.e., ESG specific holdings or activities) by ChatGPT, and zero otherwise.
ESG General	An indicator variable, which takes a value of one if ESG shareholder letter of fund i contains ESG general information by ChatGPT, and zero otherwise.
Letter Length	The logarithm of number of words in each shareholder letter
Fund-level data (Source: CRSP, Morningstar)	
Fund size	Fund size is the aggregate value of total net assets(mnav) across all share classes of the same fund. We take the logarithm of fund size. Source: CRSP
Fund returns	The weighted-average of monthly returns(mret) across all share classes. Source: CRSP
Flow flows	Fund i's flow at month t is calculated as: $Flows(\%)_{i,t} = \frac{AUM_t - AUM_{t-1} \times (1+Net\_returns_{i,t})}{AUM_{t-1}}$. Source: CRSP
Fund age	Fund age is calculated based on the inception date of the oldest fund share class. We take the logarithm of fund age plus 1. Source: CRSP
Expense ratio	The weighted-average of expense ratios(exp_ratio) across all share classes. Source: CRSP
Turnover ratio	The weighted-average of expense ratios(turn_ratio) across all share classes. Source: CRSP
Marketing fee fraction	The fraction of marketing fee is defined as 12b-1 fees divided by fund's expense ratio (actual_12b1/exp_ratio). Then we take the weight-average of marketing fees across all share classes. Source: CRSP
Institutional shares	If the share class is defined as an institutional fund (i.e., Institutional Fund Indicator, inst_fund, is 'Y'), then we consider it to be held by institutional investors. Institutional shares is define as the fraction of asset held by institutional investors. Source: CRSP
Institutional funds	A fund is defined as institutional (retail) funds if institutional (retail) share classes account for more (less) than 50% of the fund's assets under management, i.e., institutional ratio>(<)50%. Source: CRSP
Family Size	Family size is the sum of total net assets of all the managed funds in the family. We take the logarithm of family size. Source: CRSP
Family Age	Family age in months, estimated as the age of the oldest fund in the family. Source: CRSP

High MS Rating	A dummy variable which equals one if fund's Morningstar star rating is 4 or 5. Morningstar star rating is a quantitative and backward looking measure of fund's past performance, ranging from one to five stars, provided by Morningstar database. Source: Morningstar

ESG data (Source: Morningstar, Truvalue Labs, Trucost, RepRisk)

ESG Incidents	Firm-level ESG-related incident. We construct fund-level incidents by aggregating all ESG-related incidents of holding stocks. Source: RepRisk
Scope 1 emission	Scope 1 emissions (measured in millions of tons) are from directly emitting sources that are owned or controlled by a company. We construct value-weighted fund-level Scope 1 Carbon emissions based on portfolio holdings. Source: Trucost
Scope 2 emission	Scope 2 emissions (measured in millions of tons) are from the consumption of purchased electricity, steam, or other sources of energy generated upstream from a company's direct operations. We construct value-weighted fund-level Scope 2 Carbon emissions based on portfolio holdings. Source: Trucost
Scope 3 emission	Scope 3 emissions (measured in millions of tons) encompass all other emissions associated with a company's operations that are not directly owned or controlled by the company. We construct value-weighted fund-level Scope 3 Carbon emissions based on portfolio holdings. Source: Trucost
ESG Self-Label	An indicator variable which equals one if the fund is labeled as an ESG fund in Morningstar Sustainable Funds U.S. Landscape Report, and zero otherwise. Source: Morningstar
ESG Momentum	ESG momentum is a score that reveals the direction, or trend, of firm-level ESG performance based on daily data. We construct value-weighted fund-level ESG momentum based on portfolio holdings. Source: Truvalue Labs

Fama–French and Carhart factors (Source: CRSP and Kenneth French data library)

MKT	MKT is the monthly return to the market portfolio minus the monthly return of 30-day Treasury bills.
RF	RF is the monthly return of 30-day Treasury bills
SMB	SMB is the difference between the monthly returns on diversified portfolios of small and large stocks.
HML	HML is the difference between the monthly returns on a diversified portfolio of high and low B/M stocks.
UMD	UMD is the difference between the monthly returns on diversified portfolios of winners and losers.
β_{MK}, β_{HML}, β_{SMB}, β_{MOM}	To estimate the fund's monthly betas, we regress the prior 36 months (i.e., month t - 36 to month t - 1) of fund excess returns (fund returns minus risk-free rate RF) on the factors (MKT, SMB, HML, UMD) to obtain factor loadings. We require at least 12 months of non-missing returns.

CAPM alpha	To estimate the fund's CAPM alpha, we regress the prior 36 months (i.e., month *t-36* to month *t-1*) of fund excess returns (fund returns minus the risk-free rate) on the market excess return (MKT) to obtain the market beta. We require at least 12 months for non-missing returns. Monthly CAPM alphas are the difference between fund excess returns and the product of market excess return and the estimated market beta obtained over the prior 36 months.
Fama-French 3-factor alpha	To estimate the fund's Fama-French 3-factor alpha, we regress the prior 36 months of fund excess returns on the Fama-French three factors (MKT, SMB and HML) to obtain factor loadings. We require at least 12 months for non-missing returns. Monthly Fama-French 3-factor alpha is the difference between fund excess returns and the product of factor returns and the corresponding estimated factor loadings obtained over the prior 36 months.
Carhart 4-factor Alpha	To estimate the fund's Carhart 4-factor alpha, we regress the prior 36 months of fund excess returns on the Carhart four factors (MKT, SMB, HML, UMD) to obtain factor loadings. We require at least 12 months of non-missing returns. Monthly alphas are the difference between fund excess returns, and the product of factor returns and the corresponding estimated factor loadings estimated over the prior 36 months.

Appendix B: Examples of ESG-related shareholder letters:

Fund Name	Report Date	Type	Content
Perritt MicroCap Opportunities Fund	N-CSR, Oct 31, 2018	ESG specific	"We have decided to include details of some unique holdings. We think these descriptions will give a better understanding of why we are excited about the current investment opportunities. DLH Holdings Corp. provides ***health care and social services*** in the United States. It offers ***defense and veterans' health solutions***. … . Infrastructure and Energy Alternatives (IEA) provides engineering, procurement, and construction services for ***the renewable energy***…. . Northern Technologies International Corporation (NTIC) develops leading corrosion inhibiting products and services, as well as ***bio-based and biodegradable polymer compounds.*** They recently invested $3.5 million in developing ***new corrosion solutions and bioplastic products***. …. Nature-Tec ***produces bioplastic solutions*** such as plastic bags for shipping and resin for straws to ***reduce carbon dioxide emissions and provide sustainable products.***"
Impax Asset Management	N-CSRS, Aug 24, 2016	ESG specific	"There are positive things happening in the world. They may not get much media coverage but they are real. … It is not exaggeration to say, for instance, that ***the business community is generally ahead of government when it comes to climate change*** and the need to find solutions. Nor is it an exaggeration to say that ***companies have become more responsive on issues ranging from board diversity and women's empowerment to eliminating discrimination and human rights abuses in their supply chains***. … We do it when we ***file shareholder resolutions calling on companies to reduce their greenhouse gas emissions. We do it when we petition the Securities and Exchange Commission to require companies to disclose their pay ratios between male and female employees***. … We invest for the long term, so it is slow work, but it is vital work."
Trillium mutual funds	N-CSRS, Dec 31, 2017	ESG specific	"The fund was able to strengthen its Consumer Staples holdings by adding Orkla, a leading supplier of branded goods to grocery. … . The company is committed to improving the nutritional profile of its food products, ***having established nutrition and health objectives*** across its portfolios. It has also ***established a goal to sustainably source key raw materials*** by 2020. … . Portfolio 21 invests in industry leaders across the globe that ***effectively address and mitigate their environmental impact***. One such measure that we evaluate is ***carbon intensity***, which can be quantified by computing the ***average emission rate of a given pollutant*** from a given source relative to the intensity of a specific activity."
Aspiration Redwood Fund	N-CSR, Dec 9, 2021	ESG specific	"Whether it is corporate pledges at the COP26 climate talks in Glasgow or promises of action in the wake of murder of George Floyd, ***environmental and social concerns*** are more and more front and center for business. And research has shown that ***companies with stronger environmental, social, and governance practices may tend to overperform their peers***. That's why the Redwood Fund seeks to marry value to values-providing broad exposure to the large cap sector while ***encouraging industry leaders in areas like environmental action and employee benefits***. … . ***Bio-Rad Laboratories***,

