# The Economics of Greenwashing Funds*

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**Abstract**

This paper examines the benefits and costs of greenwashing in mutual funds. We identify greenwashing funds by analyzing their green disclosures using large language models (LLMs) alongside actual green investments. We find that funds engaging in greenwashing charge higher fees while attracting greater flows from investors. Moreover, investors tend to be lenient and less sensitive to poor performance in greenwashing funds, incentivizing underperforming funds to adopt this practice. However, greenwashing funds are more likely to incur regulatory costs and experience outflows, as reflected in ESG-related comment letters from the SEC. Finally, institutional and retail investors respond differently to greenwashing funds.

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## 1. Introduction

Investors have increasingly integrated environmental, social, and governance (ESG) factors into their capital allocation decisions in recent years. As a key intermediary channeling investor capital into the securities market, the mutual fund industry has responded by offering ESG-oriented funds to meet growing investor demand. While these ESG claims influence their fund selection, investors often lack the resources to independently verify such assertions, creating opportunities for funds to engage in greenwashing— the practice of making misleading claims about ESG considerations and practices. This paper empirically investigates the benefits and costs of greenwashing from the perspective of mutual funds using large language models (LLMs).

We begin by exploring the potential benefits for funds engaging in greenwashing. Do greenwashing funds charge higher fees? If so, how do investors respond in terms of capital flows? Do investors give greenwashing funds the benefit of the doubt, showing low sensitivity to poor financial performance? Next, we examine the potential costs of greenwashing, focusing primarily on regulatory scrutiny and its consequences. Additionally, we analyze the differing treatment of institutional and retail investors by greenwashing funds, concluding that not all investors are equally affected.

Understanding the economics of greenwashing is important. Misleading ESG claims can exacerbate agency problems between funds and investors due to the inherent difficulty in verifying these claims. Furthermore, greenwashing distorts capital allocation, causing deviations from investors' intentions and potentially misdirecting capital away from firms aligned with ESG goals. Such misallocation may adversely impact social welfare. Therefore, a thorough investigation into mutual fund greenwashing would not only help investors make more informed fund selections but also assist policymakers in regulating

ESG-related delegated investments.

We define greenwashing funds as those that overstate their commitment to environmental and sustainability factors by extensively discussing these topics in shareholder reports while lacking substantial high-sustainability investments. Specifically, we focus on two dimensions: the level of ESG disclosure and actual ESG investments. Using BERT, a large language model, we quantify the intensity of ESG-related discussions (e.g., climate change, pollution, community relations, and business ethics) in a fund's shareholder reports. We assess actual ESG investments through the Morningstar Sustainability Rating of the fund's portfolio holdings. Funds are categorized as greenwashing if they exhibit ESG discussions above the median level but receive a sustainability rating below the median.

We apply this greenwashing measure to a comprehensive sample of domestic active equity funds from July 2018 to December 2023. To understand the motivations behind greenwashing, we first examine mutual fund fees, as mutual funds generate revenue by charging a corresponding percentage of assets under management. Given that investors with strong ESG preferences are often willing to pay a premium for ESG-related assets, we hypothesize that greenwashing funds may exploit this demand by charging higher fees.[1] Consistent with this hypothesis, our results show that greenwashing funds charge fees that are 9% higher than those of funds not associated with ESG.

Despite higher fees, greenwashing funds attract greater investor flows, receiving 3.6% more net flows annually than their counterparts, which translates to an additional $20 million in assets under management for the average mutual fund. These findings suggest that many investors may be misinformed and continue to invest in greenwashing funds despite their lack of substantial ESG investments.

We further examine investor responses to fund performance. Previous research

[1] For example, "The ESG premium might be more valuable than you realise," October 19, 2023, *Financial Times*.

documents a convex relation between flows and past performance among equity mutual funds (e.g., Chevalier and Ellison, 1997; Sirri and Tufano, 1998; Chen, Goldstein, and Jiang, 2010). In our setting, we find that the flow-performance convexity is even more pronounced for greenwashing funds. In particular, when these funds perform poorly, their investors exhibit a lower sensitivity to weak performance compared to investors in other funds. Thus, misled investors redeem fewer shares from greenwashing funds if these funds experience deteriorated performance more than other types of mutual funds.

Given the benefits of greenwashing without a genuine commitment to ESG investments, a natural question arises: why don't all funds engage in greenwashing? To address this question, we investigate the costs associated with greenwashing. Since our measure of greenwashing is derived from shareholder reports filed with the Securities and Exchange Commission (SEC), we examine whether the SEC identifies and responds to instances of greenwashing.[2] Interestingly, we find that greenwashing funds are more likely to receive ESG-related comment letters from the SEC, indicating that the SEC actively monitors ESG statements in the disclosures of these funds. Investors also react to the SEC's oversight, as greenwashing funds tend to experience net outflows after receiving comment letters.

However, this monitoring effect diminishes when the SEC faces an unexpected surge in workload. The increased likelihood of greenwashing funds receiving ESG-related comment letters largely disappears when the SEC staff needs to handle a high volume of irregular filings from other entities, such as Form 8-K. For this reason, our LLM-based approach may offer an alternative method to assist regulators in more effectively identifying greenwashing funds.

Since mutual fund disclosures contain forward-looking information that can predict

[2] In the corporate setting, Krueger, Sautner, Tang, and Zhong (2024) find that regulations on ESG disclosure improve the information environment and benefit capital market, suggesting an important role for regulators governing disclosure mandates.

future fund actions (Cao, Yang, and Zhang, 2023), it is possible that greenwashing funds intend to invest in high-ESG assets, even if they are not currently doing so. However, our findings rule out this possibility. First, we examine whether greenwashing funds shift toward ESG investments after receiving warnings from the SEC via comment letters. Rather than improving their actual ESG practices, these funds simply reduce the extent of their ESG disclosures. Greenwashing behaviors remain persistent, especially among riskier and more established funds. Furthermore, the likelihood of a greenwashing fund transitioning into a genuine ESG fund is less than 10%.

Finally, we evaluate the performance of greenwashing funds. The existing literature on ESG investments in the cross-section of stocks suggests that firms with lower carbon emissions often yield lower stock returns (Bolton and Kacperczyk, 2021; Pástor, Stambaugh, and Taylor, 2021), and high ESG-rated stocks tend to underperform during market downturns (Bansal, Wu, and Yaron, 2022). Given that greenwashing funds invest less in these lower-expected-return stocks, they may have room to allocate capital to other profitable investments, potentially justifying their higher fees and compensating investors with higher returns. However, an alternative explanation is that greenwashing managers lack the skill to pick quality ESG investments and merely use ESG disclosures to mislead investors. Our findings support the latter view: greenwashing funds consistently deliver lower risk-adjusted returns, both before and after fees. In addition, funds with poor prior returns or low Morningstar fund ratings are more likely to engage in greenwashing, suggesting a tendency toward unskilled management.

Our paper contributes to several strands of literature. First, it is related to the growing body of research on ESG preferences in fund investments. Prior studies have shown that ESG considerations influence both investors' fund-selection decisions and funds' investment strategies (e.g., Hartzmark and Sussman, 2019; Krueger, Sautner, and Starks,

2020; Chen and Dai, 2023; Raghunandan and Rajgopal, 2024). Analyzing funds signing the Principles for Responsible Investment (PRI), Gibson, Glossner, Krueger, Matos, and Steffen (2022), Kim and Yoon (2023), and Liang, Sun, and Teo (2022) find mutual funds and hedge funds with low ESG securities in the portfolios would attract large inflows. Emiris, Harris, and Koulischer (2024) find that regulations on ESG disclosures lead to strong flows into green funds. Andrikogiannopoulou, Krueger, Mitali, and Papakonstantinou (2023) and Dumitrescu, Gil-Bazo, and Zhou (2023) define greenwashing funds by comparing the text-based ESG prospectus and actual ESG holdings or ratings and find greenwashing funds attract more fund flows.[3] Different from these papers, we systematically examine greenwashing behavior in fund management, focusing on the trade-off between benefits — such as increased fees and flows — and costs associated with regulatory intervention. To our knowledge, this is the first paper to document a rise in management fees and regulatory costs in greenwashing funds.

Second, our paper contributes to the literature on misleading disclosures in the fund investment industry. Prior studies have documented return misreporting in hedge funds.[4] While mutual funds are generally not expected to manipulate returns due to stricter regulations than hedge funds, recent studies find that mutual funds also engage in discrepancies between their practices and disclosures in various areas such as risk-taking (e.g., Du and Wang, 2023; Sheng, Xu, and Zheng, 2024; Bonsall, Holzman, and Miller, 2024;

[3] Our study differs from these studies in several respects. First, prospectus and shareholder reports serve different purposes. A prospectus acts as an annual legal document to provide investors with certain information required by the SEC and often follows fixed formats such as investment objectives, investment strategies, risks, and fees. Shareholder report provides periodic updates on the fund's performance and activities over a six-month interval. The disclosure in shareholder reports studied in this paper is not subject to templates and contains more time-varying information, allowing managers to express their views with a large degree of freedom. Second, we propose a new LLM-based model that effectively identifies greenwashing funds. Third, in addition to flow, we consider higher fees and lower flow-performance sensitivity as other benefits of greenwashing. Finally, we explore the costs of greenwashing and attempt to understand the equilibrium of greenwashing activities in the fund industry.

[4] See, e.g., Bollen and Pool (2009); Agarwal, Daniel, and Naik (2011); Jorion and Schwarz (2014); Patton, Ramadorai, and Streatfield (2015); Chen, Cohen, and Gurun (2021); Cao, Da, Jiang, and Yang (2024).

Holzman, Marshall, and Schmidt, 2024). We uncover that mutual funds may strategically misreport ESG information to investors, and that investors fail to identify greenwashing funds. Given the heightened scrutiny from the SEC on ESG-related misreporting, our paper adds to this line of research on fund disclosures and regulatory oversight.[5]

Finally and more broadly, our paper is related to the literature on artificial intelligence (AI) in finance. We propose a novel method to detect greenwashing funds by leveraging recent advancements in large language models (Devlin, Chang, Lee, and Toutanova, 2019; Huang, Wang, and Yang, 2023). Recent studies by Cao, Yang, and Zhang (2023, 2024) apply machine learning to analyze mutual fund disclosures, finding that these disclosures reflect managers' private information and influence investor decisions. By applying AI techniques to fund reports, we show that greenwashing funds mislead investors through inaccurate ESG disclosures. Our findings underscore the potential of AI in finance to enhance transparency and support investors in making more informed decisions.

The rest of the paper is organized as follows. Section 2 provides institutional background and construction of data and variables. Section 3 discusses the benefits of greenwashing funds, while Section 4 studies the regulatory costs and corresponding real impacts on fund flows. Section 5 explores additional analyses, including future performance of greenwashing funds, institutional and retail investors' responses to greenwashing funds, and the determinants of greenwashing. Section 6 concludes.

## 2. Institutional Background and Data

In this section, we first provide the institutional background of greenwashing of mutual funds. We then describe the data and the measures of greenwashing funds. Finally, we

[5] "US SEC cracks down on funds 'greenwashing' with new investment requirement," Douglas Gillison and Michelle Price, September 20, 2023, *Reuters*.

summarize the main variables used in our empirical analysis.

### 2.1. Mutual Fund Discussions on ESG

We retrieve mutual funds' shareholder reports from N-CSR (certified annual shareholder reports for management investment companies) and N-CSRS (certified semi-annual shareholder reports for management investment companies) filings on the SEC's Electronic Data Gathering, Analysis, and Retrieval (EDGAR) website. Mutual funds must electronically file Form N-CSR (we use N-CSR to represent both N-CSR and N-CSRS filings hereafter) to the SEC within 10 days of sending shareholder reports to their investors. In addition to shareholder reports, an N-CSR filing also includes its portfolio holdings as well as templated items such as the code of ethics. In our study, we exclude boilerplate items and only focus on Item 1 of N-CSR: the shareholder report because it includes the narrative discussion from managers and contains valuable information. For example, Cao, Yang, and Zhang (2023) find that the managerial discussions in shareholder reports predict mutual fund risk-taking and performance. The discussions in the shareholder reports vary over time and do not follow any fixed templates.

Because of the unstructured nature of textual data, we employ a large language model, Bidirectional Encoder Representations from Transformers (BERT) from Google, developed by Devlin, Chang, Lee, and Toutanova (2019) to understand the narrative discussions by mutual fund managers. In order to identify discussions related to ESG, we use a fine-tuned version of BERT by Huang, Wang, and Yang (2023) that classifies each sentence as ESG or non-ESG.[6] Huang, Wang, and Yang (2023) fine-tune the original BERT on corporate annual and quarterly filings, financial analyst reports, and earnings conference call transcripts to

[6] The relevant topics of "Environmental" include Climate Change, Natural Capital, and Pollution & Waste. "Social" includes Human Capital, Product Liability, and Community Relations. "Governance" includes Corporate Governance and Business Ethics & Values.

make FinBERT well-suited for financial contexts. The training samples are financial analyst reports labeled by researcher. They document that FinBERT achieves 89.5% accuracy in classifying ESG discussions and outperforms other machine learning algorithms such as Google's BERT, random forecasts, convolutional neural networks, and long short-term memory.

We next aggregate the discussions from the sentence level to the shareholder report level. Specifically, we count the number of sentences that are classified as ESG and divide it by the total number of sentences in the shareholder report. This ratio measures the extent to which a mutual fund discusses ESG topics in its disclosure.

### 2.2. Mutual Fund Sustainability Rating

To access actual sustainable practice, we obtain mutual funds' ESG ratings from Morningstar Sustainability Rating (scaled from one to five), which evaluates ESG factors at the portfolio level. For example, a fund with a higher rating holds portfolio firms with lower ESG risks and better ESG management. The Morningstar Sustainability Rating is issued on a monthly basis and is defined as the weighted average of the trailing twelve months of an asset-weighted average of Sustainalytics' company-level ESG Risk Rating. [7] Morningstar begins the coverage of Sustainability Rating in 2018. Therefore, the sample period of our study is from 2018 to 2023.

### 2.3. Classification of Greenwashing Funds

Greenwashing is the act of exaggerating the extent to which products or services take into account environmental and sustainability factors. Funds that engage in greenwashing may exaggerate or overstate the environmental and sustainability practices or factors

[7] The complete methodology for the calculation of Morningstar Sustainability Rating can be found at https://www.morningstar.com/content/dam/marketing/shared/research/methodology/744156_Morningstar_Sustainability_Rating_for_Funds_Methodology.pdf

considered in their investment portfolios while marketing themselves as ESG funds so that investors find it difficult to distinguish them from funds that truly exploit environmental and sustainability strategies.[8] The SEC's definition of greenwashing has two dimensions: ESG considerations and ESG practices.

To evaluate to what extent a fund is involved in ESG consideration, we rely on the intensity of ESG topics constructed in Section 2.1. If the ESG discussions in the most recent shareholder report are higher than the median of the cross-section, investors would expect them to invest more in sustainable assets.

On the second dimension, we assess how well a mutual fund commits to ESG practices by comparing the fund's Morningstar Sustainability Rating with the rating across all funds in the cross-section. A higher rating illustrates a more disciplined commitment to sustainable investments.

We partition all mutual funds into four groups based on the discussion and the rating. A "Greenwashing" fund has a higher-than-median discussion but a lower-than-median sustainability rating; that is, a greenwasher overstates in the shareholder report with potentially misleading information to the investors but does not exert actual investments in securities with high sustainability. In contrast, a "Walk-and-talk" fund has a higher-than-median discussion and a higher-than-median sustainability rating, suggesting that it attracts ESG-aware investors by committing to sustainable assets.

We label the third group of funds as "Ad-indifferent," which actively invest in ESG securities but maintain a conservative level of ESG discussion in their disclosures. Managers of ad-indifferent funds are ESG-aware but may seek to attract a broad investor base or be concerned about ESG-related risks, such as regulatory risks associated with sustainability

[8] The SEC alters the features of ESG funds and greenwashing funds; see https://www.investor.gov/introduction-investing/general-resources/news-alerts/alerts-bulletins/investor-bulletins-1.

investments. Lastly, those with lower-than-meidan ESG discussions and lower-than-median sustainability ratings are labeled as "Non-ESG." [9] Thus, our study compares "Greenwashing" funds with the other three types of mutual funds in the empirical analyses.