			Costco and Marsh & McLennan were the top contributors to performance. ***Montrose Environmental Group*** and Salesforce also added value over this time period."
Trillium Small/Mid Cap Fund	N-CSRS, Mar 8, 2017	ESG specific	"During the second half of the year, we initiated a position in Trimble Navigation. … .Products are sold based on return on investment and provide benefits that can include lower operational costs, higher productivity, improved quality, safety, compliance, and ***reduced environmental impact***. During the second half of 2016, Trillium field shareholder proposals with over two dozen companies, asking them to ***adopt more sustainable business practices and improve sustainability related disclosures.*** … . In August, J.B. Hunt Transport Services, Inc. ***updated its non-discrimination policies to cover gender identity for its 20,000 employees***."
T. Rowe Price New Horizons Fund	N-CSR, Feb 24, 2016	ESG general	"One way to predict how society's habits will change over time is to study young adults. As the Millennial Generation (born 1980–2000) becomes the majority of consumers in the next decade, successful consumer businesses will need to evolve in order to support their worldview. Generations form many of their perspectives and habits early in life, so formative events have predictive power. Each generation is known for a few differentiating characteristics. For instance, the Greatest Generation (born 1900–1920) was impacted by the dutiful patriotism of World War II, and Generation X (born 1960–1980) developed a distinct cultural nihilism in the wake of Vietnam. Based on our research, ***we find that millennials have been greatly affected by the financial crisis, ballooning student loan totals, and the rapid development of information technology. We expect these developments to affect their behavior as consumers.*** As they age, millennials are likely to be value-conscious consumers. ***Most feel that their financial opportunities will be more constrained than those of their parents, and they are learning thrifty behaviors as a result of high personal debt levels and tepid economic growth.*** In contrast with baby boomers, who are known for being optimistic and spendthrift, ***we expect millennials to be bargain-seekers in certain areas.***"

Figure 1: Residual Flow Difference Before and After Disclosure Date

The figures below show the average difference in residual flows between treated funds (funds with ESG shareholder letters) and their matched controls 5 months before and after the disclosure date following Agarwal, Ren, Shen and Zhao (2023). Residual flows are the regression residuals after regressing flow on fund characteristics used in Table 2. For each event period, differences in residual flows are calculated by subtracting the residual flows of control funds from the residual flows of their treated funds. The dots indicate the average of these differences at each event date. The linear plots and the 95% confidence intervals are obtained by fitting these dots before and after disclosing shareholder letters.

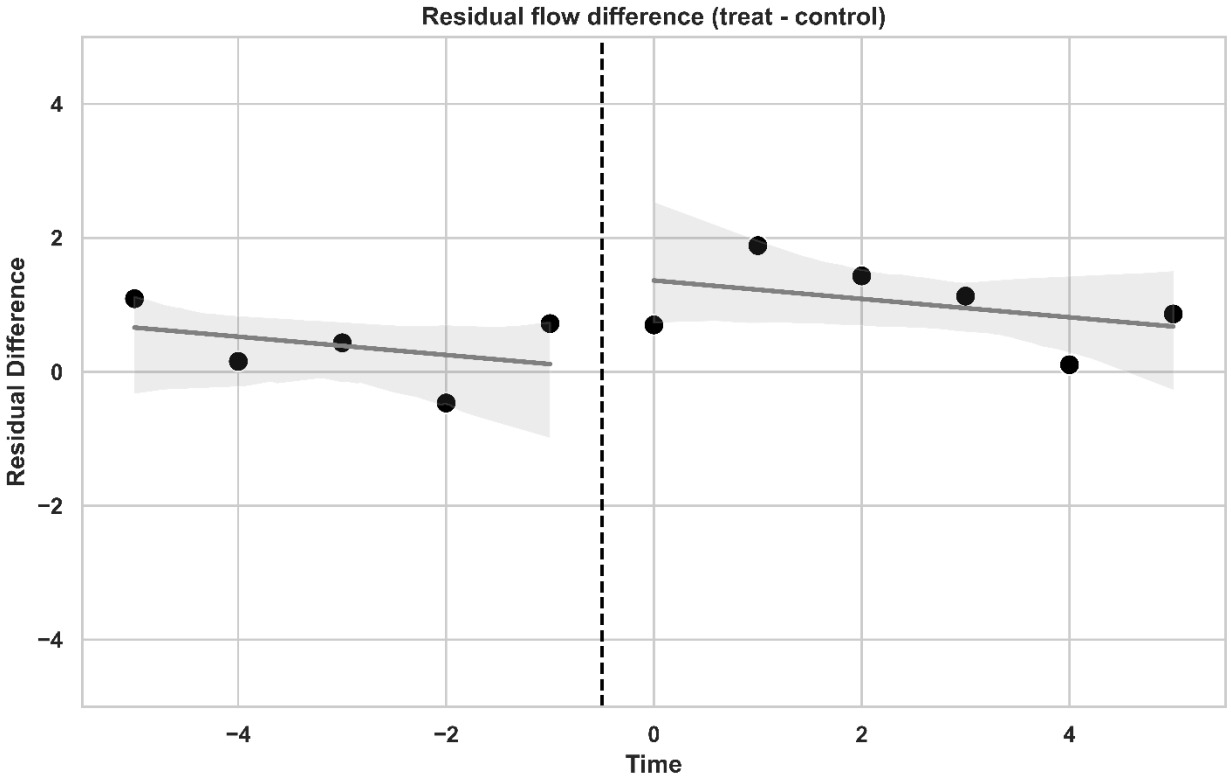


Figure 2: The Dynamic Impact of ESG Shareholder Letters on Fund Flows

This figure presents the dynamic impact of ESG shareholder letters on mutual fund's monthly flow using the LP-DID method proposed by Dube, Girardi, Jordà and Taylor (2024). The solid dots represent the estimated coefficients with one month prior to the disclosure date (t=-1) as the reference, while the solid vertical line segments present two-sided 90% confidence intervals. Control variables including the Carhart alpha over the prior 6 months, size, age, expense ratio, Morningstar rating, family size, family age and ESG self-label are defined in Appendix 1. All models include fund and year-by-month fixed effects, and the *t*-statistics are based on standard errors clustered at fund level.

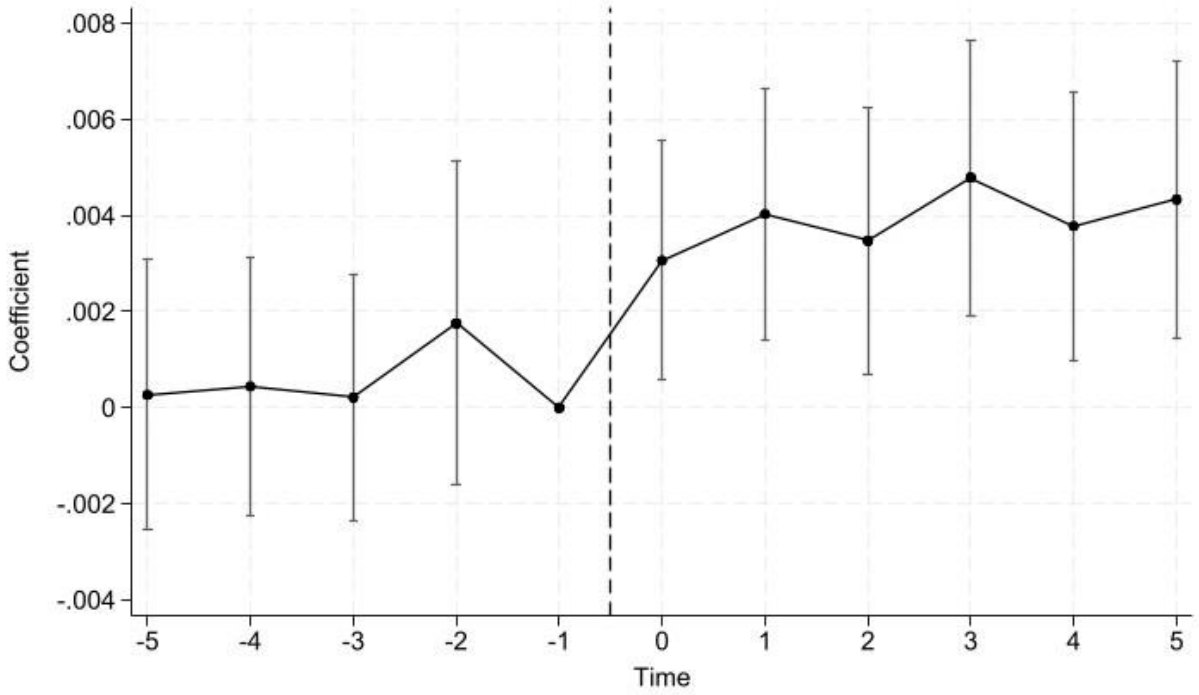


Figure 3: Distribution of Estimated Coefficients from DID-placebo Tests

This figure shows the effect of ESG-related shareholder letters on mutual fund flows in falsification tests. We keep the original distribution, randomly assign the DID interaction terms and re-estimate DID regression (Eq. (2)) for 500 times. The graph presents the density of the estimated coefficients on the pseudo-DID interaction terms from 500 placebo tests. The vertical line represents the true coefficient at 0.0014 from the DID regression (the coefficient of ESG × After of column (1) in Table 3).

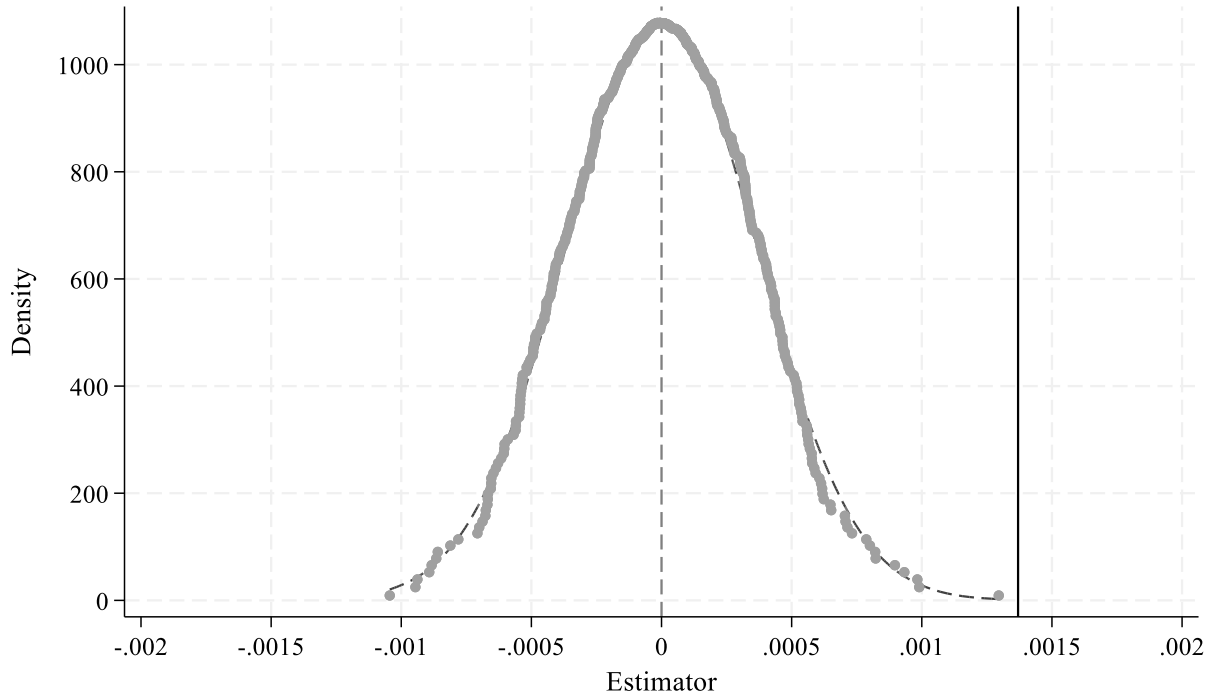
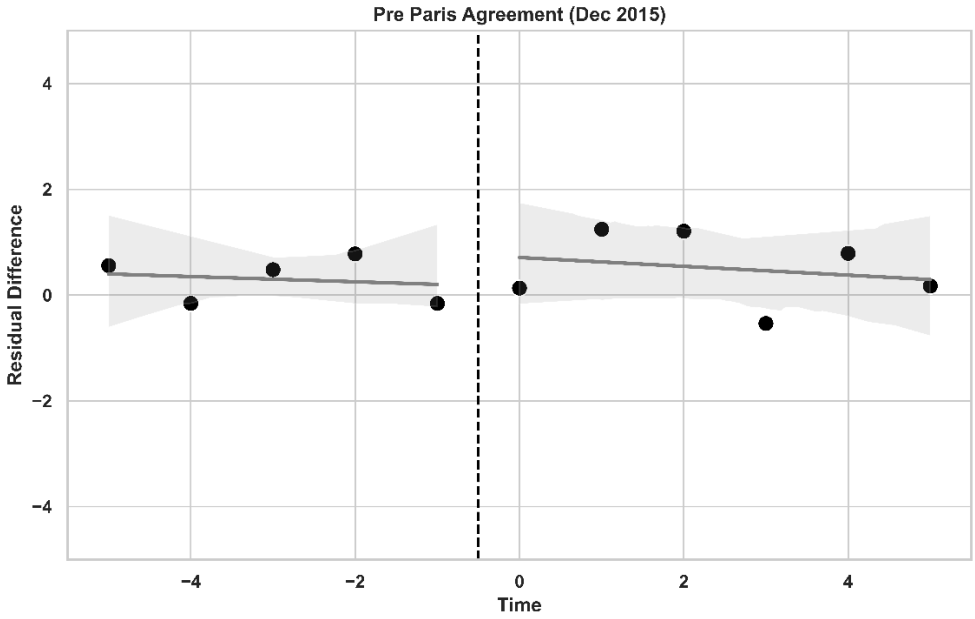


Figure 4: ESG Flow Effects Before and After Paris Agreement

The figures below show the average difference in residual flows between treated funds (funds with ESG shareholder letters) and their matched controls before (in the top subplot) and after (in the bottom subplot) the Paris Agreement following Agarwal, Ren, Shen and Zhao (2023). Residual flows are the regression residuals after regressing flow on fund characteristics (performance, size, age, expense ratio, turnover ratio, family size, family age and Morningstar rating). For each event period, differences in residual flows are calculated by subtracting the residual flows of control funds from the residual flows of their treated funds. The dots indicate the average of these differences at each event date. The linear plots and the 95% confidence intervals are obtained by fitting these dots before and after disclosing shareholder letters, for pre and post Paris Agreement period respectively.