### 2.4. Mutual Fund Variables

Our mutual fund data come from Morningstar from July 2018 to December 2023, including monthly net and gross returns, monthly total net assets under management (TNA) at the share-class and fund levels, fund-level estimated net flows, annual adjusted expense ratios, annual turnover ratio, Morningstar three-year fund ratings, the flag for the institutional share class, and the investment objectives presented in the fund prospectus. We estimate the Fama-French six-factor alpha in a 36-month rolling window, where the factors and the risk-free interest rate are from Ken French's website. The fund risk is calculated as the standard deviations of monthly net returns over the past three years. Fund-level characteristics include Fama-French six-factor alpha (*FF6 Alpha*), log of fund-level assets under management (*TNA*), the age of the oldest share class within the fund (*Age*), the three-year standard deviation of fund net returns (*Risk*), the fund-level net flow (*Flow*), annual adjusted expense ratio from prospectus (*Fee*), and annual turnover ratio (*Turnover*).

Based on investment objectives, we focus on domestic active equity funds. We eliminate index funds, exchange-traded funds, target-dated funds, fund of funds, and funds specializing in other asset classes. We aggregate share classes into a single fund using their lagged TNA and remove funds with end-of-month TNA less than $1 million

[9] We conduct robustness checks in the Internet Appendix using alternative ESG ratings and different thresholds for defining greenwashing to ensure that the findings are not sensitive to the specific measures used. Specifically, we partition ESG disclosure and investments into terciles, quartiles, or quintiles and also collect fund disclosures and ratings on environmental topics. In light of changes in the measurement of the Morningstar Sustainability rating, we also compare ratings with sample medians each month. We also use the raw value of ratings and disclosure. The results remain qualitatively strong and significant. Note that the correlation between average ESG rating and average ESG disclosure is about 0.02, suggesting that the two dimensions are mutually independent in identifying different types.

and less than one year from the inception dates. To merge with information from funds' shareholder disclosure, we require the CIK identifier in the Morningstar to be non-missing.

Our final sample consists of 2,782 unique active equity mutual funds with 117,515 non-missing fund-month level observations. We winsorize all unbounded variables at the 1% and 99% levels. Panel A of Table 1 provides the summary statistics of our sample. About 36% of observations belong to greenwashing funds, while 17% are walk-and-talk funds.

[Insert Table 1 Here]

An average mutual fund is about 22 years old, yields 0.7% net returns but -0.07% Fama-French six-factor *Alpha* per month, receives a median level of Morningstar fund ratings (of three stars), manages $547 million of assets, charges 92 basis points (bp) of annual adjusted expenses, faces 0.68% outflows per month, and generates a 68% turnover rate per year. Panel B compares the sample mean levels of these fund characteristics between greenwashing and non-greenwashing funds. It turns out that greenwashing funds significantly differ from the other three types of funds. For example, greenwashing funds are more risky, with past three-year return volatility being 5.1% versus 4.9% among non-greenwashing ones. The annual expense ratio is also significantly larger (95 bp versus 90 bp), suggesting that funds may profit from high fee charges.

[Insert Figure 1 Here]

We further illustrate the magnitudes of annual adjusted expense ratios across all four types of mutual funds. In Figure 1, we plot the average expense ratio by fund type. Notably, a non-ESG-related mutual fund charges 86 bp per year, significantly below the fee charged by greenwashing (94 bp) or walk-and-talk funds (93 bp). Investors generally

favor mutual funds that advocate ESG practice and advertise for ESG considerations, that is, the walk-and-talk funds, and are willing to pay higher fees to support sustainability investment. However, it is difficult for investors to distinguish them from greenwashing funds since investors pay similar fees to greenwashing funds.

Given the recent trend of fee decreasing, we investigate whether the expense ratios of four types of funds significantly plunge and whether greenwashing funds no longer deceive investors by charging higher than average fees. It turns out that all funds witness a drop in annual expense ratios, particularly among non-ESG funds. Greenwashing funds, however, remained at a similar level as walk-and-talk funds since 2020 and even presented a higher fee charge in 2023.

## 3. Why Funds Greenwash? The Benefits and Incentives of Greenwashing

In this section, we explore the incentives driving greenwashing. We focus on charged fees and fund flows, which directly impact managerial compensation. Additionally, we explore flow-performance sensitivity to further understand investor response.

### 3.1. Do greenwashing funds charge higher fees?

Mutual fund managers receive compensation based on the fees they charge to investors. To understand why funds greenwash, we start our analysis with mutual fund expense ratios, as mutual funds generate revenue by charging fees as a percentage of assets under management. We hypothesize that funds engaging in greenwashing exploit the demand from ESG-aware investors by imposing higher costs, as these investors are willing to pay a premium for ESG investments. Specifically, we regress the following equation:

$$Fee_{i,t+1} = \beta \times Greenwashing_{i,t} + \gamma \times Controls_{i,t} + FE + \varepsilon_{i,t+1} \tag{1}$$

where $Fee_{i,t+1}$ is the one-period-ahead adjusted expense ratio, expressed in basis points. Since mutual funds generally disclose their expense ratios annually, we use one-year-ahead annual expense ratios and intraplate into the monthly frequency in the current year to avoid look-ahead bias. *Greenwashing* is an indicator variable equal to one for a greenwashing fund and zero otherwise, where a greenwashing fund has low Morningstar sustainability ratings but high ESG disclosures. *Controls* include *FF6 Alpha* (*Star rating* or *Net return*), *TNA*, *Age*, *Risk*, *Flow*, and *Turnover*. We include time-varying investment style fixed effects in all regressions and cluster standard errors at the style level. The investment style is based on the investment objectives listed in the fund prospectus.

[Insert Table 2 Here]

Table 2 presents the results using different performance measures as the control variables. Column (1) has no control. The findings show that greenwashing funds charge at least 3.3 basis points (bp) higher fees than the other mutual funds. The estimated difference ranges from 2.10 bp to 2.14 bp with three different fund performance measures and other control variables in Columns (2) to (4).

Figure 1 illustrates that the average fee charge is 90 bp, suggesting that funds engaging in greenwashing activities collect at least 3% more in management and other fees compared to otherwise funds with similar fund size, equivalent to an additional $180,517 in profits collected from fund investors annually. The disparities in the expense ratios are especially detrimental to long-term investors, such as those with pension accounts. For instance, investors holding greenwashing funds in their portfolios would have to pay an extra $4.0 million over the next twenty-two years if they were to buy and hold, which is the average age of mutual funds in our sample. Compared with non-ESG funds, greenwashing funds charge 9% higher fees than these peers.

Moreover, according to the bottom panel in Figure 1, the average fee charged by greenwashing funds decreased from 100 bp in 2018 to less than 90 bp in 2023. However, the fee for non-ESG funds decreased by 20 bp in the same period. The estimated 3.3 bp accounts for at least one-third of the differences.

The estimated magnitude and signs of other control variables are consistent with previous findings documented in the literature. For example, a smaller, more risky fund tends to incur higher fees. Our findings remain robust when considering alternative combinations of style and year-fixed effects and when using double-clustered standard errors at the investment style and year levels.

### 3.2. Do greenwashing funds attract greater flows from investors?

Active mutual funds have been charging lower fees in recent years due to the rise of passive investing and heightened sensitivity to costs. Investors are likely to opt for the fund with lower fees when comparing two otherwise identical funds. However, ESG investments represent a unique case because they require specialized skills and dedicated efforts from fund managers and, therefore, genuine ESG fund managers can justify the higher fees they charge. In other words, investors would be willing to pay an ESG premium and still invest in "Walk-and-talk" funds. On the other hand, investors *should* avoid greenwashing funds, which lack substantive ESG integration and cannot justify the high fees. To this end, we examine whether investors can recognize whether funds engage in actual ESG investment.

We use the following regression to explore the relationship between fund flows and greenwashing:

$$Flow_{i,t+1} = \beta \times Greenwashing_{i,t} + \gamma \times Controls_{i,t} + FE + \varepsilon_{i,t+1} \tag{2}$$

where $Flow_{i,t+1}$ is one-month-ahead net flows (%) for fund $i$. The definitions of $Greenwashing_{i,t}$ and $Controls_{i,t}$ are the same as Eq. (1). We include the time-varying investment style fixed effects in all regressions and calculate the standard errors by clustering at the style level.

[Insert Table 3 Here]

In Table 3, we present the estimated results using different combinations of control variables. We find that greenwashing funds attract 0.31% more net flows every month than non-greenwashing funds in Column (1), equivalent to an annual net flow of 3.72%. This estimated magnitude is an economically significant increase in fund flows among greenwashing funds, considering that the $75^{th}$ percentile of monthly fund flow is 0.19%. Moreover, greenwashing funds attract more monthly fund flows than other funds between 0.15% to 0.21% (equivalent to 1.80% to 2.52% annually) with different control variables in Columns (2) to (4). In particular, our results are not driven by the autocorrelation in fund flows using the current level of flows.

The high net flows provide the average greenwashing funds with an additional $1.7 million in assets under management compared to other funds. Considering that greenwashing funds also charge 3.3 bp higher expense ratios, both sources of benefits deliver at least $181,077 per year. Notably, for long-term investors, compounding interests enlarge the benefits for mutual funds, or disadvantages for fund investors, by 4.3 million dollars for a 22-year holding period.

The increase in flows to greenwashing funds contradicts two well-documented investor behaviors: the aversion to high-fee funds and the preference of ESG-aware investors for funds with ESG commitments. If investors support ESG themes, funds charging higher fees with low ESG ratings should not attract capital.

These findings suggest that investors may have been misled by the ESG disclosures provided by mutual funds. As a result, investors continue to invest in greenwashing

funds, even though these funds lack substantial ESG investments. The corollary is that investors cannot effectively distinguish greenwashing funds from genuine ESG funds, creating perverse incentives for funds to engage in greenwashing and take advantage of investor demand for ESG products. Hence, greenwashing funds benefit from higher expense ratios and increased net inflows even without *de facto* ESG investments.

### 3.3. Do greenwashing funds suffer from negative performance?

Our findings on expense ratios and fund flows reveal that investors are misinformed, leading to the misallocation of capital toward funds that engage in greenwashing practices. This misallocation generates market inefficiencies within the fund industry and undermines long-term recognition of ESG issues. In particular, fund managers involved in greenwashing face less accountability for poor performance in ESG-related investments. Thus, we examine how fund flows respond to the performance of greenwashing funds compared to their non-greenwashing counterparts.

Specifically, we estimate the sensitivity of flows to past performance using the following regression:

$$\begin{aligned} Flow_{i,t+1} &= \beta \times Performance_{i,t} \times D(Performance_{i,t} < 0) + \beta_1 \times Performance_{i,t} \\ &\quad + \beta_2 \times D(Performance_{i,t} < 0) + \gamma \times Controls_{i,t} + FE + \varepsilon_{i,t+1} \end{aligned} \tag{3}$$

where $Flow_{i,t+1}$ is the one-month-ahead net flows for fund $i$. $Performance$ is the fund level performance measure, including (1) $FF6Alpha$, defined as the Fama-French six-factor alpha estimated in a 36-month rolling window by regressing excess fund net returns on the six factors, including the excess market returns, size, value, profitability, investment, and momentum factors, and (2) the market-adjusted net return, $Net\ return_{i,t} - Market\ return_t$,

the difference between the funds' net returns and the market returns. $D(Performance < 0)$ is an indicator equal to one if the performance measure is negative and zero otherwise. The coefficient of the interaction, $\beta$, captures the asymmetry in the flow-performance sensitivity. Control variables include one-month lagged *Flow*, *TNA*, *Age*, *Risk*, *Fee*, and *Turnover*. We include the time-varying investment style fixed effects in all regressions and calculate the standard errors by clustering at the style level.

Investors can redeem their shares at the fund's net asset value. When experiencing substantial outflows, funds need to adjust their portfolios by executing costly and potentially unprofitable trades, which can adversely impact future performance. Empirically, if the flow-performance sensitivity is lower in the weak performance regime than in the well-performing regime, mutual funds benefit from such a convex relation. The convex sensitivity reduces the pressure on funds during downturns, providing a buffer against outflows.

[Insert Table 4 Here]

We compare the flow-performance sensitivity between greenwashing and non-greenwashing funds using Fama-French six-factor alphas in Columns (1) and (2) of Table 4. A positive and significant $\beta_1$ on *Performance* across all specifications confirms a positive relation between past performance and future fund flows. The negative coefficient $\beta_2$ on the indicator of the negative performance indicates a convex relation, consistent with prior research (e.g., Chevalier and Ellison, 1997; Sirri and Tufano, 1998; Chen, Goldstein, and Jiang, 2010).

More importantly, the flow-performance convexity is more pronounced for greenwashing funds: the coefficient $\beta$ on the interaction term is negative and significant for greenwashing funds but insignificant for non-greenwashing ones. Among underperforming funds, the sensitivity to a decline in the alpha of greenwashing funds is lower

(1.93 − 0.77 = 1.16%), in contrast to the high sensitivity of flows out of non-greenwashing funds to a decrease in their alpha (1.39 − 0.18 = 1.21%). In terms of economic magnitude, for a one percent decrease in alpha of greenwashing versus non-greenwashing funds, share redemption increases by about 1.44% and 1.59%; equivalently, the outflow is up to $7.67 million and $8.77 million. A one percent increase in alpha attracts 1.93% and 1.39% more inflow to greenwashing versus non-greenwashing funds; that is, $10.25 million and $7.69 million cash inflows.

This suggests that weak-performed greenwashing funds do not suffer as much as non-greenwashing funds from investor's share redemption. In other words, when these funds perform poorly, their investors exhibit lower sensitivity to weak performance compared to investors in other funds. Columns (3) and (4) show similar results using market-adjusted net return as the performance measure. The differences between $\beta$s using Fama-French six-factor alphas in Columns (1) and (2) and using market-adjusted returns in Columns (3) and (4) are both statistically significant at least 10% level.

Overall, our findings in this section and Section 3.2 suggest that investors not only allocate their capital toward greenwashing funds but also exhibit stickiness in their investment, with reduced redemption during periods of underperformance and greater purchases when funds perform well. This implies that investors trust ESG claims and lack awareness about greenwashing. However, greenwashing funds benefit from the misallocation of capital at the cost of investors. These distortions undermine the efficient allocation of resources, as capital remains in funds that may not deliver committed value financially or socially.

## 4. The Costs of Greenwashing

Given the benefits of greenwashing in Section 3, a natural question is why not all funds greenwash. Therefore, we investigate the costs of preventing greenwashing. Since our measure of greenwashing is derived from shareholder reports filed with the SEC, we examine whether the SEC scrutinizes misstatements regarding ESG-related topics and whether investors penalize funds once they recognize their delegated money managers engage in greenwashing practices.

To emphasize the efficiency of the regulatory oversights, we analyze whether greenwashing funds become less misleading following the regulatory intervention by increasing holdings of high-ESG-rated securities or reducing misleading information in shareholder disclosures. This analysis provides insights into the efficiency of regulatory inquiries in curbing greenwashing and promoting transparency in ESG investments.

### 4.1. The regulatory costs from the SEC

Greenwashing funds' misleading sustainability investments, such as exaggerating the extent to which their portfolio choices take into account ESG practices, make it challenging for investors to differentiate these funds from those that indeed implement environmental and sustainability strategies.

The prevalence of greenwashing funds has drawn policymakers' attention. The SEC has been exploring mechanisms to combat greenwashing and enhance the transparency and accuracy of fund disclosure related to environmental and sustainability issues in the mutual fund industry.

The Division of Investment Management oversees investment companies, including mutual funds, and ensures compliance with applicable regulation and disclosure require-

ments. Its Disclosure Review and Accounting Office (DRAO) is responsible for reviewing shareholder reports and other filings, such as prospectuses and proxy statements, for mutual funds. It helps ensure that investors have the information they need to make informed investment decisions.

When DRAO identifies potentially material deficiencies in disclosures or requests clarifications to avoid misleading information, it issues a comment letter to the fund and outlines questions and concerns. The letters draw immediate attention from the fund management, and the fund manager is typically expected to respond within ten business days.[10] A recent study by Du and Wang (2023) shows that comment letters reduce subsequent misconduct by mutual fund companies, and future disclosures become longer and more conservative after receiving comment letters. Since the majority of mutual funds have received comment letters from the SEC, we focus on ESG and sustainability-related letters in our setting.

To identify these letters, we search for ESG-related keywords in the main context of all comment letters obtained from Audit Analytics, such as "environment," "sustainable," and "ESG." We then examine the probability of receiving in the future for greenwashing funds using the following regression,

$$Comment\ Letter_{i,t+1\to t+T} = \beta \times Greenwashing_{i,t} + \gamma \times Controls_{i,t} + FE + \varepsilon_{i,t+1\to t+T} \tag{4}$$

where $Comment\ Letter_{i,t+1\to t+T}$ is an indicator variable equal to one if a fund receives ESG-related comment letters from SEC from $t+1$ to $t+T$, and zero otherwise, expressed in percentage points. We examine two horizons where $T$ equals one (next month) or six (next six months). *Greenwashing* is an indicator variable equal to one for a greenwashing fund

[10] Fund managers can request an extension from the SEC when additional time is required. The SEC grants extensions if managers provide justified reasons.

and zero otherwise, where a greenwashing fund has low Morningstar sustainability ratings but high ESG disclosures. Control variables include *FF6 Alpha*, *TNA*, *Age*, *Risk*, *Flow*, *Fee*, and *Turnover*. Since comment letters are issued at the filing entity level (i.e., CIK level), we adopt two sets of fixed effect combinations: (1) CIK and time-varying investment style fixed effects and (2) fund and month fixed effects. We calculate the standard errors by clustering at the style level.

[Insert Table 5 Here]

Columns (1) and (2) in Table 5 report the probability of a greenwashing fund receiving a comment letter in the next month. We find that the SEC inquires about a greenwashing fund about ESG issues with a 0.7% to 0.8% higher unconditional probability than the other funds. Given that the fraction of ESG-related comment letters is small (4.5% among all mutual funds), the estimated probability represents at least 15% to 18% more comment letters issued from the SEC. Moreover, the likelihood of receiving comment letters is more pronounced when we extend the horizon to six months ahead in Columns (3) and (4). The increases in the likelihood are robust with different fixed effects. These findings document a *direct* regulatory cost from the SEC's scrutiny.

### 4.2. The impacts of the regulatory costs

The comment letters result in heightened compliance costs and potential reputational impacts for funds. Hence, we investigate whether these regulatory costs diminish the benefits documented in Section 3. That is, whether these funds face money outflows after being scrutinized by the SEC.

We examine the fund flows from investors after funds receive ESG-related comment letters. We regress cumulative fund net flows from $t+1$ to $t+T$ on the interaction term of

greenwashing and the indicator variable for receiving comment letters in the following specification:

$$\begin{aligned} Flow_{i,t+1\to t+T} &= \beta \times Greenwashing_{i,t} \times Comment\ Letter_{i,t} \\ &\quad +\gamma \times Controls_{i,t} + FE + \varepsilon_{i,t+1\to t+T} \end{aligned} \tag{5}$$

where $Flow_{i,t+1\to t+T}$ is the cumulative fund flows from month $t+1$ to $t+T$. We consider the next month and six-month future horizons. *Comment Letter* is an indicator variable equal to one if a fund receives ESG-related comment letters from the SEC and zero otherwise. *Greenwashing* is an indicator variable equal to one for a greenwashing fund and zero otherwise, where a greenwashing fund has low Morningstar sustainability ratings but high ESG disclosures. Control variables include *FF6 Alpha*, *TNA*, *Age*, *Risk*, *Flow*, *Fee*, and *Turnover*. We include the CIK and time-varying investment style fixed effects in all regressions and calculate the standard errors by clustering at the style level.

Because investors of greenwashing funds tend to be sticky in their future asset allocation, as documented in Section 3.3, we partition mutual funds into quintiles based on the current absolute value of fund flows and examine how investors respond to SEC scrutiny. If an investor pays more attention to the fund she invests in, such regulatory inquiries should impact their allocation. Thus, investors of a fund with an absolute net flow in the top quintile would respond to regulatory costs more promptly than investors of a fund with little capital flow in the bottom quintile.

[Insert Table 6 Here]

Table 6 presents the estimation results using Eq. (5). For greenwashing funds with high flows, their investors recognize the reputational impacts and withdraw their capital from funds. The economic magnitude is also large. For example, a greenwashing fund receiving

a comment letter suffers at least 1.7% outflows in the next month or 5.8% net outflows in the subsequent six months (Columns (1) and (2)). Since the 75$^{th}$ percentile of flow is only 0.19%, regulatory costs' real impact is economically significant in the top flow quintile.

Our real impacts of the regulatory costs suggest that a more "popular" greenwashing fund with SEC inquiries may face more loss or redemption pressure. The results are also consistent with the recent observation of "running away" from ESG funds since 2023 as investors are increasingly concerned about greenwashing activities.[11]

On the other hand, this effect is less pronounced for funds with low existing flows (Columns (3) and (4)), likely because their investors are sticky in capital reallocation. This underscores the importance of raising investor awareness about greenwashing and holding funds accountable for engaging in such practices.

In short, the regulatory costs inherited from comment letters issued by the SEC to greenwashing funds cast real impacts on mutual funds. Investors regard such regulatory costs as a negative signal for inconsistency with ESG considerations and punish the mutual fund by redeeming shares in the future.

### 4.3. Efficiency of issuing comment letters: When the SEC is busy with filing oversights

Recent studies document the relation between the constraints among the SEC staff and the issuance of corporate comment letters from the SEC (Bonsall, Holzman, and Miller, 2024; Holzman, Marshall, and Schmidt, 2024). Due to the periodic pattern of corporate filings (e.g., 10-K and 10-Q), Gunny and Hermis (2020) measure the busyness of SEC staff as the period with voluminous filings. Ege, Glenn, and Robinson (2020) count the number of filings and regress on the lagged numbers. They use the regression residual to evaluate

[11] For example, "U.S. Sustainable Funds Register First Annual Outflows in 2023," Alyssa Stankiewicz, January 17, 2024, *Morningstar*; "Global ESG Funds Hit With Outflows for First Time in Q4 (2023)," Hortense Bioy, February 2, 2024, *Morningstar*. Note that comment letters do not directly have impacts on fund flows unless conditional on being greenwashing.

how constrained SEC staff is and how difficult they are to review disclosures in detail.

Mutual funds are subject to numerous regulatory requirements designed to protect investors and ensure proper fund management, such as liquidity risk management, limitations of leverage use, and disclosure obligations. It requires significant monitoring efforts from the SEC. Therefore, the regulatory costs may diminish when SEC staff is constrained.

We construct the measure of SEC staff constraint based on the number of irregular filings. If the SEC staff unexpectedly reviews a large volume of documents, it is less likely to uncover misleading materials in shareholder reports. Thus, a greenwashing fund may "survive" from SEC oversights and does not receive a comment letter.

To construct this measure, we first detrend the number of irregular filings from 2005 to 2023. SEC began adding the comment letter to its toolkit in August 2004. We regress the number of letters on a series of numbers representing the year-month series up to the current month to avoid lookahead bias. The regression residual is the detrended measure. Then, we subtract the historical average of the detrended residual as the detrended-demeaned series of the number of irregular filings.

[Insert Figure 2 Here]

Figure 2 shows the raw and detrended-demeaned time series of the number of all and irregular comment letters. From the top left panel, the number of all letters is stable around the quadratic fitted line, with a few peaks after market turmoil in 2008 and 2020. Yet, the number of irregular filings in the bottom left panel is more volatile with a large strike around the 2008 financial crisis. After the process of detrending and demeaning, the number of irregular filings is less volatile, but there are still months with more filings than others. Thus, our measure of SEC constraint, *Unexpected Busyness*, is the time-series

indicator variable equal to one if the detrended-demeaned number of irregular filings is greater than the top quintile from 2018 to 2023. We find that 19% of months are classified as busy times for the SEC staff.

Next, we examine whether unexpected busyness from the SEC weakens the regulatory costs for greenwashing funds.

$$\begin{aligned} \textit{Comment Letter}_{i,t+1\to t+T} &= \beta \times \textit{Greenwashing}_{i,t} \times \textit{Unexpected Busyness}_{t} \\ &\quad +\gamma \times \textit{Controls}_{i,t} + FE + \varepsilon_{i,t+1\to t+T} \end{aligned} \tag{6}$$

where $\textit{Comment Letter}_{i,t+1\to t+T}$ is an indicator variable equal to one if a fund receives ESG-related comment letters from the SEC from $t+1$ to $t+T$, and zero otherwise. *Greenwashing* is an indicator variable equal to one for a greenwashing fund and zero otherwise, where a greenwashing fund has low Morningstar sustainability ratings but high ESG disclosures. Control variables include *FF6 Alpha*, *TNA*, *Age*, *Risk*, *Flow*, *Fee*, and *Turnover*. We include two sets of fixed effects as in Eq. (4) and calculate the standard errors by clustering at the style level.

[Insert Table 7 Here]

Table 7 presents the estimation results. A greenwashing fund is less likely to be scrutinized with ESG issues when the SEC staff are busy with too many filings. In particular, the probability decreases by 0.78% due to unexpected busyness, making the net effects of receiving a comment letter in the next month among greenwashing funds decrease to 0.06% or 0.1% (i.e., $0.84 - 0.78$ or $1.01 - 0.91$), compared to the likelihood being 0.8% to 1% in other months. In Figure 2, the SEC staff generally become much busier after market turmoil, for example, the COVID-19 pandemic. Our result is consistent with the

observation that the cases of greenwashing increased after 2020, and the SEC spent effort to create new toolkits for regular ESG funds.

In summary, the monitoring effect in Section 4.1 almost disappears when the SEC faces an unexpected surge in workload. To this end, our LLM-based approach offers an alternative approach to help regulators more effectively identify greenwashing funds, particularly when human resources are constrained.

### 4.4. How greenwashing funds respond to comment letters

Since mutual fund disclosures contain forward-looking information that can predict future fund actions (Cao, Yang, and Zhang, 2023), it is possible that greenwashing funds intend to invest in high-ESG assets in the future. In this section, we first explore the persistence of greenwashing. Next, we examine whether greenwashing funds shift towards ESG investments after receiving warnings from the SEC via comment letters.

[Insert Figure 3 Here]

Figure 3 presents that the status of greenwashing is persistent for at least twelve months. For example, after about six months, there are still more than 60% of greenwashing funds remain greenwashing, around 20% of them reduce ESG disclosures while only a small fraction turns into walk-and-talk. In other words, less than ten percent of greenwashers endeavor to invest in high-ESG-rated securities, given their intense discussions on ESG topics in recent shareholder reports.

Next, we study how effective the regulatory costs are in disciplining greenwashing funds and improving their greenness in the future. To assess whether the regulatory costs contribute to less greenwashing and more walk-and-talk, we regress future types of mutual funds on an interaction of the greenwashing and the dummy of receiving comment letters,

which estimates how the future status of a greenwashing fund responds to comment letters. The specification is as follows:

$$\begin{aligned} Fund\ Type_{i,t+T} &= \beta \times Greenwashing_{i,t} \times Comment\ Letter_{i,t} \\ &\quad + \gamma \times Controls_{i,t} + FE + \varepsilon_{i,t+T} \end{aligned} \tag{7}$$

where $Fund\ Type_{i,t+T}$ represents a fund $j$ being *Greenwashing* or *Walk-and-talk* in month $t+T$, for $T = 1, 2, \cdots, 12$. We adopt the same controls as in Eq. (4) and time-varying style fixed effects. The standard errors are clustered at the style level.

[Insert Figure 4 Here]

The top two panels of Figure 4 plot the estimated coefficients in Eq. (7) for the next twelve months. The Left panel indicates that the greenwasher significantly reduces greenwashing after receiving comment letters for the next twelve months. However, they do not transmit into the walk-and-talk funds (Right panel), which both invest in high-ESG-rated securities and accurately discuss relevant topics in the shareholder report.

To further understand which aspects of a greenwashing fund have changed during the SEC scrutinization, we decompose funds along the Morningstar sustainability ratings and the ESG disclosures. We replace the dependent variable in Eq. (7) with a high-rating dummy and a high-discussion dummy in the next $T$ months. The high-rating dummy, *High ESG Rating*, equals one if the Morningstar Sustainability Rating of fund $i$ is higher than the sample median and zero otherwise. Similarly, the high-discussion dummy, *High ESG Disclosure*, compares the number of ESG-related topics mentioned in the shareholder report with the sample median.

The bottom panels of Figure 4 show the different future reactions in terms of investing in green assets (Left panel) and discussing greenness in the disclosure (Right panel).

Greenwashing funds actively reduce their discussion about ESG-related topics in the future. For example, the probability of higher-than-median disclosure reduces by 5% in the next twelve months. However, the increase in the accuracy of statements about ESG considerations does not align with the increase in trading ESG securities. In the next twelve months, greenwashing funds make no statistical improvement in their ESG ratings. In other words, greenwashers only unmask themselves as non-ESG funds instead of contributing to environmental and sustainability strategies.

With the SEC's increasing effort to help investors distinguish greenwashing funds via comment letters and even legislative charges, our findings present supportive evidence of the effectiveness of SEC scrutiny. However, although greenwashing funds respond to the warnings from the SEC, these funds simply reduce the extent of their ESG disclosures rather than improving their actual ESG practices.

## 5. Additional Analyses

### 5.1. Do greenwashing funds perform well?

In this section, we assess the performance of greenwashing funds. The existing literature on ESG investing in the cross-section of stocks suggests that firms with lower carbon emissions often exhibit lower stock returns (Bolton and Kacperczyk, 2021; Pástor, Stambaugh, and Taylor, 2021), and high ESG-rated stocks tend to underperform during market downturns (Bansal, Wu, and Yaron, 2022). Given that greenwashing funds allocate less capital to these lower-expected-return stocks, they might have the flexibility to invest in other profitable opportunities, potentially justifying their higher fees. On the other hand, it is possible that greenwashing fund managers lack the skill to select quality ESG investments and instead rely on ESG disclosures to mislead investors.

To measure future fund performance, we first regress excess fund returns on the

Fama-French six factors, including the excess market returns, size, value, profitability, investment, and momentum factors, in a 36-rolling window, $t-35, \cdots, t$,

$$\begin{aligned} Return_{i,t} - r_{f,t} &= \beta^1_{i,t} \times MKT_t + \beta^2_{i,t} \times SMB_t + \beta^3_{i,t} \times HML_t + \beta^4_{i,t} \times RMW_t \\ &+ \beta^5_{i,t} \times CMA_t + \beta^6_{i,t} \times MOM_t + \epsilon_{i,t} \end{aligned}$$

where $Return_{i,t}$ and $r_{f,t}$ are fund (gross or net) returns and the risk-free interest rate. Fama-French six factors are represented by *MKT*, *SMB*, *HML*, *RMW*, *CMA*, and *MOM*, respectively. We store the estimated risk factor loadings, $\{\beta^k_{i,t}\}^6_{k=1}$, up to the current month $t$. Then, we calculate the fitted intercept, $\widehat{\alpha}$, for the next $T$ months, i.e., $\{\widehat{\alpha}_{i,t+1}, \cdots, \widehat{\alpha}_{t+T}\}$. Lastly, we define the future performance from $t+1$ to $t+T$ as the average, $Alpha_{i,t+1\to t+T} = \frac{1}{T}\sum_{\tau=1}^{T} \widehat{\alpha}_{t+\tau}$. To assess greenwashing funds' future performance, the specification is

$$Future\ Alpha_{i,t+1\to t+T} = \beta \times Greenwashing_{i,t} + \gamma \times Controls_{i,t} + FE + \varepsilon_{i,t+1\to t+T} \tag{8}$$

where the evaluation horizons of fund performance are six- and twelve-month, i.e., $T = 6,\ 12$. *Greenwashing* is an indicator variable equal to one for a greenwashing fund and zero otherwise, where a greenwashing fund has low Morningstar sustainability ratings but high ESG disclosures. Control variables include *FF6 Alpha*, *TNA*, *Age*, *Risk*, *Flow*, and *Turnover*. Since we document that greenwashing funds charge higher fees, which might mechanically lead to lower net-of-fee returns, we consider alpha calculated using both net and gross returns to isolate the impacts of expenses.

[Insert Table 8 Here]

Table 8 presents future performance results for greenwashing funds. Greenwashing funds consistently underperform, delivering lower risk-adjusted returns both before and

after fees. It supports the view that greenwashing managers tend to be unskilled.

### 5.2. Which investors can identify greenwashing funds?

Next, we investigate whether greenwashing funds treat institutional and retail investors differently. We first calculate the fraction of TNA that belongs to institutional shares, i.e., $Inst\ share_{i,t} = TNA\ in\ institutional\ shares_{i,t}/total\ TNA_{i,t}$. We then group mutual funds into quintiles based on *Inst share* and define a mutual fund as institutional investors initiated if a fund lies in the top quintile with high *Inst share*. The retail funds are those in the bottom quintile with low *Inst share*. The assumption is that institutional investors concentrate on mutual funds with institutional shares and retail investors on retail shares.

To compare the disparities between institutional and retail funds engaging in greenwashing activities, we regress future fees ($Fee_{i,t+1}$, bp), fund net flows ($Flow_{i,t+1}$, %), and Fama-French six-factor alpha estimated using net returns ($Future\ Alpha_{i,t+1\to t+6}$, %) on the dummy variable of greenwashing funds. Control variables, fixed effects, and standard errors are the same as those in Eq. (1).