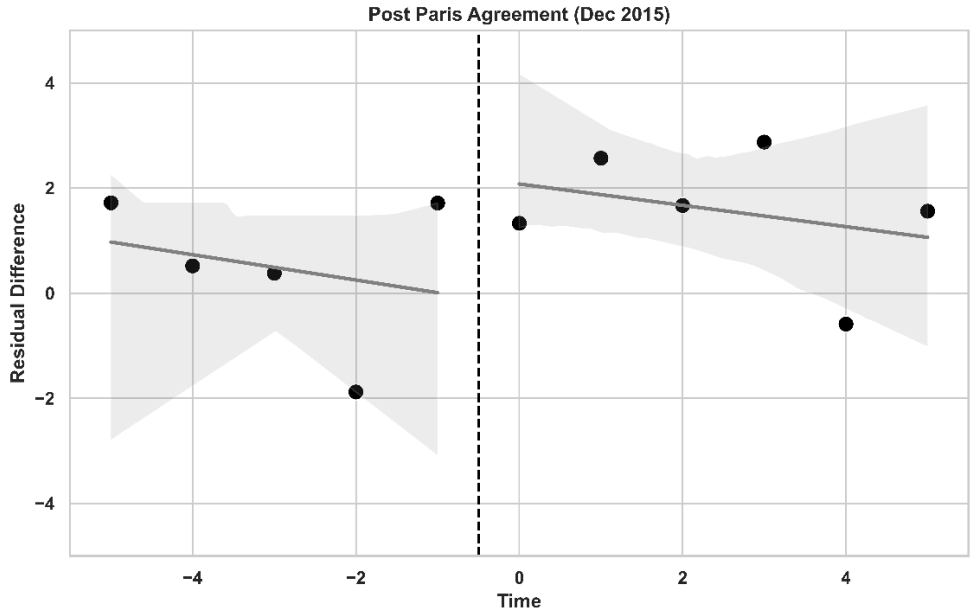


Table 1: Summary Statistics

This table presents the summary statistics of our sample. The sample consists of 32,996 shareholder letters from 1,740 U.S. actively managed equity mutual funds, covering the period from January 2006 to December 2022. We report the mean, standard deviation, 25th percentile (Q25), median (Q50), and 75th percentile (Q75) for each variable. $ESG_{i,t}$ is a dummy variable equal to one if mutual fund *i* includes ESG-related information (identified by ESG-BERT) in its shareholder letter at time *t*, and zero otherwise. *ESG Specific* is a dummy variable equal to one if the shareholder letter contains specific ESG information, such as holdings and activities (identified by ChatGPT), and zero otherwise. *ESG General* is a dummy variable equal to one if the shareholder letter contains only vague ESG information, and zero otherwise. *Letter Length* is the natural logarithm of the total number of words in a shareholder letter. $Flow_{i,t}$ represents the monthly flow, defined as the percentage change in assets under management from month t - 1 to t, adjusted for the fund return in month t. $Flow_{i,t,t+6}$ is the cumulative flow over the following six months from month t. *Carhart Alpha* is the cumulative alpha estimated using the Carhart (1997) four-factor model. *Fund size* is the natural logarithm of assets under management, measured in millions of U.S. dollars. *Fund age* is the natural logarithm of the number of years since the fund's inception. *Expense ratio* is defined as the total annual management, administrative, and 12b-1 fees and expenses divided by year-end fund size. *Family Size* is the natural logarithm of the total net assets of all funds managed within the fund family. *Family age* is the natural logarithm of the age of the oldest fund in the family. *High MS Rating* is a dummy variable equal to one if the fund's Morningstar star rating is 4 or 5, and zero otherwise. *Institutional shares* represents the percentage of shares held by institutional clients, as identified by the CRSP flag. *Marketing Fee Fraction* is the weight-average of marketing fees across all share classes. *ESG Self-Label* is a dummy variable equal to one if the fund is labeled as an ESG fund in the Morningstar Sustainable Funds U.S. Landscape Report, and zero otherwise. $\#Incidents_{i,t,t+6}$ is the number of ESG-related incidents of holding stocks over the following six months. $Scope\ 1(2,3)\ Emissions_{i,t,t+6}$ is the value-weighted fund-level Scope 1 (2,3) carbon emissions, measured in millions of tons, based on portfolio holdings from month t to month t + 6. Detailed definitions of all variables are provided in Appendix A.

Variables	Obs.	Mean	SD	Q25	Median	Q75
Shareholder Letter Variables						
ESG	32,996	0.18	0.39	0.00	0.00	0.00
ESG Specific	32,996	0.04	0.19	0.00	0.00	0.00
ESG General	32,996	0.14	0.35	0.00	0.00	0.00
Letter Length	32,996	8.13	1.92	6.71	7.81	9.30
Fund Variables						
$Flow_{i,t}$ (%)	32,996	-0.15	3.94	-1.43	-0.48	0.61
$Flow_{i,t,t+6}$ (%)	32,920	-0.06	19.95	-8.54	-3.39	3.20
Carhart $Alpha_{i,t,t+6}$ (%)	32,815	-0.88	5.00	-2.99	-0.80	1.32
Carhart $Alpha_{i,t,t-6}$ (%)	32,515	-0.81	5.01	-2.92	-0.73	1.36
Fund Size	32,996	5.93	1.91	4.62	6.04	7.28
Fund Age	32,996	2.72	0.65	2.39	2.82	3.15
Expense Ratio (%)	32,996	1.10	0.41	0.87	1.07	1.29
Family Size	32,179	8.89	2.40	7.56	9.03	10.47
Family Age	32,226	2.62	0.40	2.41	2.70	2.91
High MS Rating	32,996	0.31	0.46	0.00	0.00	1.00
Institutional shares	32,964	0.38	0.38	0.00	0.24	0.77
Marketing Fee Fraction	23,789	0.12	0.11	0.03	0.09	0.19
ESG Variables						
ESG Self-Label	32,996	0.01	0.12	0.00	0.00	0.00
# $Incidents_{i,t,t+6}$	28,333	178.93	247.72	16.00	78.00	257.00
Scope 1 $Emissions_{i,t,t+6}$	30,771	0.10	0.77	0.00	0.00	0.00
Scope 2 $Emissions_{i,t,t+6}$	30,771	0.05	0.25	0.00	0.00	0.00
Scope 3 $Emissions_{i,t,t+6}$	30,771	3.59	10.75	0.00	0.00	1.16

Table 2: Flow Effects of ESG Shareholder Letters

This table reports the baseline results of the flow effects of ESG shareholder letters at fund-month level from January 2006 to December 2022. The dependent variable is the following 6 months cumulative flow. The main independent variable is $ESG_{i,t}$, which takes a value of one if mutual fund *i* contains ESG-related information (identified by ESG-BERT) in its shareholder letter at time *t*, and zero otherwise. We construct our PSM sample by running probit regressions with the following matching variables: size, age, flow and Carhart alpha over the prior 6 months, and Carhart 4-factor loadings. For treated funds with ESG-related shareholder letters, matched control funds are those with the highest propensity scores. Control variables include the Carhart alpha over the prior 6 months (continuous in columns 1 and 3; and quartiles in columns 2 and 4), size, age, expense ratio, Morningstar rating, family size, family age, ESG self-label, and letter length. Both fund and year-month fixed effects are imposed. The *t*-statistics are based on standard errors clustered at the fund level. Superscripts *, **, and *** indicate statistical significance at 10%, 5% and 1% level respectively.