[Insert Table 9 Here]

Table 9 shows that retail investors are generally exploited by greenwashing funds with higher fees (6.2 bp) and more inflows (0.4%) than institutional investors (-2.0 bp in fees and -0.1% of flows). The differences between institutional and retail funds are statistically significant, represented by the $p$-value (0.00 and 0.03). However, fund performance between institutional and retail funds is indistinguishable from zero (-0.04% versus -0.05%, with $p$-value=0.40 for the difference).

Moreover, we calculate the economic magnitude of greenwashing on fees, flows, and performance by multiplying the estimated coefficients of the greenwashing dummy with

the average TNA of institutional or retail funds, $\widehat{\beta}_{Greenwashing} \times$ *average TNA*. It turns out that investors of retail greenwashing funds generally pay \$207,000 for annual expenses, whereas institutional funds investors save \$57,000. Regarding flows, retail investors send up to \$1.3 million per month, but institutional investors retreat about \$0.3 million.

In summary, greenwashing funds create disparities between institutional and retail investors. Our findings suggest that retail investors are more likely to be misled by greenwashing funds, possibly because they do not have the knowledge and capability to distinguish a greenwashing fund from a genuine ESG fund. We emphasize the importance of accurately identifying greenwashing funds to protect retail investors better.

### 5.3. Determinants of greenwashing funds

Lastly, we explore the determinants of being a greenwashing fund in the next $T$ months ($T$ =1, 6, and 12) using the logit regression,

$$Greenwashing_{i,t+T} = \Delta \times X_{i,t} + FE + \eta_{i,t+T} \tag{9}$$

where $X_{i,t}$ is the fund characteristics, including *FF6 Alpha* (*Star rating* or *Net return*), *TNA*, *Age*, *Risk*, *Flow*, *Fee*, and *Turnover*.

[Insert Table 10 Here]

Table 10 presents the results of the determinants of greenwashing funds. The coefficients on fund performance measures are significantly negative. For example, a 1% lower level of *FF6 Alpha* is associated with at least 16% larger likelihood of greenwashing in the next six months (Column (4), $t = -2.52$), suggesting that funds that show negative risk-adjusted returns tend to become greenwashing in the future. In summary, funds with poor prior

returns or low Morningstar fund ratings are more likely to engage in greenwashing, indicating a tendency toward unskilled management.

In addition, older, more risky, and higher turnover funds are more likely to engage in greenwashing. High-fee funds also have a greater likelihood of greenwashing. These results are consistent with different forecast horizons.

## 6. Conclusion

In this paper, we examine the benefits and costs of greenwashing in mutual funds. We define greenwashing funds as those that overstate their commitment to environmental and sustainability factors. Using LLMs, we propose a novel measure of greenwashing, categorizing a fund as greenwashing if it has excessive ESG discussions but low sustainability ratings.

When exploring the economic incentives behind greenwashing, we find that greenwashing funds charge significantly higher fees than other funds. This is consistent with the notion that greenwashing funds exploit investors with strong preferences for ESG investments but limited ability to verify ESG-related claims. Moreover, greenwashing funds attract greater investor flows, translating to an additional $20 million in AUM for the average fund. This further suggests that greenwashing may mislead investor decisions. Additionally, we find that investors in greenwashing funds exhibit lower sensitivity to poor fund performance.

However, greenwashing funds are more likely to receive ESG-related comment letters from the SEC, indicating that greenwashing practices are under active regulatory scrutiny. Following such comment letters, greenwashing funds typically experience net fund outflows. In addition, these funds consistently deliver weak risk-adjusted returns on average, both before and after fees.

To our knowledge, this is the first paper to systematically investigate greenwashing in the mutual fund industry. Our findings shed light on the economic incentives behind greenwashing and the associated regulatory scrutiny, revealing distortions in capital allocation across mutual funds. These insights have important implications for both fund investors and financial regulators.

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**Figure 1. Average Fees by Fund Type**

This figure presents the average fees (in basis points) charged by different types of domestic active equity mutual funds, "Greenwashing," "Walk-and-talk," "Ad-indifferent," and "Non-ESG," which are defined based on the Morningstar Sustainability ratings and the ESG disclosures in the shareholder reports in Table A1. The top panel compares the sample average of fees, and the bottom panel shows the time series average from 2018 to 2023.

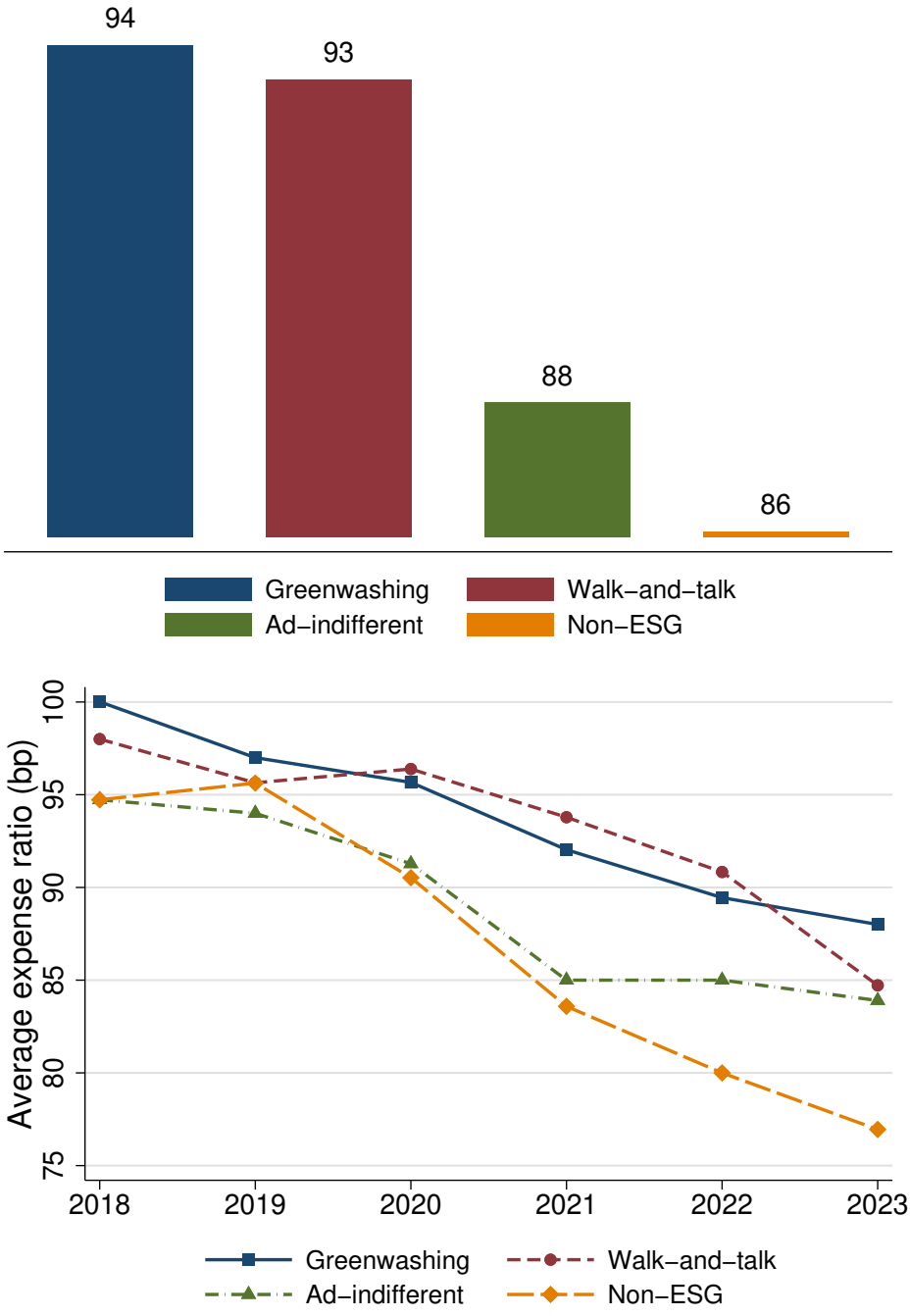


**Figure 2. The Trend of ESG-related Comment Letters**

This figure presents the monthly number of "all" and "irregular" comment letters on the SEC filings each month. The sample is from 1/2005 to 12/2023. The left panels plot the amount of all comment letters and irregular comment letters, as well as the corresponding quadratic fitted lines. The shadow areas represent the periods of NBER recessions. We define a comment letter as "irregular" if the letter focuses on irregularly issued filings, for example, forms other than annual 10-K, quarterly 13F and 10-Q, or semi-annual N-CSR. Then, we detrend the number of comment letters by regressing the raw number on a time variable up to the concurrent month. We keep the residual as the detrended amount of comment letters. Lastly, we subtract a mean value of the detrended number for each month and obtain the monthly detrended and demeaned number of all and irregular comment letters. We show the time series in the right panels and a linear fitted line from 1/2018 to 12/2023.

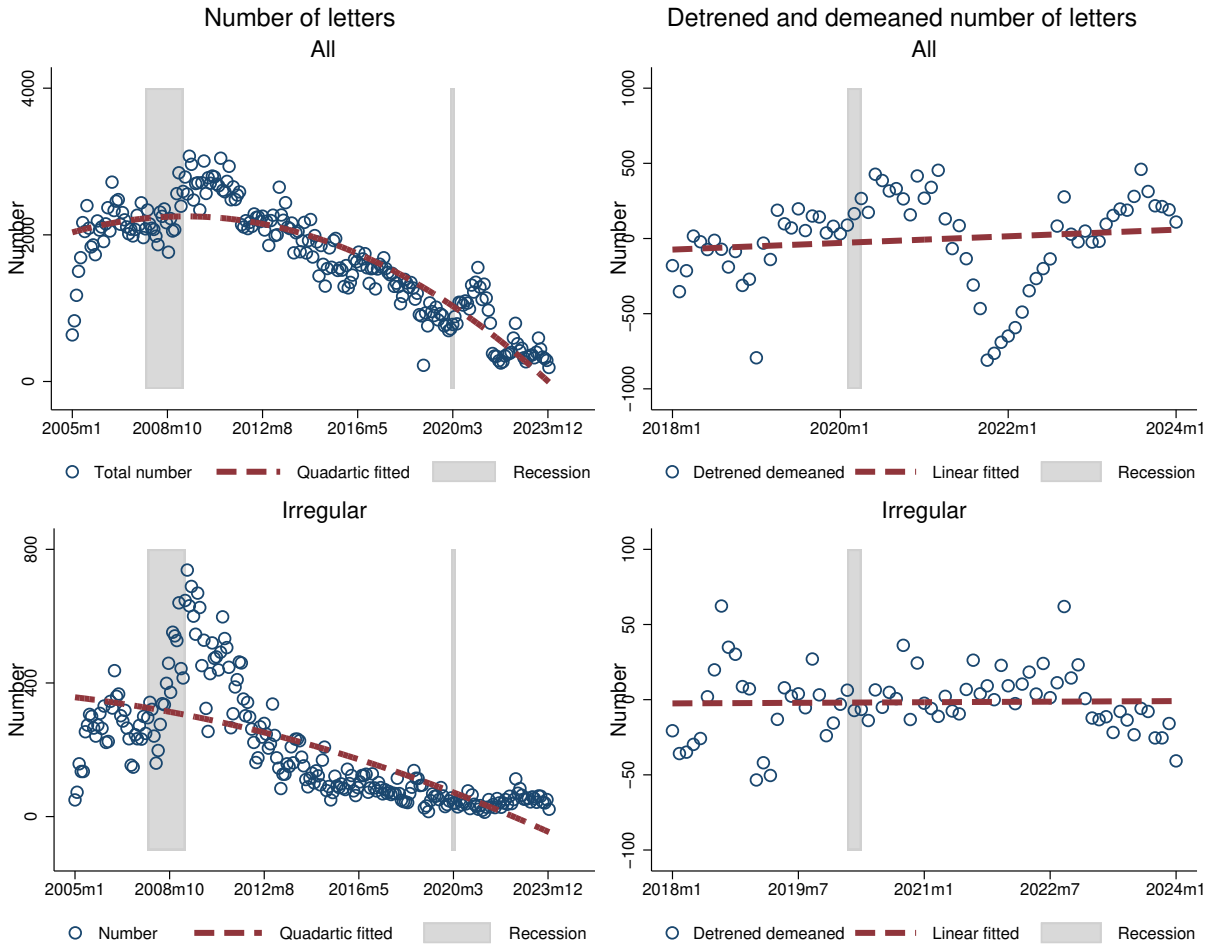
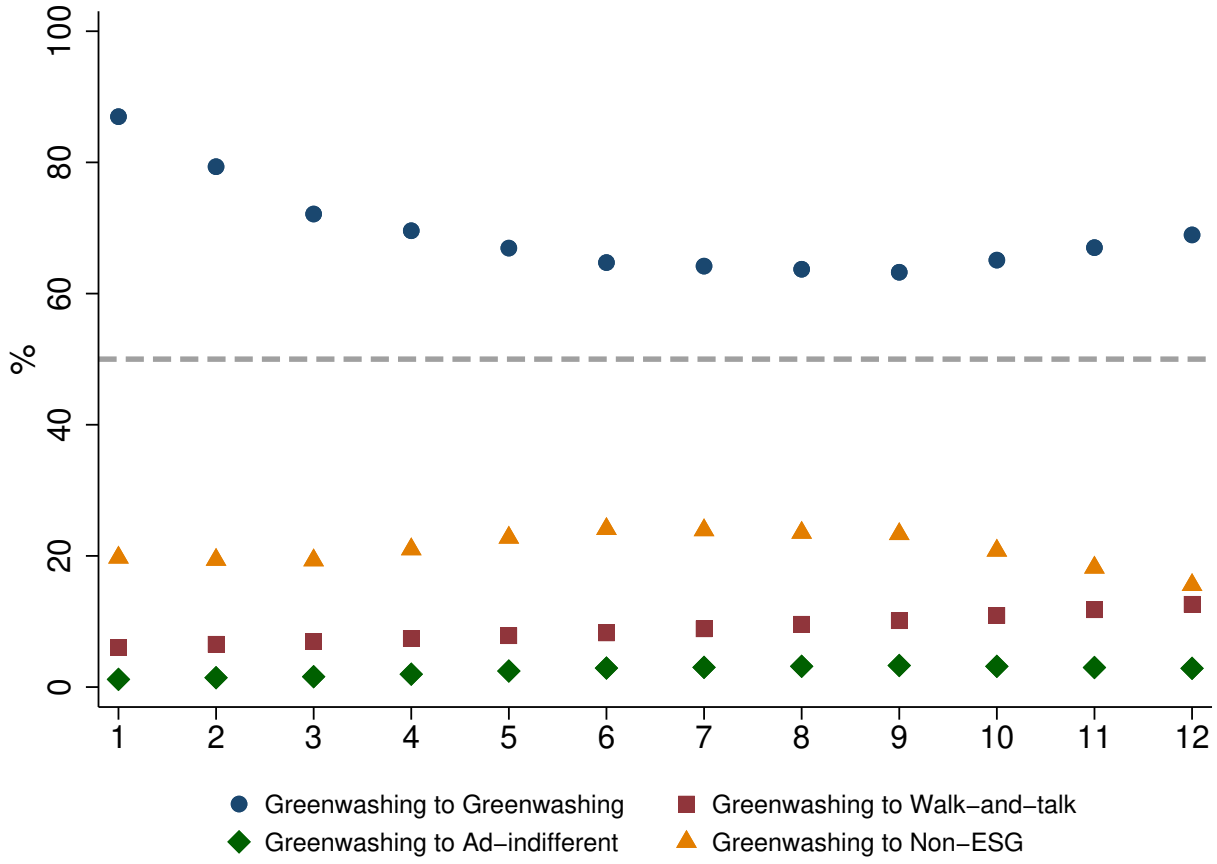


**Figure 3. Transition Matrix of Funds**

This figure presents the probability of a mutual fund that transits from greenwashing to three other types in the next twelve months, including walk-and-talk, ad-indifferent, and non-ESG, which are defined based on the Morningstar sustainability ratings and the ESG disclosures in the shareholder reports in Table A1. The x-axis represents the $t$ month horizon in the future, and the y-axis represents the fraction (in percentage) of greenwashing funds that belong to the corresponding types.

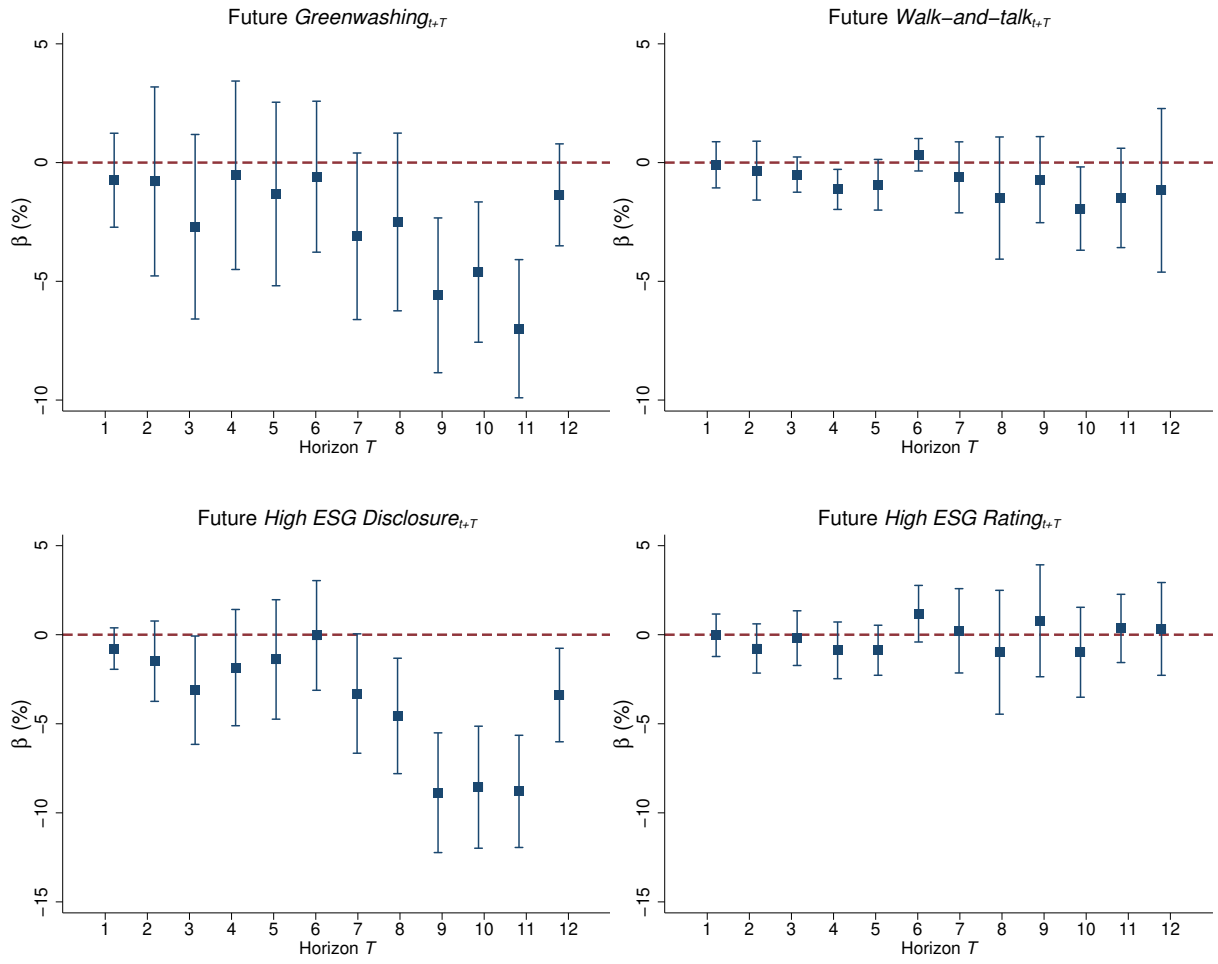


## Figure 4. Transition after Receiving Comment Letters

This figure reports the probability of being different types in the future after greenwashing funds receive comment letters from the SEC. Specifically, we estimate the following equation:

$$Fund\ Type_{i,t+T} = \beta \times Greenwashing_{i,t} \times Comment\ Letter_{i,t} + \gamma \times Controls_{i,t} + FE + \varepsilon_{i,t+T}$$

where $Fund\ Type_{i,t+T}$ represents a fund $j$ being *Greenwashing*, *Walk-and-talk*, with a high ESG disclosure (*High ESG Disclosure*), or with a high sustainability rating (*High ESG Rating*) in month $t+T$, for horizon $T = 1, 2, \cdots, 12$. $Comment\ Letter_{i,t}$ is an indicator variable equal to one if a fund receives ESG-related comment letters from the SEC in month $t$, and zero otherwise. *Greenwashing* is an indicator variable equal to one for a greenwashing fund and zero otherwise, where a greenwashing fund has low Morningstar sustainability ratings but high ESG disclosures. Control variables include *FF6 Alpha*, *TNA*, *Age*, *Risk*, *Flow*, *Fee*, and *Turnover*, and are defined in Table A1. *FE* is the time-varying investment style fixed effect. We present the scatters of the estimated coefficients, $\beta$, for the next twelve-month horizon and the corresponding 95% confidence intervals based on standard errors clustered by investment style.



## Table 1. Summary Statistics

This table reports the summary statistics. Panel A provides summary statistics for the full sample. We define a mutual fund as one of the four types: Greenwashing, Walk-and-talk, Ad-indifferent, or Non-ESG, based on the interaction of two dummy variables. The dummy variables compare fund-level values with the sample medians using the Morningstar Sustainability Rating and the discussion of ESG topics in the shareholder reports (N-CSR). For example, a greenwashing fund has a lower-than-median of the Morningstar Sustainability Rating and a higher-than-median of the discussion about ESG topics. Panel B compares the sample mean values of fund-level features between greenwashing versus non-greenwashing funds. All variables are defined in Table A1. There are 2,782 unique active equity mutual funds with 117,515 non-missing fund-month observations. The sample period is from July 2018 to December 2023.

| | Panel A. Full sample summary statistics | | | | | |
|---|---|---|---|---|---|---|
| | Obs | Mean | SD | P25 | Median | P75 |
| Greenwashing | 117,515 | 0.36 | 0.48 | 0 | 0 | 1 |
| Walk-and-talk | 117,515 | 0.17 | 0.38 | 0 | 0 | 0 |
| Ad-indifferent | 117,515 | 0.15 | 0.35 | 0 | 0 | 0 |
| Non-ESG | 117,515 | 0.32 | 0.47 | 0 | 0 | 1 |
| FF6 alpha (%) | 117,515 | -0.07 | 0.31 | -0.24 | -0.07 | 0.09 |
| Star rating | 117,515 | 3.03 | 1.13 | 2 | 3 | 4 |
| Net return (%) | 117,515 | 0.7 | 5.58 | -2.69 | 1 | 4.17 |
| TNA | 117,515 | 20.12 | 1.93 | 18.81 | 20.15 | 21.42 |
| Age (in years) | 117,515 | 22.08 | 13.05 | 13 | 21 | 28 |
| Risk (%) | 117,515 | 4.97 | 1.89 | 3.67 | 5.11 | 6.22 |
| Flow (%) | 117,515 | -0.68 | 3.94 | -1.42 | -0.58 | 0.19 |
| Fee (bp) | 117,515 | 91.83 | 36.55 | 72.47 | 92.16 | 109.85 |
| Turnover | 117,515 | 0.68 | 0.79 | 0.26 | 0.46 | 0.79 |

| | Panel B. Compare greenwashing versus non-greenwashing funds | |
|---|---|---|
| | Greenwashing | Non-greenwashing |
| FF6 alpha (%) | -0.08 | -0.07 |
| Star rating | 2.93 | 3.08 |
| Net return (%) | 0.84 | 0.63 |
| TNA | 20.09 | 20.13 |
| Age (in years) | 22.89 | 21.62 |
| Risk (%) | 5.07 | 4.92 |
| Flow (%) | -0.70 | -0.67 |
| Fee (bp) | 94.54 | 90.32 |
| Turnover | 0.70 | 0.67 |

## Table 2. Greenwashing Funds and Fees

This table presents fees charged by greenwashing funds and other mutual funds:

$$Fee_{i,t+1} = \beta \times Greenwashing_{i,t} + \gamma \times Controls_{i,t} + FE + \varepsilon_{i,t+1}$$

where $Fee_{i,t+1}$ is the one-month ahead fee, i.e., the annual adjusted expense ratio for fund $i$, and is interpolated into monthly frequency. *Greenwashing* is an indicator variable equal to one for a greenwashing fund and zero otherwise, where a greenwashing fund has low Morningstar sustainability ratings but high ESG disclosures. Control variables include *FF6 Alpha* (*Star rating* or *Net return*), *TNA*, *Age*, *Risk*, *Flow*, and *Turnover*. All variables are defined in Table A1. The *t*-statistics, in parentheses, are based on standard errors clustered by investment style. *$p$ <.1; **$p$ <.05; ***$p$ <.01.

| Dependent variable | $Fee_{t+1}$ | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Greenwashing | 3.330*** | 2.097*** | 2.144*** | 2.118*** |
| | (3.32) | (3.07) | (3.08) | (3.03) |
| FF6 Alpha | | -3.526 | | |
| | | (-1.48) | | |
| Star rating | | | 0.108 | |
| | | | (0.28) | |
| Net return | | | | -0.248*** |
| | | | | (-5.30) |
| TNA | | -8.860*** | -8.961*** | -8.945*** |
| | | (-26.48) | (-26.31) | (-27.18) |
| Age | | 0.305** | 0.306** | 0.306** |
| | | (2.57) | (2.54) | (2.56) |
| Risk | | 4.011*** | 4.055*** | 4.074*** |
| | | (3.60) | (3.53) | (3.49) |
| Flow | | -0.075 | -0.114** | -0.102** |
| | | (-1.55) | (-2.13) | (-2.15) |
| Turnover | | 5.060** | 5.140** | 5.118** |
| | | (2.24) | (2.27) | (2.27) |
| Style × Time FE | YES | YES | YES | YES |
| $N$ | 116,292 | 116,292 | 116,292 | 116,292 |
| Adj. $R^2$ | 0.099 | 0.332 | 0.332 | 0.332 |

## Table 3. Greenwashing Funds and Flows

This table examines whether greenwashing funds attract higher future fund flows:

$$Flow_{i,t+1} = \beta \times Greenwashing_{i,t} + \gamma \times Controls_{i,t} + FE + \varepsilon_{i,t+1}$$

where *Flow* is the one-month ahead flow-to-fund size ratio. *Greenwashing* is an indicator variable equal to one for a greenwashing fund and zero otherwise, where a greenwashing fund has low Morningstar sustainability ratings but high ESG disclosures. Control variables include *FF6 Alpha* (*Star rating* or *Net return*), *TNA*, *Age*, *Risk*, *Flow*, and *Turnover*. All variables are defined in Table A1. The *t*-statistics, in parentheses, are based on standard errors clustered by investment style. *$p$ <.1; **$p$ <.05; ***$p$ <.01.

| Dependent variable | $Flow_{t+1}$ | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Greenwashing | 0.310** | 0.164** | 0.213*** | 0.146** |
| | (2.79) | (2.32) | (2.91) | (2.21) |
| FF6 Alpha | | 2.542*** | | |
| | | (6.79) | | |
| Star rating | | | 0.541*** | |
| | | | (8.84) | |
| Net return | | | | 0.107*** |
| | | | | (4.79) |
| TNA | | 0.024 | 0.030 | 0.086*** |
| | | (0.97) | (1.46) | (3.84) |
| Age | | 0.012 | 0.013 | 0.011 |
| | | (1.40) | (1.47) | (1.25) |
| Risk | | -0.008 | 0.013 | -0.043 |
| | | (-0.17) | (0.20) | (-0.63) |
| Flow | | 0.299*** | 0.298*** | 0.321*** |
| | | (4.19) | (4.07) | (4.32) |
| Turnover | | -0.243 | -0.266 | -0.291 |
| | | (-1.37) | (-1.51) | (-1.63) |
| Style × Time FE | YES | YES | YES | YES |
| *N* | 128,657 | 117,224 | 117,224 | 117,224 |
| Adj. $R^2$ | 0.018 | 0.045 | 0.045 | 0.045 |

## Table 4. Greenwashing Funds and Flow-Performance Sensitivity

This table reports flow-performance sensitivity for greenwashing funds and other funds:

$$Flow_{i,t+1} = \beta \times Performance_{i,t} \times D(Performance_{i,t} < 0)$$

$$+\beta_1 \times Performance_{i,t} + \beta_2 \times D(Performance_{i,t} < 0) + \gamma \times Controls_{i,t} + FE + \varepsilon_{i,t+1}$$

where *Flow* is the one-month-ahead flow-to-fund size ratio. *Performance* is the fund level performance measure, including (1) *FF6Alpha*, defined as the Fama-French six-factor alpha estimated in a 36-month rolling window, and (2) market-adjusted net return, $Net\ return_{i,t} - Market\ return_t$, the difference between the funds' net returns and the market returns. $D(Performance < 0)$ is an indicator equal to one if the performance measure is negative. The coefficient of the interaction, $\beta$, captures the asymmetry in the flow-performance sensitivity. Columns (1) and (3) report the subsample of greenwashing funds, and Columns (2) and (4) report other funds. Control variables include one-month lagged *Flow*, *TNA*, *Age*, *Risk*, *Fee*, and *Turnover*. All variables are defined in Table A1. The *t*-statistics, in parentheses, are based on standard errors clustered by investment style. *$p$ <.1; **$p$ <.05; ***$p$ <.01.

| Dependent variable | $Flow_{t+1}$ | | | |
|---|---|---|---|---|
| Performance measure | FF6 Alpha | | Market-adjusted net return | |
| | Greenwashing | Non-greenwashing | Greenwashing | Non-greenwashing |
| | (1) | (2) | (3) | (4) |
| D(Performance < 0) × Performance | -0.773** | -0.178 | -0.131*** | -0.019 |
| | (-2.36) | (-0.62) | (-3.21) | (-0.75) |
| Performance | 1.929*** | 1.392*** | 0.187*** | 0.100*** |
| | (4.98) | (5.25) | (4.80) | (3.31) |
| D(Performance < 0) | -0.287*** | -0.196** | 0.027 | 0.081* |
| | (-3.23) | (-2.30) | (0.37) | (1.85) |
| $p$-value($\beta_{Greenwashing} - \beta_{Non-Greenwashing}$) | 0.09 | | 0.01 | |
| Controls | YES | YES | YES | YES |
| Style × Time FE | YES | YES | YES | YES |
| $N$ | 41,805 | 75,354 | 41,805 | 75,354 |
| Adj. $R^2$ | 0.104 | 0.098 | 0.093 | 0.090 |

## Table 5. Greenwashing Funds and ESG-related Comment Letters from the SEC

This table reports the probability of receiving comment letters from the SEC between greenwashing funds and other funds:

$$Comment\ Letter_{i,t+1\to t+T} = \beta \times Greenwashing_{i,t} + \gamma \times Controls_{i,t} + FE + \varepsilon_{i,t+1\to t+T}$$

where $Comment\ Letter_{i,t+1\to t+T}$ is an indicator variable equal to one if a fund receives ESG-related comment letters from the SEC from $t+1$ to $t+T$, and zero otherwise, expressed in percentage points. $T$ equals one in Panel A (next month) and six in Panel B (next six months). *Greenwashing* is an indicator variable equal to one for a greenwashing fund and zero otherwise, where a greenwashing fund has low Morningstar sustainability ratings but high ESG disclosures. Control variables include *FF6 Alpha*, *TNA*, *Age*, *Risk*, *Flow*, and *Turnover*. All variables are defined in Table A1. The $t$-statistics, in parentheses, are based on standard errors clustered by investment style. *$p$ <.1; **$p$ <.05; ***$p$ <.01.

| Dependent variable | Comment Letter at $t+1$ | | Comment Letter in $t+1$ to $t+6$ | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Greenwashing | 0.675** | 0.817** | 0.870*** | 0.963*** |
| | (2.40) | (2.65) | (3.65) | (3.72) |
| Controls | YES | YES | YES | YES |
| CIK FE | YES | | YES | |
| Style × Time FE | YES | | YES | |
| Fund FE | | YES | | YES |
| Time FE | | YES | | YES |
| $N$ | 117,327 | 117,458 | 117,327 | 117,458 |
| Adj. $R^2$ | 0.094 | 0.078 | 0.324 | 0.325 |

## Table 6. Greenwashing Funds and Comment Letters: Flows

This table reports fund flows to greenwashing funds receiving ESG-related comment letters from the SEC. We partition mutual funds into quintiles based on past fund flows and report top and bottom quintiles. Specifically,

$$Flow_{i,t+1\to t+T} = \beta \times Greenwashing_{i,t} \times Comment\ Letter_{i,t} + \gamma \times Controls_{i,t} + FE + \varepsilon_{i,t+1\to t+T}$$

where $Flow_{i,t+1\to t+T}$ is the cumulative fund flows from month $t+1$ to $t+T$. We consider both one- and six-month-ahead flows. *Comment Letter* is an indicator variable equal to one if a fund receives ESG-related comment letters from the SEC and zero otherwise. *Greenwashing* is an indicator variable equal to one for a greenwashing fund and zero otherwise, where a greenwashing fund has low Morningstar sustainability ratings but high ESG disclosures. Control variables include *FF6 Alpha*, *TNA*, *Age*, *Risk*, *Flow*, *Fee*, and *Turnover*. All variables are defined in Table A1. The $t$-statistics, in parentheses, are based on standard errors clustered by investment style. *$p$ <.1; **$p$ <.05; ***$p$ <.01.