Dep. Var.	$Flow_{i,t,t+6}$			
	Panel A: Full sample		Panel B: PSM sample	
	(1)	(2)	(3)	(4)
$ESG_{i,t}$	**0.010*** **	**0.010*** **	**0.013*** **	**0.014*** **
	(3.26)	**(3.29)**	**(3.13)**	**(3.28)**
$Alpha_{i,t,t-6}$	0.481***		0.658***	
	(10.75)		(12.64)	
$Performance_{i,t-1,t-6}$ Quartile4		0.033***		0.029***
		(9.88)		(5.71)
$Performance_{i,t-1,t-6}$ Quartile2		-0.015***		-0.015***
		(-5.68)		(-3.42)
$Performance_{i,t-1,t-6}$ Quartile1		-0.039***		-0.040***
		(-12.86)		(-8.05)
Fund $Size_{i,t-1}$	-0.061***	-0.059***	-0.057***	-0.057***
	(-17.35)	(-17.21)	(-12.24)	(-12.13)
Fund $Age_{i,t-1}$	-0.062***	-0.063***	-0.051**	-0.054**
	(-3.55)	(-3.58)	(-2.38)	(-2.53)
Expense $ratio_{i,t-1}$	-8.310***	-8.262***	-11.614***	-12.054***
	(-5.33)	(-5.31)	(-4.87)	(-5.02)
High MS $Rating_{i,t-1}$	0.103***	0.101***	0.097***	0.099***
	(17.05)	(16.79)	(11.34)	(11.47)
Family $Size_{i,t-1}$	0.006	0.006	0.004	0.004
	(1.52)	(1.52)	(0.72)	(0.78)
Family $Age_{i,t-1}$	-0.045	-0.051	-0.041	-0.036
	(-1.39)	(-1.64)	(-0.95)	(-0.84)
ESG Self-$Label_{i,t-1}$	0.063**	0.058**	0.090***	0.091***
	(2.57)	(2.37)	(2.84)	(2.93)
Letter $Length_{i,t}$	-0.001	-0.001	-0.001	-0.001
	(-1.20)	(-1.17)	(-1.01)	(-0.95)
Fund FE	Yes	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes	Yes
Observations	31,672	31,672	10,780	10,780
R-square	0.242	0.246	0.336	0.332

Table 3: ESG Flow Effects: Difference-in-Differences

This table reports the ordinary least square estimates at the fund-month level, relating mutual fund flow to ESG shareholder letters. The dependent variable is $Flow_{i,t}$ and the main independent variable is the DID interaction term $ESG_i \times After_t$. ESG_i is an indicator variable for mutual funds with ESG-related shareholder letters (treatment group). $After_t$ takes a value of one for the following 5 months after the ESG-related shareholder letters in month *t*, and zero otherwise. Controls are the same as those used in Table 2. Column 1 presents the result without control variables. Column 2 presents the result with continuous Carhart alpha over the past six months as control and Column 3 provides the result with quartile Carhart alpha as control. We have also imposed both fund and year-by-month fixed effects. The sample period is from January 2006 to December 2022. The *t*-statistics are based on standard errors clustered at fund level. Superscripts *, **, and *** indicate statistical significance at 10%, 5% and 1% level respectively.

Dep. Var.	$Flow_{i,t}$		
	(1)	(2)	(3)
$ESG_i \times After_t$	**0.001****	**0.001*****	**0.001*****
	(2.18)	**(2.65)**	**(2.70)**
$Alpha_{i,t,t-6}$		0.117***	
		(11.38)	
$Performance_{i,t-1,t-6}$ Quartile4			0.007***
			(10.28)
$Performance_{i,t-1,t-6}$ Quartile2			-0.002***
			(-3.31)
$Performance_{i,t-1,t-6}$ Quartile1			-0.005***
			(-9.01)
Fund $Size_{i,t-1}$		0.002***	0.002***
		(2.78)	(2.93)
Fund $Age_{i,t-1}$		-0.021***	-0.021***
		(-7.82)	(-7.84)
Expense $ratio_{i,t-1}$		-0.336	-0.367
		(-0.91)	(-0.99)
High MS $Rating_{i,t-1}$		0.015***	0.015***
		(18.09)	(18.05)
Family $Size_{i,t-1}$		-0.001	-0.001
		(-1.57)	(-1.52)
Family $Age_{i,t-1}$		-0.008	-0.008
		(-1.19)	(-1.19)
ESG Self-$Label_{i,t-1}$		0.005	0.004
		(0.81)	(0.71)
Fund FE	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes
Observations	103,299	101,005	101,005
R-square	0.071	0.092	0.090

Table 4: ESG Flow Effects: Parallel Trends and Dynamic effects

This table presents evidence on the timing of the effects of disclosing ESG-related shareholder letters on mutual fund flows, using the estimation approach proposed by Dube, Girardi, Jordà and Taylor (2024). Regressions are estimated at the fund-month level. The dependent variable is fund *i*'s flow in month *t*. ESG^{Pre} and ESG^{Post} are the pooled estimates before and after disclosing ESG shareholder letters respectively. ESG_i is an indicator variable for mutual funds with ESG-related shareholder letters (treatment group). *Pre(5)* through *Pre(2)* are indicator variables for observations that fall during 2 through 5 months prior to the event date. *Post(1)* through *Post(5)* are indicator variables for observations that fall during 1 through 5 months after disclosing ESG-related shareholder letter. Columns 1 and 2 report the pooled estimates without and with control variables respectively. Columns 3 and 4 report the event study estimates without and with control variables respectively. Control variables are the same as those used in Table 2. The sample period is from January 2006 to December 2022. Both fund and year-by-month fixed effects are imposed. The *t*-statistics are based on standard errors clustered at fund level. Superscripts *, **, and *** indicate statistical significance at 10%, 5% and 1% level respectively.

Dep. Var.	$Flow_{i,t}$			
	Pooled Estimates		Event Study Estimates	
	(1)	(2)	(3)	(4)
ESG^{Pre}	0.000	0.000		
	(0.37)	(0.42)		
ESG^{Post}	**0.004*** **	**0.004*** **		
	(3.58)	**(3.45)**		
$ESG_i \times Pre5$			0.000	0.000
			(0.26)	(0.19)
$ESG_i \times Pre4$			0.000	0.000
			(0.25)	(0.32)
$ESG_i \times Pre3$			0.000	0.000
			(0.04)	(0.16)
$ESG_i \times Pre2$			0.002	0.002
			(0.91)	(1.02)
$ESG_i \times Post0$			**0.003****	**0.003****
			(2.41)	**(2.41)**
$ESG_i \times Post1$			**0.004*** **	**0.004*** **
			(2.92)	**(3.02)**
$ESG_i \times Post2$			**0.004*** **	**0.003****
			(2.60)	**(2.46)**
$ESG_i \times Post3$			**0.005*** **	**0.005*** **
			(3.49)	**(3.28)**
$ESG_i \times Post4$			**0.004*** **	**0.004*** **
			(2.81)	**(2.66)**
$ESG_i \times Post5$			**0.005*** **	**0.004*** **
			(3.17)	**(2.94)**
Controls	No	Yes	No	Yes
Fund FE	Yes	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes	Yes
Observations	103,299	103,299	103,299	103,299

Table 5: ESG Flow Effects: DID with Alternative Control Samples

This table presents the robust tests for our DID analysis, using not yet or never treated observations as "clean" controls. The dependent variable is fund *i*'s flow in month *t*. ESG_i is an indicator variable for mutual funds with ESG-related shareholder letters (treatment group). *Pre(5)* through *Pre(2)* are indicator variables for observations that fall during 2 through 5 months prior to the event date. *Post(1)* through *Post(5)* are indicator variables for observations that fall during 1 through 5 months after disclosing ESG-related shareholder letter. Panel A reports the pooled estimates and Panel B reports the event study estimates. Columns 1 and 2 report the results with not yet treated observations as controls while columns 3 and 4 report the results with never treated observations as controls. Controls variables are the same as those used in Table 2. The sample period is from January 2006 to December 2022 and regressions are estimated at the fund-month level. Both fund and year-by-month fixed effects are imposed. The *t*-statistics are based on standard errors clustered at fund level. Superscripts *, **, and *** indicate statistical significance at 10%, 5% and 1% level respectively.

Panel A: Pre v.s. Post				
Dep. Var.	$Flow_{i,t}$			
	Non-yet treated as controls		Never treated as controls	
	(1)	(2)	(3)	(4)
ESG^{Pre}	0.000	0.001	0.001	0.001
	(0.46)	(0.45)	(1.02)	(0.97)
ESG^{Post}	**0.004*****	**0.003*****	**0.004*****	**0.003****
	(3.30)	**(2.84)**	**(3.15)**	**(2.32)**
Controls	No	Yes	No	Yes
Fund FE	Yes	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes	Yes
Observations	103,299	103,299	103,299	103,299
Panel B: Dynamic Estimates				
Dep. Var.	$Flow_{i,t}$			
	Non-yet treated as controls		Never treated as controls	
	(1)	(2)	(3)	(4)
$ESG_i \times Pre5$	0.001	0.001	0.001	0.001
	(0.56)	(0.48)	(0.85)	(0.79)
$ESG_i \times Pre4$	0.000	0.000	0.000	0.000
	(0.11)	(0.20)	(0.29)	(0.30)
$ESG_i \times Pre3$	-0.000	0.000	0.001	0.001
	(-0.11)	(0.01)	(0.57)	(0.65)
$ESG_i \times Pre2$	0.001	0.002	0.002	0.002
	(0.82)	(0.95)	(1.33)	(1.48)
$ESG_i \times Post0$	**0.003****	**0.003****	**0.002***	**0.002**
	(2.23)	**(2.12)**	**(1.83)**	**(1.63)**
$ESG_i \times Post1$	**0.004*****	**0.003*****	**0.004*****	**0.003****
	(2.66)	**(2.56)**	**(2.85)**	**(2.40)**
$ESG_i \times Post2$	**0.003****	**0.003****	**0.003****	**0.002**
	(2.39)	**(2.06)**	**(2.30)**	**(1.63)**
$ESG_i \times Post3$	**0.005*****	**0.004*****	**0.005*****	**0.004*****
	(3.21)	**(2.85)**	**(3.36)**	**(2.62)**
$ESG_i \times Post4$	**0.004*****	**0.003*****	**0.005*****	**0.003****
	(2.69)	**(2.31)**	**(3.06)**	**(2.20)**
$ESG_i \times Post5$	**0.005*****	**0.004****	**0.005*****	**0.004****
	(3.08)	**(2.56)**	**(3.24)**	**(2.27)**
Controls	No	Yes	No	Yes
Fund FE	Yes	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes	Yes
Observations	103,299	103,299	103,299	103,299

Table 6: Flow Effects of ESG Shareholder Letters: Institutional Funds versus Retail Funds

This table reports the flow effects of ESG shareholder letters for institutional funds in columns (1) and (3), and for retail funds in columns (2) and (4) over the period from January 2006 to December 2022. Regressions are estimated at the fund-month level. The dependent variable is the following 6 months cumulative flow. The main independent variable is $ESG_{i,t}$, which takes a value of one if mutual fund *i* contains ESG-related information (identified by ESG-BERT), and zero otherwise. We use the CRSP flag (in columns 1 and 2) and marketing fee fraction (in columns 3 and 4) to identify institutional and retail funds. Control variables are the same as used in Table 2. All regressions include fund fixed effect and year-by-month fixed effect. The *t*-statistics are based on standard errors clustered at the fund level. Superscripts *, **, and *** indicate statistical significance at 10%, 5% and 1% level respectively.

Dep. Var.	$Flow_{i,t,t+6}$			
	Institutional	Retail	Institutional	Retail
	(1)	(2)	(3)	(4)
$ESG_{i,t}$	**0.017*** **	**0.006**	**0.018*** **	**0.007***
	(3.32)	**(1.50)**	**(3.30)**	**(1.85)**
Diff		**0.011***		**0.011***
t-value		**(1.74)**		**(1.69)**
Institutional/Retail Classification	CRSP flag		Marketing fee fraction	
Controls	Yes	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes	Yes
Observations	31,608	31,608	31,603	31,603
R-square	0.284	0.284	0.280	0.280

Table 7: ESG Flow Effects Before and After the Paris Agreement

This table shows the results of subsample regressions before and after the Paris Agreement (Dec, 2015). We divide our sample into pre-Paris Agreement (before 2016) and after-Paris Agreement (after 2016) and repeat regressions in Table 2. The main independent variable is $ESG_{i,t}$, which takes a value of one if mutual fund *i* contains ESG-related information (identified by ESG-BERT) in its shareholder letter at time *t*, and zero otherwise. Past performance is continuous cumulative Carhart alpha over the prior 6 months in column (1) and (2), and are in quartiles in column (3) and (4). Controls are the same as used in Table 2. All regressions include fund fixed effect and year-month fixed effect. The t-statistics are reported in parenthesis which are based on standard errors clustered at the fund level. Superscripts *, **, and *** indicate statistical significance at 10%, 5% and 1% level respectively.

Dep. Var.	$Flow_{i,t,t+6}$			
	Pre-Paris Agreement	Post-Paris Agreement	Pre-Paris Agreement	Post-Paris Agreement
	(1)	(2)	(3)	(4)
$ESG_{i,t}$	-0.001	**0.015*****	0.000	**0.015*****
	(-0.42)	**(3.50)**	(0.00)	**(3.31)**
Diff		-0.016**		-0.015**
t-value		(-2.35)		(-2.36)
Controls	Yes	Yes	Yes	Yes
Past Performance Measure	Continuous	Quartile	Continuous	Quartile
Fund FE	Yes	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes	Yes
Observations	31,581	31,581	31,581	31,581
R-square	0.317	0.317	0.319	0.319

Table 8: Financial Performance after ESG Shareholder Letters

This table reports mutual funds' financial performance after disclosing ESG-related shareholder letters over the period from January 2006 to December 2022. Regressions are estimated at the fund-month level. The dependent variable is the cumulative Carhart alpha over the following six months. The main independent variable is $ESG_{i,t}$, which takes a value of one if fund *i* discloses ESG-related information in shareholder letter in month *t*, and zero otherwise. Columns (1) and (2) present the regression results for the full sample, while columns (3) and (4) show the results for the PSM sample. Controls are the same as in Table 2. We have controlled both fund and year-by-month fixed effects. The *t*-statistics are based on standard errors clustered at the fund level. Superscripts *, **, and *** indicate statistical significance at 10%, 5% and 1% level respectively.

Dep. Var.	Carhart 4-factor $Alpha_{i,t,t+6}$			
	Full sample		PSM sample	
	(1)	(2)	(3)	(4)
$ESG_{i,t}$	**0.001**	**0.001**	**-0.000**	**0.000**
	(1.26)	**(0.85)**	**(-0.05)**	**(0.22)**
Controls	Yes	Yes	Yes	Yes
Past Performance Measure	Continuous	Quartile	Continuous	Quartile
Fund FE	Yes	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes	Yes
Observations	31,672	31,245	10,780	10,780
R-square	0.156	0.466	0.282	0.502

Table 9: Real Impacts after Disclosing ESG Shareholder Letters

This table presents the regression results for the ESG performance over the six months following the disclosure of ESG-related shareholder letters. The dependent variables are the holding-based ESG incidents in the subsequent six months (Column 1), the portfolio Scope 1 emissions (Column 2), the portfolio Scope 2 emissions (Column 3), and the portfolio Scope 3 emissions (Column 4) computed as in Darkua, Glossner, Krueger and Matos (2023). The main independent variables of interest are *ESG Specific* and *ESG General*. *ESG Specific* is an indicator variable that takes the value of one if mutual funds mention specific ESG-related holdings or activities in the shareholder letters, and 0 otherwise. *ESG General* includes shareholder letters that mention only general ESG-related information. We identify whether the ESG information is specific or general using ChatGPT. Regressions are estimated at the fund-month level and sample period is from January 2006 to December 2022. Both fund and year-month fixed effects are imposed. Standard errors are clustered at the fund level. Superscripts *, **, and *** indicate statistical significance at 10%, 5% and 1% level respectively.