| | Funds with high $\lvert Flow_t \rvert$ | | Funds with low $\lvert Flow_t \rvert$ | |
|---|---|---|---|---|
| Dependent variable = $Flow_{i,t+1\to t+T}$ | $Flow_{t+1}$ | $Flow_{t+1\to t+6}$ | $Flow_{t+1}$ | $Flow_{t+1\to t+6}$ |
| | (1) | (2) | (3) | (4) |
| Greenwashing | -1.749** | -5.772** | -0.051 | 3.211 |
| × Comment Letter | (-2.65) | (-2.77) | (-0.23) | (1.06) |
| Controls | YES | YES | YES | YES |
| CIK FE | YES | YES | YES | YES |
| Style × Time FE | YES | YES | YES | YES |
| $N$ | 19,344 | 16,991 | 23,543 | 21,071 |
| Adj. $R^2$ | 0.072 | 0.195 | 0.010 | 0.044 |

## Table 7. Greenwashing Funds and Comment Letters: Unexpected Busyness of the SEC

This table reports the probability of receiving comment letters from the SEC between greenwashing funds and other funds when the SEC experiences unexpected busyness,

$$Comment\ Letter_{i,t+1\to t+T} = \beta \times Greenwashing_{i,t} \times Unexpected\ Busyness_t$$

$$+\gamma \times Controls_{i,t} + FE + \varepsilon_{i,t+1\to t+T}$$

where $Comment\ Letter_{i,t+1\to t+T}$ is an indicator variable equal to one if a fund receives ESG-related comment letters from the SEC from $t+1$ to $t+T$, and zero otherwise. *Greenwashing* is an indicator variable equal to one for a greenwashing fund and zero otherwise, where a greenwashing fund has low Morningstar sustainability ratings but high ESG disclosures. *Unexpected Busyness* is a time-series indicator variable equal to one when the SEC issues an abnormal amount of comment letters on irregular filings such as 8-K. Control variables include *FF6 Alpha*, *TNA*, *Age*, *Risk*, *Flow*, *Fee*, and *Turnover*. All variables are defined in Table A1. The *t*-statistics, in parentheses, are based on standard errors clustered by investment style. *$p$ <.1; **$p$ <.05; ***$p$ <.01.

| Dependent variable | Comment Letter at $t+1$ | | Comment Letter in $t+1$ to $t+6$ | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Greenwashing | -0.779*** | -0.907*** | -2.319*** | -2.262*** |
| × Unexpected Busyness | (-3.60) | (-3.52) | (-4.62) | (-4.95) |
| Greenwashing | 0.839*** | 1.006*** | 1.360** | 1.436** |
| | (3.31) | (3.59) | (2.76) | (2.49) |
| Controls | YES | YES | YES | YES |
| CIK FE | YES | | YES | |
| Style × Time FE | YES | | YES | |
| Fund FE | | YES | | YES |
| Time FE | | YES | | YES |
| $N$ | 117,327 | 117,458 | 117,327 | 117,458 |
| Adj. $R^2$ | 0.094 | 0.078 | 0.324 | 0.325 |

## Table 8. Greenwashing Funds and Future Performance

This table shows the future performance of greenwashing funds. :

$$Future\ Alpha_{i,t+1\to t+T} = \beta \times Greenwashing_{i,t} + \gamma \times Controls_{i,t} + FE + \varepsilon_{i,t+1\to t+T}$$

where $Future\ Alpha_{i,t+1\to t+T}$ is the average $T$-month ahead performance for fund $i$, and $T = \{6, 12\}$. We estimate *Alpha* as the difference between realized return minus expected return estimated with Fama-French six factors in the past 36-month rolling window and take the average of the next $T$ month *Future Alpha*s. *Greenwashing* is an indicator variable equal to one for a greenwashing fund and zero otherwise, where a greenwashing fund has low Morningstar sustainability ratings but high ESG disclosures. Control variables include *FF6 Alpha*, *TNA*, *Age*, *Risk*, *Flow*, and *Turnover*. All variables are defined in Table A1. The *t*-statistics, in parentheses, are based on standard errors clustered by investment style. *$p$ <.1; **$p$ <.05; ***$p$ <.01.

| Dependent variable | $Future\ Alpha_{i,t+1\to t+T}$ | | | |
|---|---|---|---|---|
| | Net returns | | Gross returns | |
| | $t+1 \to t+6$ | $t+1 \to t+12$ | $t+1 \to t+6$ | $t+1 \to t+12$ |
| | (1) | (2) | (3) | (4) |
| Greenwashing | -0.024*** | -0.016*** | -0.022*** | -0.014*** |
| | (-4.86) | (-3.56) | (-4.50) | (-2.89) |
| Controls | YES | YES | YES | YES |
| Style × Time FE | YES | YES | YES | YES |
| $N$ | 109,344 | 102,457 | 109,315 | 101,056 |
| Adj. $R^2$ | 0.367 | 0.368 | 0.366 | 0.367 |

## Table 9. Institutional versus Retail Investors for Greenwashing Funds

This table reports the differential effect of greenwashing funds on institutional and retail investors. We calculate the fraction of a fund's TNA in institutional shares and partition mutual funds into quintiles based on the institutional fraction. The top quintile contains institutional funds ('Inst") and the bottom quintile with retail funds ("Rtl"). *Fee* is the one-month ahead fee. *Flow* is the one-month ahead flow-to-fund size ratio. *Future Alpha* is the T-month averaged future alphas estimated using fund net returns and Fama-French six factors. *Greenwashing* is an indicator variable equal to one for a greenwashing fund and zero otherwise, where a greenwashing fund has low Morningstar sustainability ratings but high ESG disclosures. Control variables include *FF6 Alpha*, *TNA*, *Age*, *Risk*, *Flow*, and *Turnover*. All variables are defined in Table A1. We calculate the differences between estimated $\beta$s of institutional and retail funds and report the corresponding $p$-values. To compare the real impacts, we multiply the estimated coefficients of *DGreenwashing* by the average size of institutional versus retail funds. The $t$-statistics, in parentheses, are based on standard errors clustered by investment style. *$p$ <.1; **$p$ <.05; ***$p$ <.01.

| Dependent variable | $Fee_{t+1}$ | | $Flow_{t+1}$ | | *Future Alpha* $t+1 \rightarrow t+6$ | |
|---|---|---|---|---|---|---|
| | Inst | Rtl | Inst | Rtl | Inst | Rtl |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Greenwashing | -2.001 | 6.208*** | -0.091 | 0.404* | -0.039*** | -0.046* |
| | (-1.25) | (5.59) | (-0.57) | (1.90) | (-2.94) | (-2.06) |
| $p$-value (Rtl−Inst) | 0.00 | | 0.03 | | 0.40 | |
| Real impact = $\widehat{\beta}_{Greenwashing}$ × Average TNA ($ ×1,000) | -57 | 207 | -260 | 1344 | -99 | -153 |
| Controls | YES | YES | YES | YES | YES | YES |
| Style × Time FE | YES | YES | YES | YES | YES | YES |
| $N$ | 17,685 | 28,629 | 17,912 | 28,837 | 16,614 | 26,935 |
| Adj. $R^2$ | 0.303 | 0.490 | 0.010 | 0.013 | 0.319 | 0.363 |

## Table 10. Determinants of Greenwashing Funds

This table reports the determinants of greenwashing funds on fund characteristics using the logit model.

$$Greenwashing_{i,t+T} = \Delta \times X_{i,t} + FE + \eta_{i,t+T}$$

$Greenwashing_{i,t+T}$ is an indicator variable equal to one for a greenwashing fund and zero otherwise in month $t + T$, where greenwashing funds have low Morningstar sustainability ratings but high ESG disclosures, $T = \{1, 6, 12\}$. Fund characteristics include *FF6 Alpha* (*Star rating* or *Net return*), *TNA*, *Age*, *Risk*, *Flow*, and *Turnover*. All variables are defined in Table A1. The *t*-statistics, in parentheses, are based on standard errors clustered by investment style. *$p$ <.1; **$p$ <.05; ***$p$ <.01.

| | $Greenwashing_{t+1}$ | | | $Greenwashing_{t+6}$ | | | $Greenwashing_{t+12}$ | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| FF6 Alpha | -0.101* | | | -0.159** | | | -0.233*** | | |
| | (-1.92) | | | (-2.52) | | | (-3.34) | | |
| Star rating | | -0.113*** | | | -0.113*** | | | -0.110*** | |
| | | (-5.57) | | | (-6.98) | | | (-6.76) | |
| Net return | | | -0.008** | | | -0.004*** | | | -0.005* |
| | | | (-2.28) | | | (-3.28) | | | (-1.68) |
| TNA | 0.002 | 0.012 | -0.000 | 0.005 | 0.014 | 0.001 | 0.008 | 0.016 | 0.002 |
| | (0.13) | (0.76) | (-0.02) | (0.29) | (0.83) | (0.05) | (0.44) | (0.88) | (0.11) |
| Age | 0.008** | 0.008** | 0.008** | 0.009** | 0.009** | 0.009** | 0.010** | 0.009** | 0.010** |
| | (2.31) | (2.32) | (2.29) | (2.45) | (2.42) | (2.41) | (2.39) | (2.33) | (2.34) |
| Risk | 0.078*** | 0.069*** | 0.079*** | 0.086*** | 0.078*** | 0.089*** | 0.104*** | 0.099*** | 0.109*** |
| | (5.00) | (4.43) | (4.96) | (4.78) | (4.60) | (4.79) | (4.76) | (4.80) | (4.86) |
| Flow | 0.000 | 0.005 | -0.000 | -0.002 | 0.002 | -0.003 | 0.001 | 0.004 | -0.001 |
| | (0.06) | (0.82) | (-0.09) | (-0.46) | (0.35) | (-0.84) | (0.20) | (0.98) | (-0.48) |
| Fee | 0.002*** | 0.003*** | 0.002*** | 0.003*** | 0.003*** | 0.003*** | 0.003*** | 0.003*** | 0.003*** |
| | (3.34) | (3.42) | (3.31) | (3.61) | (3.74) | (3.58) | (4.35) | (4.56) | (4.26) |
| Turnover | 0.070** | 0.066** | 0.071** | 0.069* | 0.067* | 0.072** | 0.060 | 0.059 | 0.064 |
| | (2.33) | (2.12) | (2.37) | (1.91) | (1.81) | (1.98) | (1.36) | (1.34) | (1.46) |
| Style FE | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Time FE | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| *N* | 114,363 | 114,363 | 114,363 | 102,336 | 102,336 | 102,336 | 88,655 | 88,655 | 88,655 |
| Pseudo $R^2$ | 0.021 | 0.023 | 0.021 | 0.023 | 0.025 | 0.023 | 0.027 | 0.029 | 0.027 |

# Appendix

**Table A1. Definitions of Variables**

This table provides variable definitions and the data sources.

| Variable | Definition |
|---|---|
| *Ad-indifferent* | The dummy for the interaction of the lower-than-median discussion of ESG topics but the higher-than-median Sustainability ratings.<br>Data source: Morningstar and EDGAR |
| *Age* | The number of years since a mutual fund was launched.<br>Data source: Morningstar |
| *Comment Letter* | The dummy variable for a fund that receives a comment letter.<br>Data source: AuditAnalytics. |
| *D(Performance < 0)* | The indicator equal to one if the performance measure is negative.<br>Data source: Morningstar. |
| *ESG rating* | The Morningstar Sustainability Ratings are based on the degree to which the value of a fund's holdings is at risk because of ESG factors. Each company in the portfolio is graded on a scale of 0 to 100 relative to its industry peers. Ratings are expressed using a five-globe system, with one globe being the lowest score and five globes the highest.<br>Data source: Morningstar |
| *ESG disclosure* | We evaluate how much a fund discusses ESG topics using the annual and semiannual shareholder reports, N-CSR. We calculate the number of words related to ESG topics. "Environmental" includes Climate Change, Natural Capital, and Pollution & Waste. "Social" includes Human Capital, Product Liability, and Community Relations. "Governance" includes Corporate Governance and Business Ethics & Values.<br>Data source: EDGAR |
| *Fee* | Annual adjusted expense ratios, expressed in basis points.<br>Data source: Morningstar |
| *FF6 alpha* | We regress monthly fund excess net returns on the Fama-French six factors, including the market returns excess of the risk-free interest rate, the size, value, profitability, investment, and momentum factors in a 36-month rolling window. We define the intercept of the regression as *FF6 alpha* (%).<br>Data source: Morningstar and Ken French's website |
| *Flow* | Monthly fund-level estimated net flows (%).<br>Data source: Morningstar |
| *Future Alpha* | We first regress excess fund net (gross) returns on the Fama-French six factors, including the excess market returns, size, value, profitability, investment, and momentum factors in a 36-rolling window. Then, we calculate the fitted intercept as the difference between the realized returns and expected returns based on estimated coefficients. Future Alpha is defined as the next $T$ month average of fitted intercepts, $T = \{6, 12\}$.<br>Data source: Morningstar and Ken French's website |

*(continued)*

| Variable | Definition |
|---|---|
| *Greenwashing* | The dummy for the interaction of the higher-than-median discussion of ESG topics and the lower-than-median Sustainability ratings.<br>Data source: Morningstar and EDGAR |
| *Market-adjusted net return* | Fund net return minus market return, where the market return is the CRSP value-weighted return.<br>Data source: Morningstar and CRSP |
| *Net return* | Monthly fund returns net of fund expenses (%)<br>Data source: Morningstar |
| *Non-ESG* | The dummy for the interaction of the lower-than-median discussion of ESG topics and the lower-than-median Sustainability ratings.<br>Data source: Morningstar and EDGAR |
| *Performance* | Fund performance measure, including *FF6 alpha* and *Market-adjusted net return* as defined above.<br>Data source: Morningstar |
| *Risk* | Standard deviation of monthly fund net returns over the past 3 years (%).<br>Data source: Morningstar |
| *Star rating* | The Morningstar Rating for funds, often called the star rating, based on the past three-year performance, Morningstar Risk-Adjusted Returns, ranging from one star (bottom performing) to five stars (top performing).<br>Data source: Morningstar |
| *Style* | The investment objectives presented in the fund prospectus.<br>Data source: Morningstar |
| *TNA* | The natural logarithm of total net assets of a mutual fund in a million dollars.<br>Data source: Morningstar |
| *Turnover* | Annual fund-level turnover ratio.<br>Data source: Morningstar |
| *Unexpected Busyness* | Time-series indicator variable equal to one when the SEC issues an abnormal amount of comment letters on irregular filings such as 8-K.<br>Data source: AuditAnalytics |
| *Walk-and-talk* | The dummy for the interaction of the higher-than-median discussion of ESG topics and the higher-than-median Sustainability ratings.<br>Data source: Morningstar and EDGAR |

# Internet Appendix for

# "The Economics of Greenwashing Funds"

**Internet Appendix A: Examples of SEC comment letters and responses**

**Internet Appendix B: Additional Figures and Tables**


- Figure 1. Time series median of ESG disclosures in Shareholder Reports
- Figure 2. Distributions of Morningstar Sustainability Rating and ESG disclosures in Shareholder Reports
- Figure 3. Percentage funds with ESG-related comment letters
- Table A1. Alternative definitions of greenwashing funds
- Table A2. Alternative definitions of greenwashing funds on flow-performance sensitivity
- Table A3. Alternative definitions of greenwashing funds: Comment letters
- Table A4. Alternative definitions of greenwashing funds: Comment letters and future flows
- Table A5. Alternative definitions of greenwashing funds with continuous variables
- Table A6. Conditional value of cheap talk and green investment
- Table A7. Alternative specifications on fees, flows, and flow-performance sensitivity
- Table A8. Alternative specifications on probability of receiving comment letters
- Table A9. Alternative specifications on future flows with comment letters

# A. Examples of SEC comment letters and responses

## A.1. Example: HC Capital Trust

HC Capital Trust ("Registrant") File Nos.: 33-87762 and 811-08918 Annual Report Dated June 30, 2017, "This correspondence is being provided to you in response to your comments ("Staff Comments") communicated during our February 22, 2018 telephone conversation with respect to Registrant's Annual Report dated June 30, 2017."