Panel A: All ESG shareholder letters				
Dep. Var.	$Incidents_{i,t,t+6}$	$Scope1\ Emission_{i,t,t+6}$	$Scope2\ Emission_{i,t,t+6}$	$Scope3\ Emission_{i,t,t+6}$
	(1)	(2)	(3)	(4)
$ESG_{i,t}$	-2.716	-0.019	0.000	-0.189
	(-1.16)	(-0.95)	(0.01)	(-1.07)
Controls	Yes	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes	Yes
Observations	27,386	29,607	29,607	29,607
R-square	0.839	0.255	0.381	0.501
Panel B: ESG specific information versus general information				
Dep. Var.	$Incidents_{i,t,t+6}$	$Scope1\ Emission_{i,t,t+6}$	$Scope2\ Emission_{i,t,t+6}$	$Scope3\ Emission_{i,t,t+6}$
	(1)	(2)	(3)	(4)
ESG Specific	**-8.294****	**-0.088****	**-0.003**	**-0.792***
	(-2.091)	**(-2.23)**	**(-0.41)**	**(-1.87)**
ESG General	-1.539	-0.005	0.001	-0.065
	(-0.639)	(-0.23)	(0.21)	(-0.36)
Diff	-6.755*	-0.083**	-0.004	-0.072*
t-value	(-1.77)	(-2.33)	(-0.49)	(-1.70)
Controls	Yes	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes	Yes
Observations	27,386	29,607	29,607	29,607
R-square	0.839	0.255	0.381	0.501

Table 10: Flow Effects of ESG Shareholder Letters: General Information versus Specific Information

This table reports the effects of specific and general ESG information on the cumulative flow over the following 6 months. *ESG Specific* are those shareholder letters that mention specific ESG-related holdings or activities, while *ESG General* are those shareholder letters that only mention general ESG-related information. We identify *ESG Specific* using ChatGPT, and the rest are classified as *ESG General*. The dependent variable is the following 6 months cumulative flow. The main independent variables are *ESG Specific*, which equals one if shareholder letter contains specific ESG information (i.e., holdings or activities), and 0 otherwise, and *ESG General*, which equals one if shareholder letter contains general ESG information, and 0 otherwise. Past performance is represented as continuous variables in columns (1) and (3), and in quartiles in columns (2) and (4). Controls are the same as used in Table 2. The sample period is from January 2006 to December 2022. We have controlled both fund and year-by-month fixed effects. The *t*-statistics are based on standard errors clustered at the fund level. Superscripts *, **, and *** indicate statistical significance at 10%, 5% and 1% level respectively.

Dep. Var.	$Flow_{i,t,t+6}$			
	Full sample		PSM sample	
	(1)	(2)	(3)	(4)
ESG General	0.008**	0.011***	0.011**	0.012**
	(2.38)	(3.17)	(2.53)	(2.55)
ESG Specific	0.010*	0.009	0.011	0.010
	(1.86)	(1.39)	(1.38)	(1.30)
Controls	Yes	Yes	Yes	Yes
Past Performance Measure	Continuous	Quartile	Continuous	Quartile
Fund FE	Yes	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes	Yes
Observations	31,672	31,245	10,780	10,780
R-square	0.242	0.317	0.336	0.332

Table 11: Longer Term Effects of ESG Disclosures

This table presents the results on the effects of ESG shareholder letters in the second quarter following disclosure. The sample period is from January 2006 to December 2022. The dependent variable $Flow_{i,q+2}$ is the cumulative flow in the second quarter after the disclosure date. The key independent variables include $ESG_{i,t}$, an indicator variable that equals one if fund *i* discloses ESG-related information in its shareholder letter in month *t*, and zero otherwise; $High\ Incidents_{i,q+1}$, an indicator variable that equals one if fund *i*'s ESG incidents in the following quarter after disclosure fall within the top 25% (third quartile), and zero otherwise; and the interaction term $ESG_{i,t} \times High\ Incident_{i,q+1}$, which captures whether a fund with an ESG shareholder letter experiences poor ESG performance after the disclosure, as measured by ESG incidents. Columns (1) and (2) report the regression results for the full sample, while columns (3) and (4) show the results for the PSM sample. Controls are the same as in Table 2. We have controlled both fund and year-by-month fixed effects. The *t*-statistics are based on standard errors clustered at the fund level. Superscripts *, **, and *** indicate statistical significance at 10%, 5% and 1% level respectively.

Dep. Var.	$Flow_{i,q+2}$			
	Full sample		PSM sample	
	(1)	(2)	(3)	(4)
$ESG_{i,t} \times High\ Incident_{i,q+1}$	**-0.016*** **	**-0.016*** **	**-0.023** **	**-0.024** **
	(-2.66)	**(2.76)**	**(-2.09)**	**(-2.11)**
$ESG_{i,t}$	0.005	0.005*	0.005	0.005
	(1.63)	(1.69)	(1.33)	(1.35)
$High\ Incident_{i,q+1}$	0.006	0.006	-0.002	-0.001
	(0.77)	(0.79)	(-0.20)	(-0.17)
Controls	Yes	Yes	Yes	Yes
Past Performance Measure	Continuous	Quartile	Continuous	Quartile
Fund FE	Yes	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes	Yes
Observations	31,636	31,636	10,780	10,780
R-square	0.112	0.112	0.264	0.264

Online Appendix

Figure A1: The Dynamic Impact of ESG Shareholder Letters on Fund Flow: Alternative Estimates
This figure presents the dynamic impact of ESG shareholder letters on mutual fund's monthly flow using the DID methods proposed by de Chaisemartin and D'Haultfoeuille (2024). The solid dots represent the estimated coefficients, while the solid vertical line segments present two-sided 90% confidence intervals. Control variables including the Carhart alpha over the prior 6 months, size, age, expense ratio, Morningstar rating, family size, family age and ESG self-label are defined in Appendix A. All models include fund and year-by-month fixed effects, and the *t*-statistics are based on standard errors clustered at fund level.