| | |
|---|---|
| Comment No. 1: | *You requested that the Registrant add disclosure indicating that 80% of the ESG Growth Portfolio's net assets will be invested in securities of "ESG" issuers pursuant to Rule 35d-1 under the 1940 Act.* |
| Response No. 1: | The Registrant respectfully declines to add an 80% policy because the term "ESG" refers to a strategy of the Portfolio, rather than a type of investment. The Registrant notes that Rule 35d-1 requires that a fund with a name that suggests that the fund focuses its investments in a particular type of investment or industry adopt a policy to invest, under normal circumstances, at least 80% of its net assets in the particular type of investment or industry suggested by the fund's name. The SEC Staff, however, stated in the releases proposing and adopting Rule 35d-1 that the rule does not apply to a fund name that connotes a type of investment strategy. The Registrant notes that the term "ESG" in the Portfolio's name refers to the Portfolio's investment strategy, pursuant to which the Advisor employs negative screens, as described in the Prospectus, to enact its ESG strategy. |
| Source: | https://www.sec.gov/Archives/edgar/data/934563/000119312518079155/filename1.htm |

## A.2. Example: SEI Investments Global Funds Services

Advisors' Inner Circle Fund II (File No. 811-07102) and Advisors' Inner Circle Fund III (File No. 811-22920), "The comments provided relate to the Trusts' annual reports as of July 31, 2019, September 30, 2019, October 31, 2019, and December 31, 2019, filed on Form N-CSR (the 'Reports') and related filings of the Trusts. Comments provided specifically relate to the below Funds, but such comments, to the extent applicable, should be applied to all Funds in the Trusts going forward. All Funds are a Series of the Trust."

| | |
|---|---|
| Comment No. 5: | *The Mesirow Financial Small Cap Value Sustainability Fund added an environmental, social and governance ("ESG") investment strategy effective as of July 30, 2019. Did the addition of this new strategy cause significant portfolio repositioning to meet the strategy?* |
| Response No. 5: | The portfolio, pre and post adoption of the ESG strategy, was managed in the same manner strategically and tactically. Because the fund had already place considerable importance on ESG factors in the analysis of securities, there was no significant portfolio repositioning needed to meet the new strategy. In anticipation of explicitly adding the ESG strategy to the portfolio, there were several deletions of individual securities that did not meet our sustainability criteria. These changes amounted to less than 10% of the portfolio's market value. |
| Source: | https://www.sec.gov/Archives/edgar/data/890540/000119312520220591/filename1.htm |

## A.3. Example: Transamerica Funds

Transamerica Funds (File Nos. 033-02659; 811-04556) (the "Registrant", and each series thereof a "Funds" and together, the "Funds"), "Comments Pursuant to Review of the Registrant's Financial Statements for the Fiscal Years Ended October 31, 2023, and December 31, 2023, each filed on Form N-CSR (each a "Filing" and together, the "Filings")"

Comment No. 6: *With respect to Transamerica High Yield ESG, Transamerica Sustainable Bond and Transamerica Sustainable Equity Income, please include an 80% investment policy with regard to the use of the words "sustainable" and "ESG" as applicable in the name of these funds.*

Response No. 6: The Registrant believes the terms "sustainable" and "ESG," as used in the names of the noted Funds, connote an investment strategy and therefore do not require the Funds to include a related 80% investment policy under the current Rule 35d-1 under the 1940 Act. The Registrant acknowledges that each of these Funds will need to adopt a related 80% policy in advance of the December 10, 2025 compliance date for the amendments to Rule 35d-1.

Source: https://www.sec.gov/Archives/edgar/data/787623/000119312524234843/filename1.htm

## A.4. Example: PGIM

PGIM Mutual Funds. [...] comments to the undersigned relating to the review by the staff (the "Staff") of the Securities and Exchange Commission ("SEC") of certain annual shareholder report and registration statement filings for various investment company registrants, which are collectively known as the PGIM Funds.

Comment No. 11: *The PGIM 60/40 Allocation Fund, Prudential Day One 2015 Fund, Prudential Day One 2050 Fund, Prudential Day One 2055 Fund, Prudential Day One 2060 Fund, and Prudential Day One 2065 Fund contain a note in the financial highlights table highlighting non-recurring fees. Please explain the nature of the non-recurring fees and how these fees were determined to be excluded from the expense limitation agreement.*

Response No. 11: Third party consultants were engaged on a limited basis to analyze certain aspects of the Funds' operations relating to ESG and Fund analytics reporting, and certain Fund fees and expenses. These third-party reviews were a one-time expense that are not part of any regular review or procedure. As such, the resulting expenses incurred during the applicable period were deemed to be non-recurring fees.
Each Fund's respective expense limitation agreement provides that the contractual waiver excludes Fund and any acquired fund interest, brokerage, taxes (such as income and foreign withholding taxes, stamp duty and deferred tax expenses), extraordinary expenses, and certain other Fund expenses, which the Funds deem to include non-recurring fees. Accordingly, the non-recurring fees were excluded from the expense limitation agreement.

Source: https://www.sec.gov/Archives/edgar/data/1554697/000168386324005312/filename1.htm

## B. Additional Figures and Tables

### B.1. Figures: Disclosures and Ratings

**Figure 1. Time series median of ESG disclosures in Shareholder Reports**

This figure presents the time series of the median level of ESG disclosure (in %) in Shareholder Reports from 2018 to 2023. The gray area represents the period when the SEC announced multiple material penalties to asset management companies with misstatements in ESG disclosures.

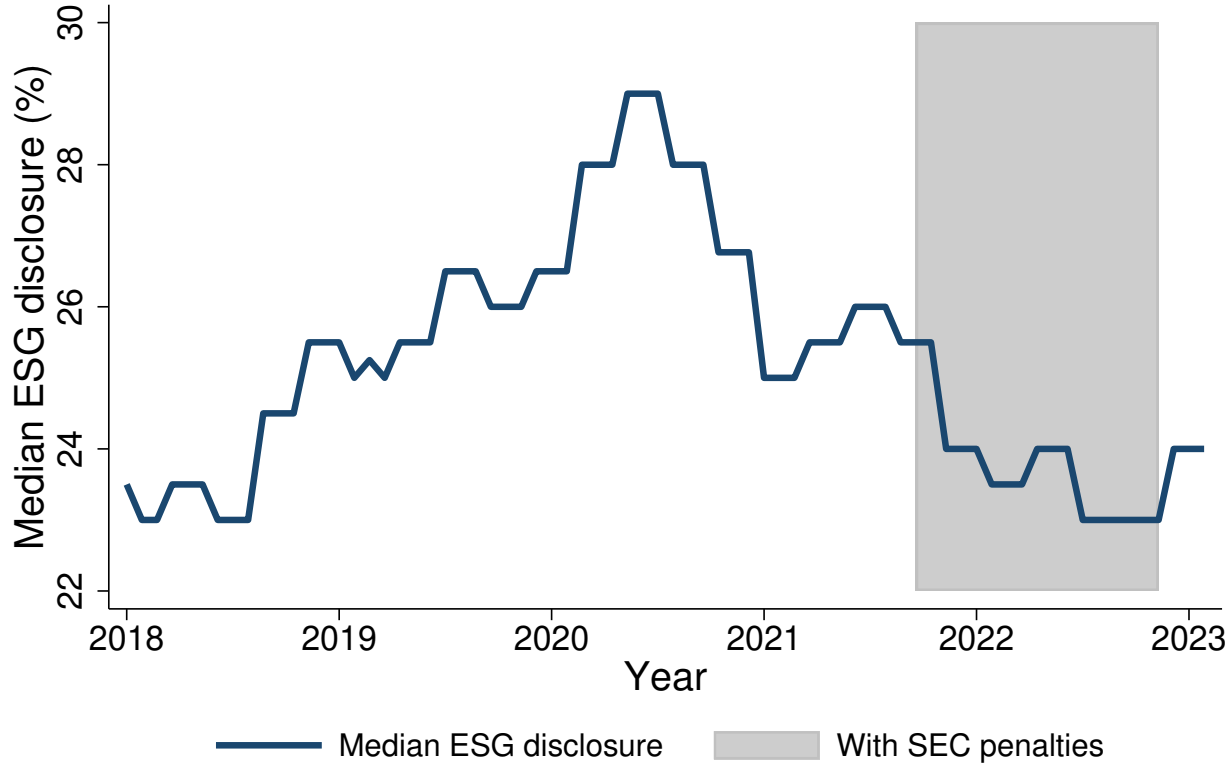


**Figure 2. Distributions of Morningstar Sustainability Rating and ESG disclosures in Shareholder Reports**

This figure presents the distributions of Sustainability ratings and ESG disclosures across different funds and time.

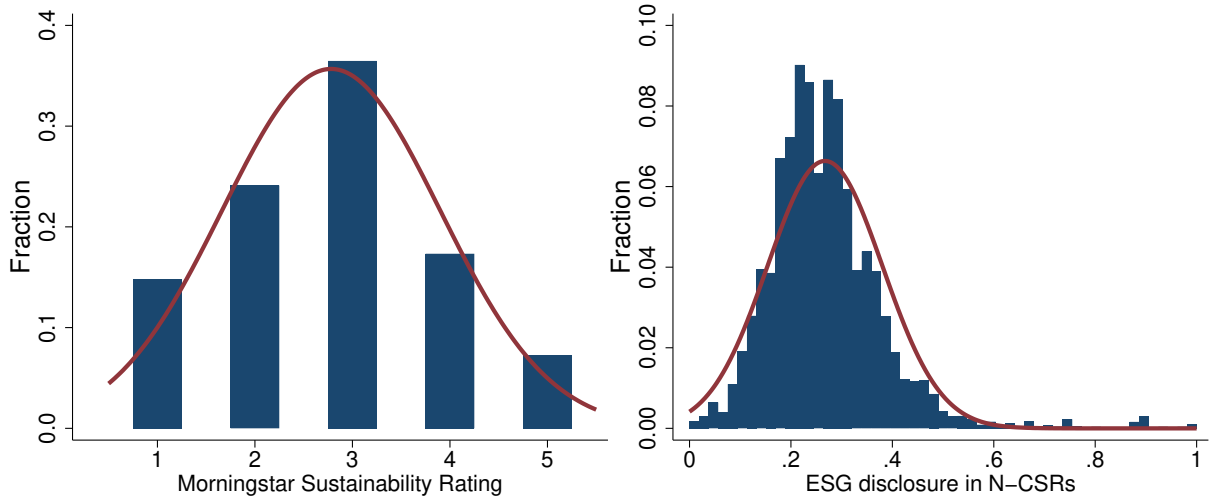
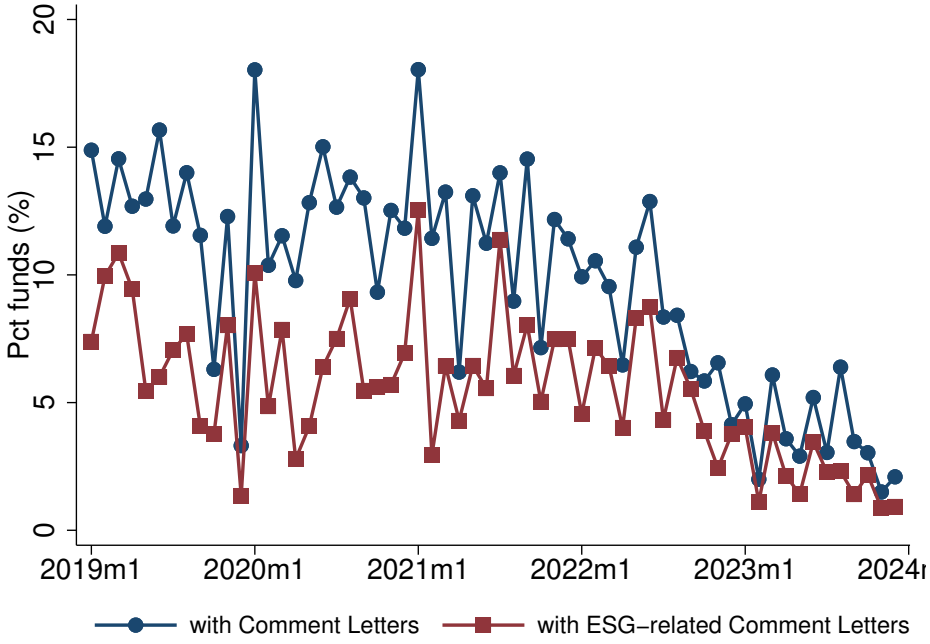


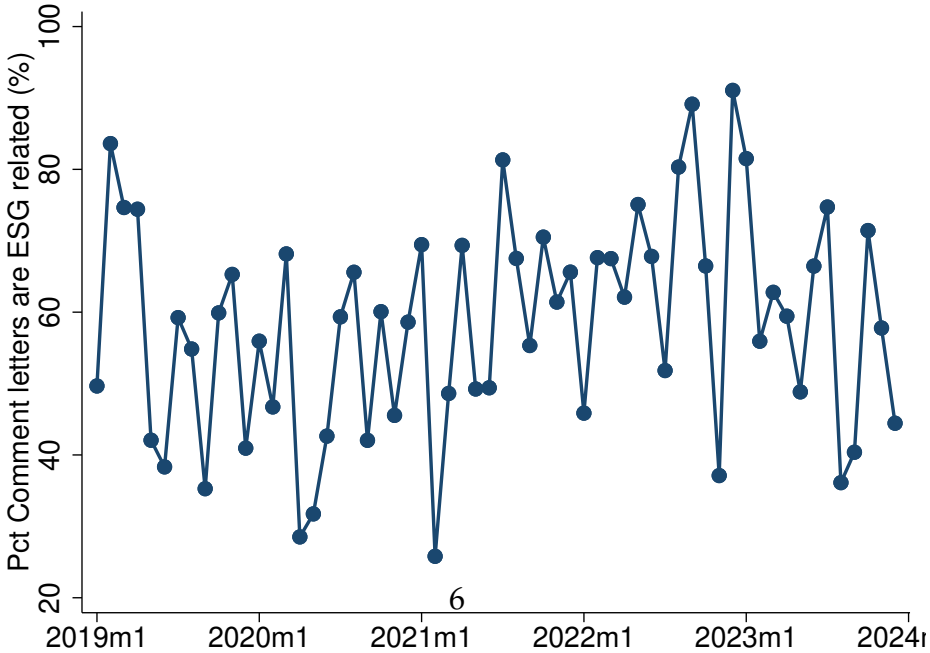
**Figure 3. Percentage funds with ESG-related comment letters**

This figure presents the time series of funds with ESG-related comment letters from January 2019 to December 2023. Panel A presents the percentage of equity mutual funds with comment letters or ESG-related comment letters, and Panel B shows the fraction of funds with ESG-related letters among funds with comment letters.

Panel A: Percentage of funds with comment letters or ESG-related comment letters




Panel B: Percentage of comment letters being ESG-related



## B.2. Alternative definitions of greenwashing funds

### Table A1. Alternative definitions of greenwashing funds

This table presents fees charged and fund flows between greenwashing funds and other mutual funds:

$$F_{i,t+1} = \beta \times Greenwashing_{i,t} + \gamma \times Controls_{i,t} + FE + \varepsilon_{i,t+1}$$

where $F_{i,t+1}$ is either the one-month ahead fee or net flow for fund $i$. *Greenwashing* is an indicator variable equal to one for a greenwashing fund and zero otherwise. We define a greenwashing fund using extreme groups via alternative partitions (i.e., half, tercile, quartile, or quintile) with the Sustainability Score or Environmental Score from Morningstar as rating variables, as well as alternative coverage of disclosure topics ("E"). Control variables include *FF6 Alpha*, *TNA*, *Age*, *Risk*, *Flow*, and *Turnover*. All variables are defined in Table A1. The $t$-statistics, in parentheses, are based on standard errors clustered by investment style. *$p$ <.1; **$p$ <.05; ***$p$ <.01.