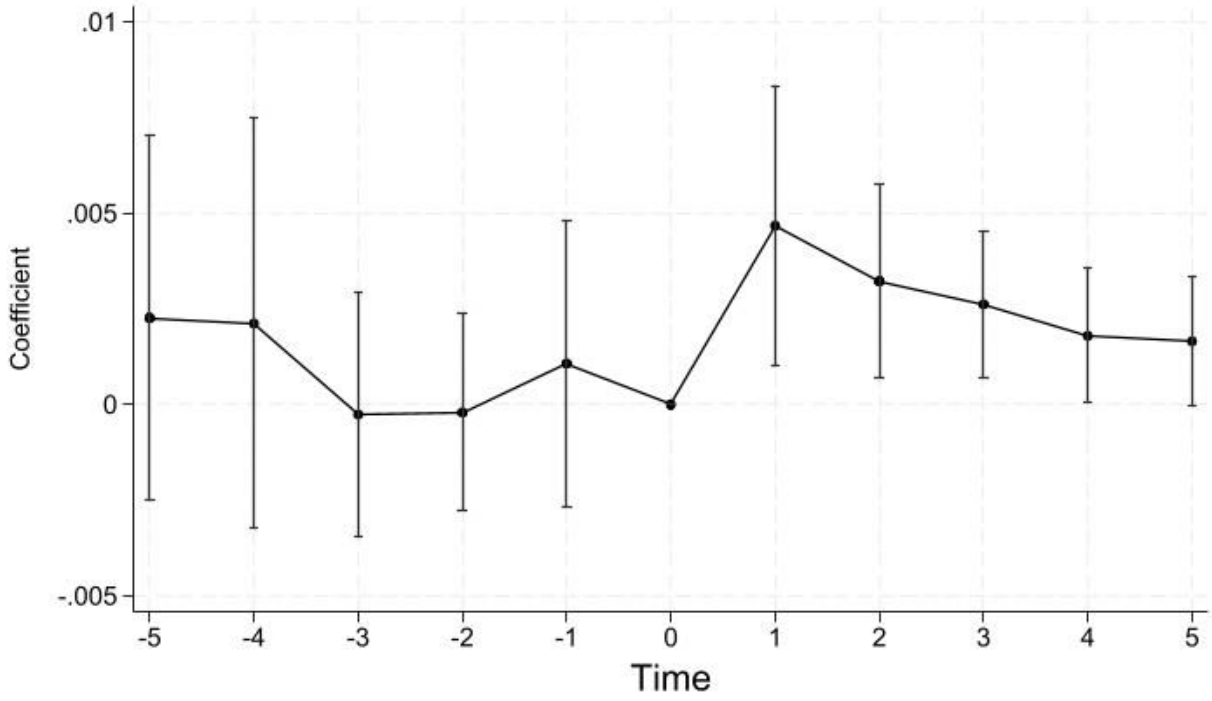


Table A1: Flow Effects of ESG Shareholder Letters: Alternative Fixed Effects

This table reports robust tests with different fixed effects for our baseline regression (Panel A) and DID regression (Panel B). Category fixed effect and category-by-year-month fixed effect are imposed in columns 1 and 2 respectively. Column 3 includes reporting year-month fixed effect following Hillert, Niessen-Ruenzi and Ruenzi (2023). All fixed effects are imposed in column (4). The dependent variable is the following 6 months cumulative flow. The main independent variable is $ESG_{i,t}$, which takes a value of one if mutual fund *i* contains ESG-related information (identified by ESG-BERT) in its shareholder letter at time *t*, and zero otherwise. Control variables include the Carhart alpha over the prior 6 months, size, age, expense ratio, Morningstar rating, family size, family age, ESG Self-Label, and letter length. Both fund and year-month fixed effects are imposed. The t-statistics are based on standard errors clustered at the fund level. Superscripts *, **, and *** indicate statistical significance at 10%, 5% and 1% level respectively.

Panel A: Baseline regression				
Dep. Var.	$Flow_{i,t,t+6}$			
	Cat FE	Cat×YM FE	Reporting FE	All FEs
	(1)	(2)	(3)	(4)
$ESG_{i,t}$	**0.008*** **	**0.008*** **	**0.009*** **	**0.008*** **
	(2.66)	**(2.70)**	**(2.91)**	**(2.68)**
Fund FE	Yes	Yes	Yes	Yes
Category FE	Yes	No	No	No
Year-Month FE	Yes	No	Yes	No
Cat by YM FE	No	Yes	No	Yes
Reporting FE	No	No	Yes	Yes
Observations	31,666	31,239	31,665	31,238
R-square	0.292	0.368	0.297	0.372
Panel B: DID regression				
Dep. Var.	$Flow_{i,t}$			
	Cat FE	Cat×YM FE	Reporting FE	All FEs
	(1)	(2)	(3)	(4)
$ESG_i \times After_t$	**0.001*** **	**0.001*** **	**0.001*** **	**0.001*** **
	(2.84)	**(2.67)**	**(2.75)**	**(2.88)**
Fund FE	Yes	Yes	Yes	Yes
Category FE	Yes	No	No	No
Year-Month FE	Yes	No	Yes	No
Cat by YM FE	No	Yes	No	Yes
Reporting FE	No	No	Yes	Yes
Observations	100,981	100,685	100,981	100,685
R-square	0.128	0.183	0.138	0.185

Table A2: ESG Flow Effects: Add Alternative Control Variables

This table reports robust tests for our DID regressions with more control variables. In addition to the control variables used in Table 2, we have further controlled both short-term and long-term performance (columns 1 and 3), and raw return (in columns 2 and 4), following Hartzmark and Sussman (2019) and Krueger et al., (2024). The dependent variable is $Flow_{i,t}$ and the main independent variable is the DID interaction term $ESG_i \times After_t$. ESG_i is an indicator variable for mutual funds with ESG-related shareholder letters (treatment group). $After_t$ takes a value of one for the 5 months following the disclosure of ESG-related shareholder letters in month t, and zero otherwise. Both fund and year-month fixed effects are imposed. The t-statistics are based on standard errors clustered at the fund level. Superscripts *, **, and *** indicate statistical significance at 10%, 5% and 1% level respectively.

Dep. Var.	$Flow_{i,t}$			
Additional Controls:	Short- and long-term performance	Raw Return and Alpha	Short- and long-term performance	Raw Return and Alpha
	(1)	(2)	(3)	(4)
$ESG_i \times After_t$	**0.001*** (2.71)**	**0.002*** (2.85)**	**0.002*** (2.87)**	**0.002*** (2.94)**
Controls	Yes	Yes	Yes	Yes
Past Performance Measure	Continuous	Continuous	Quartile	Quartile
Fund FE	Yes	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes	Yes
Observations	96,673	96,673	96,673	96,673
R-square	0.089	0.092	0.087	0.091

Table A3: ESG Flow Effects:
Difference-in-Differences with Alternative Propensity Score Matching Sample

This table reports robust tests with different PS-matched samples for our DID regression. The PS-matched sample (control group) is constructed based on Carhart 4-factor loadings, size, age, cumulative flow over the prior 6 months and cumulative raw return (in columns 1 and 3). Columns 2 and 4 present results with two more fund characteristics as matching variables: expense ratio and turnover ratio. The dependent variable is $Flow_{i,t}$ and the main independent variable is the DID interaction term $ESG_i \times After_t$. ESG_i is an indicator variable for mutual funds with ESG-related shareholder letters (treatment group). $After_t$ takes a value of one for the 5 months following the disclosure of ESG-related shareholder letters in month *t*, and zero otherwise. Controls are the same as those used in Table 2. Both fund and year-month fixed effects are imposed. The *t*-statistics are based on standard errors clustered at the fund level. Superscripts *, **, and *** indicate statistical significance at 10%, 5% and 1% level respectively.

Dep. Var.	$Flow_{i,t}$			
Matching variables:	Raw return	9 characteristics	Raw return	9 characteristics
	(1)	(2)	(3)	(4)
$ESG_i \times After_t$	**0.001****	**0.001*****	**0.001****	**0.001*****
	(2.01)	**(2.63)**	**(2.13)**	**(2.71)**
Controls	Yes	Yes	Yes	Yes
Past Performance Measure	Continuous	Continuous	Quartile	Quartile
Fund FE	Yes	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes	Yes
Observations	97,867	97,143	97,891	97,115
R-square	0.101	0.100	0.091	0.108

Table A4: ESG Flow Effects: Difference-in-Differences with Full Sample

This table reports robust tests with the full PSM sample of available observations between 2006 and 2022 for our DID regressions, following Fauver, Hung, Li and Taboada (2017). The PSM sample (control group) is constructed based on Carhart 4-factor loadings, size, age, cumulative flow and cumulative Carhart alpha over the prior 6 months. Columns 1 and 2 present results with traditional TWFE DID model. Columns 3 and 4 present results with LP-DID. The dependent variable is $Flow_{i,t}$ and the main independent variable is the DID interaction term $ESG_i \times After_t$. ESG_i is an indicator variable for mutual funds with ESG-related shareholder letters (treatment group). $After_t$ takes a value of one for the 5 months following the disclosure of ESG-related shareholder letters in month *t*, and zero otherwise. ESG^{Post} is the pooled estimate of the flow effect of disclosing ESG shareholder letter. Controls are the same as those used in Table 2. Both fund and year-month fixed effects are imposed. The *t*-statistics are based on standard errors clustered at the fund level. Superscripts *, **, and *** indicate statistical significance at 10%, 5% and 1% level respectively.

Dep. Var.	$Flow_{i,t}$			
	TWFE DID		LP-DID	
	(1)	(2)	(3)	(4)
$ESG_i \times After_t$	**0.001****	**0.001****		
	(2.46)	**(2.51)**		
ESG^{Post}			**0.004*****	**0.004*****
			(3.37)	**(3.35)**
Controls	Yes	Yes	Yes	Yes
Past Performance Measure	Continuous	Continuous	Quartile	Quartile
Fund FE	Yes	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes	Yes
Observations	256,408	256,408	256,408	256,408