Panel A: Alternative partitions and ESG score variables on fees

| Rating variable: | Sustainability Score | | | Enviornmental Score | | | |
|---|---|---|---|---|---|---|---|
| Partition: | Tercile | Quartile | Quintile | Half | Tercile | Quartile | Quintile |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Greenwashing | 2.238* | 4.018** | 5.052** | 3.952*** | 4.791*** | 8.615*** | 8.867*** |
| | (1.82) | (2.55) | (2.11) | (3.76) | (3.04) | (4.45) | (3.08) |
| $N$ | 48,159 | 31,816 | 17,645 | 109,956 | 46,586 | 25,443 | 15,219 |
| Adj. $R^2$ | 0.328 | 0.325 | 0.366 | 0.327 | 0.356 | 0.365 | 0.357 |

Panel B: Alternative disclosures (E) with alternative partition and rating scores on fees

| Rating variable: | Sustainability Score | | | | Environmental Score | | | |
|---|---|---|---|---|---|---|---|---|
| Partition: | Half | Tercile | Quartile | Quintile | Half | Tercile | Quartile | Quintile |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Greenwashing | 1.358* | 1.402 | 3.549*** | 4.003*** | 2.578*** | 3.368*** | 6.276*** | 7.415*** |
| | (1.92) | (1.02) | (2.86) | (3.93) | (2.92) | (3.62) | (5.28) | (8.35) |
| $N$ | 117,042 | 62,414 | 46,039 | 32,742 | 109,956 | 60,139 | 38,250 | 29,802 |
| Adj. $R^2$ | 0.328 | 0.321 | 0.323 | 0.372 | 0.326 | 0.346 | 0.347 | 0.347 |

Panel C: Alternative partitions and ESG score variables on flow

| Rating variable: | Sustainability Score | | | | Environmental Score | | | |
|---|---|---|---|---|---|---|---|---|
| Partition: | Half | Tercile | Quartile | Quintile | Half | Tercile | Quartile | Quintile |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Greenwashing | 0.164** | 0.302* | 0.544*** | 0.134** | 0.202*** | 0.111 | 0.167 | 0.134** |
| | (2.32) | (1.76) | (3.72) | (2.08) | (2.89) | (1.57) | (1.54) | (2.08) |
| $N$ | 117,224 | 48,238 | 31,944 | 15,419 | 110,231 | 46,713 | 25,645 | 15,419 |
| Adj. $R^2$ | 0.045 | 0.004 | 0.019 | 0.035 | 0.018 | 0.008 | 0.032 | 0.035 |

## Table A2. Alternative definitions of greenwashing funds on flow-performance sensitivity

This table reports flow-performance sensitivity for greenwashing funds and other funds using alternative definitions:

$$Flow_{i,t+1} = \beta \times Performance_{i,t} \times D(Performance_{i,t} < 0)$$

$$+\beta_1 \times Performance_{i,t} + \beta_2 \times D(Performance_{i,t} < 0) + \gamma \times Controls_{i,t} + FE + \varepsilon_{i,t+1}$$

where *Flow* is the one-month-ahead flow-to-fund size ratio. *Performance* is the fund level performance measure using *FF6Alpha*. $D(Performance < 0)$ is an indicator equal to one if the performance measure is negative. The coefficient of the interaction, $\beta$, captures the asymmetry in the flow-performance sensitivity. Columns "GW" and "NGW" report the subsample of greenwashing funds and other funds. We define greenwashing funds using alternative rating measures (Sustainability Score or Environmental Score) and alternative disclosure measures ("E," "ES," or "ESG"), separated by sample median or extreme groups in the tercile partition. Control variables include one-month lagged *Flow*, *TNA*, *Age*, *Risk*, *Fee*, and *Turnover*. All variables are defined in Table A1. The *t*-statistics, in parentheses, are based on standard errors clustered by investment style. *$p$ <.1; **$p$ <.05; ***$p$ <.01.

Panel A: Separate by sample median

| | Sustainability Score | | | | Environmental Score | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | E | | ES | | ESG | | E | | ES | |
| | GW | NGW | GW | NGW | GW | NGW | GW | NGW | GW | NGW |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| D(Performance < 0) | -0.676** | -0.292 | -1.000*** | -0.126 | -1.018** | -0.570 | -0.861** | -0.489 | -1.099** | -0.517 |
| x Performance | (-2.69) | (-1.01) | (-4.08) | (-0.41) | (-2.10) | (-1.14) | (-2.09) | (-0.98) | (-2.31) | (-1.06) |
| Performance | 1.516*** | 1.660*** | 1.820*** | 1.507*** | 2.128*** | 1.569*** | 1.847*** | 1.570*** | 2.081*** | 1.556*** |
| | (3.94) | (6.80) | (5.32) | (5.26) | (4.58) | (4.45) | (4.10) | (4.30) | (4.58) | (4.36) |
| D(Performance < 0) | -0.318*** | -0.177* | -0.233*** | -0.218** | -0.400*** | -0.186** | -0.312*** | -0.209** | -0.272*** | -0.228** |
| | (-3.39) | (-2.04) | (-3.26) | (-2.08) | (-6.74) | (-2.24) | (-3.69) | (-2.58) | (-4.84) | (-2.51) |
| *N* | 40,401 | 76,745 | 39,846 | 77,269 | 27,465 | 81,670 | 26,984 | 82,141 | 25,751 | 83,343 |
| Adj. $R^2$ | 0.096 | 0.105 | 0.100 | 0.102 | 0.112 | 0.092 | 0.109 | 0.095 | 0.106 | 0.092 |

Panel B: Tercile partition

| | Sustainability Score | | | | | | Environmental Score | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ESG | | E | | ES | | ESG | | E | | ES | |
| | GW | NGW | GW | NGW | GW | NGW | GW | NGW | GW | NGW | GW | NGW |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| D(Performance < 0) | -1.235*** | -0.225 | -1.037*** | -0.144 | -1.694*** | -0.113 | -2.017* | -0.727** | -1.736 | -0.579 | -1.998* | -0.653 |
| x Performance | (-3.05) | (-0.83) | (-3.85) | (-0.44) | (-3.34) | (-0.27) | (-1.88) | (-2.08) | (-1.65) | (-1.46) | (-2.04) | (-1.41) |
| Performance | 2.299*** | 1.653*** | 2.084*** | 1.538*** | 2.301*** | 1.546*** | 3.116*** | 1.764*** | 2.785** | 1.602*** | 2.935*** | 1.595*** |
| | (5.27) | (6.04) | (6.74) | (5.54) | (5.43) | (5.04) | (2.84) | (4.65) | (2.63) | (4.76) | (3.10) | (3.87) |
| D(Performance < 0) | -0.234* | -0.140*** | -0.187 | -0.196** | -0.189* | -0.169 | -0.331** | -0.201* | -0.342** | -0.240* | -0.221* | -0.297** |
| | (-1.85) | (-3.05) | (-1.21) | (-2.22) | (-1.78) | (-1.66) | (-2.59) | (-1.94) | (-2.20) | (-1.91) | (-1.91) | (-2.32) |
| *N* | 12,819 | 35,101 | 12,472 | 49,775 | 12,769 | 40,322 | 11,112 | 34,745 | 11,283 | 48,062 | 10,381 | 40,099 |
| Adj. $R^2$ | 0.157 | 0.104 | 0.128 | 0.103 | 0.138 | 0.101 | 0.133 | 0.107 | 0.121 | 0.100 | 0.118 | 0.096 |

## Table A3. Alternative definitions of greenwashing funds: Comment letters

This table reports the probability of receiving comment letters from the SEC between greenwashing funds and other funds using alternative definitions:

$$Comment\ Letter_{i,t+1} = \beta \times Greenwashing_{i,t} + \gamma \times Controls_{i,t} + FE + \varepsilon_{i,t+1 \to t+T}$$

where $CommentLetter_{i,t+1}$ is an indicator variable equal to one if a fund receives ESG-related comment letters from the SEC in $t+1$, and zero otherwise, expressed in percentage points. *Greenwashing* is an indicator variable equal to one for a greenwashing fund and zero otherwise, where a greenwashing fund has low Morningstar sustainability ratings but high ESG disclosures. We define greenwashing funds using alternative disclosure measures ("E" or "ESG") separated by sample median or extreme groups in the tercile partition. Control variables include *FF6 Alpha*, *TNA*, *Age*, *Risk*, *Flow*, and *Turnover*. All variables are defined in Table A1. The *t*-statistics, in parentheses, are based on standard errors clustered by investment style. *$p$ <.1; **$p$ <.05; ***$p$ <.01.

| | ESG | | E | |
|---|---|---|---|---|
| | Half | Tercile | Half | Tercile |
| | (1) | (2) | (3) | (4) |
| Greenwashing | 0.675*** | 0.441 | 0.553*** | 0.515** |
| | (4.51) | (1.58) | (3.78) | (2.08) |
| $N$ | 117,327 | 48,218 | 117,327 | 62,546 |
| Adj. $R^2$ | 0.094 | 0.103 | 0.094 | 0.093 |

## Table A4. Alternative definitions of greenwashing funds: Comment letters and future flows

This table reports fund flows to greenwashing funds receiving ESG-related comment letters from the SEC with alternative definitions. We partition mutual funds into quintiles based on past fund flows and report top and bottom quintiles. Specifically,

$$Flow_{i,t+1\to t+6} = \beta \times Greenwashing_{i,t} \times Comment\ Letter_{i,t} + \gamma \times Controls_{i,t} + FE + \varepsilon_{i,t+1\to t+6}$$

where $Flow_{i,t+1\to t+6}$ is the cumulative fund flows from month $t+1$ to $t+6$. *Comment Letter* is an indicator variable equal to one if a fund receives ESG-related comment letters from the SEC and zero otherwise. *Greenwashing* is an indicator variable equal to one for a greenwashing fund and zero otherwise, where a greenwashing fund has low Morningstar sustainability ratings but high ESG disclosures. We define greenwashing funds using alternative disclosure measures ("E" or "ESG") separated by sample median or extreme groups in the tercile, quartile, or quintile partitions. Control variables include *FF6 Alpha*, *TNA*, *Age*, *Risk*, *Flow*, and *Turnover*. All variables are defined in Table A1. The *t*-statistics, in parentheses, are based on standard errors clustered by investment style. *$p$ <.1; **$p$ <.05; ***$p$ <.01.

Panel A: Alternative partition and future fund flows

| | Half | | Tercile | | Quartile | | Quintile | |
|---|---|---|---|---|---|---|---|---|
| | High | Low | High | Low | High | Low | High | Low |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Greenwashing | -5.772** | 3.211 | -9.107** | 6.564 | -14.871** | 3.825* | -12.951*** | 0.700 |
| × Comment Letter | (-2.77) | (1.06) | (-2.10) | (1.64) | (-2.60) | (1.79) | (-3.12) | (0.20) |
| *N* | 16,991 | 21,071 | 6,888 | 8,472 | 4,450 | 5,504 | 2,438 | 2,920 |
| Adj. $R^2$ | 0.195 | 0.044 | 0.202 | 0.048 | 0.220 | 0.105 | 0.283 | 0.125 |

Panel B: Alternative ESG disclosures (E) and future fund flows

| | Half | | Tercile | | Quartile | | Quintile | |
|---|---|---|---|---|---|---|---|---|
| | High | Low | High | Low | High | Low | High | Low |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Greenwashing | -4.234** | 4.494* | -4.341* | 1.340 | -2.535 | 3.407 | -4.157** | 1.166 |
| × Comment Letter | (-2.75) | (1.71) | (-2.05) | (0.45) | (-1.06) | (1.15) | (-2.23) | (0.39) |
| *N* | 16,991 | 21,071 | 9,114 | 11,131 | 6,563 | 7,998 | 4,691 | 5,502 |
| Adj. $R^2$ | 0.195 | 0.044 | 0.226 | 0.101 | 0.254 | 0.142 | 0.311 | 0.143 |

**Table A5. Alternative definitions of greenwashing funds with continuous variables**

This table reports how greenwashing funds benefit from fee charges, flows, and flow-performance sensitivity with alternative definitions. We define the measure of greenwashing using the interaction of two continuous variables, the percent of ESG disclosure in N-CSRs and the inverse of Morningstar Sustainability scores. Control variables include *FF6 Alpha*, *TNA*, *Age*, *Risk*, *Flow*, and *Turnover*. All variables are defined in Table A1. The *t*-statistics, in parentheses, are based on standard errors clustered by investment style. *$p$ <.1; **$p$ <.05; ***$p$ <.01.

| | Fee (t+1) | Flow (t+1) |
|---|---|---|
| | (1) | (2) |
| Greenwashing | 11.159* | 1.060** |
| | (1.73) | (2.37) |
| Controls | YES | YES |
| $N$ | 116,292 | 128,044 |
| Adj. $R^2$ | 0.332 | 0.023 |

## Table A6. Conditional value of cheap talk and green investment

This table reports the value of cheap talk and green investment conditional on with or without disclosure and investment. *Greenwashing* is an indicator variable equal to one for a greenwashing fund and zero otherwise, where a greenwashing fund has low Morningstar sustainability ratings but high ESG disclosures. *Walk-and-Talk* is an indicator variable equal to one for a Walk-and-Talk fund and zero otherwise, where a Walk-and-Talk fund has high Morningstar sustainability ratings and high ESG disclosures. *Ad-indifferent* is an indicator variable equal to one for an ad-indifferent fund and zero otherwise, where an ad-indifferent fund has high Morningstar sustainability ratings but low ESG disclosures. Control variables include *FF6 Alpha*, *TNA*, *Age*, *Risk*, *Flow*, and *Turnover*. All variables are defined in Table A1. Columns (1) and (2) compare between greenwashing funds and non-ESG funds (value of cheap talk without investment). Columns (3) and (4) compare ad-indifferent funds and non-ESG funds (value of green investment without disclosure). Columns (5) and (6) compare walk-and-talk with greenwashing funds. Columns (7) and (8) compare walk-and-talk with ad-indifferent funds. The *t*-statistics, in parentheses, are based on standard errors clustered by investment style. *$p$ <.1; **$p$ <.05; ***$p$ <.01.

| | Cheap talk without investment | | Green investment without disclosure | | Green investment with disclosure | | Cheap talk with investment | |
|---|---|---|---|---|---|---|---|---|
| | $Fee_{t+1}$ | $Flow_{t+1}$ | $Fee_{t+1}$ | $Flow_{t+1}$ | $Fee_{t+1}$ | $Flow_{t+1}$ | $Fee_{t+1}$ | $Flow_{t+1}$ |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Greenwashing | 4.308*** | 0.345*** | | | | | | |
| | (3.94) | (4.64) | | | | | | |
| Ad-indifferent | | | 1.940 | 0.232** | | | | |
| | | | (1.30) | (2.22) | | | | |
| Walk-and-talk | | | | | 2.638*** | -0.492 | 5.536*** | -0.491 |
| | | | | | (3.06) | (-1.22) | (6.40) | (-0.72) |
| Sample Comparison | GW vs Non-ESG | | AD vs Non-ESG | | WT vs GW | | WT vs AD | |
| Controls | YES | YES | YES | YES | YES | YES | YES | YES |
| $N$ | 79,028 | 86,718 | 54,372 | 60,712 | 61,800 | 67,495 | 37,133 | 41,159 |
| Adj. $R^2$ | 0.377 | 0.003 | 0.338 | -0.006 | 0.337 | 0.093 | 0.268 | 0.075 |

## B.3. Alternative specifications

### Table A7. Alternative specifications on fees, flows, and flow-performance sensitivity

This table reproduces the analyses in Tables 2, 3, 4 by including dummies for Walk-and-Talk and Ad-indifferent funds. We further examine corporate bond mutual funds in Columns (2) and (4).

| | Fee | | Flow | | Flow-performance | |
|---|---|---|---|---|---|---|
| | Equity | Bond | Equity | Bond | GW | NGW |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Walk-and-talk | 7.401*** | 12.994*** | -0.030 | -0.311 | | |
| | (5.73) | (4.88) | (-0.07) | (-1.34) | | |
| Greenwashing | 4.658*** | 3.714** | 0.363** | -0.388 | | |
| | (4.22) | (2.46) | (2.33) | (-1.21) | | |
| Ad-indifferent | 2.003 | 2.444 | 0.276** | 0.121 | | |
| | (1.26) | (0.65) | (2.18) | (0.44) | | |
| D(Performance < 0) x Performance | | | | | -0.676** | -0.366 |
| | | | | | (-2.69) | (-1.02) |
| Performance | | | | | 1.516*** | 1.706*** |
| | | | | | (3.94) | (5.30) |
| D(Performance < 0) | | | | | -0.318*** | -0.155 |
| | | | | | (-3.39) | (-1.34) |
| *N* | 117,042 | 4,402 | 128,657 | 4,478 | 40,401 | 37,432 |
| Adj. $R^2$ | 0.333 | 0.440 | 0.018 | 0.002 | 0.096 | 0.095 |

**Table A8. Alternative specifications on probability of receiving comment letters**

This table reproduces the analyses in Table 5. "All funds" panel uses all equity mutual funds and includes dummies for Walk-and-Talk and Ad-indifferent funds. "ESG funds" panel excludes Non-ESG funds and includes the dummy of Walk-and-Talk funds.

| | All funds | | ESG funds | |
|---|---|---|---|---|
| | $t+1$ | $t+1 \rightarrow t+6$ | $t+1$ | $t+1 \rightarrow t+6$ |
| | (1) | (2) | (3) | (4) |
| Walk-and-talk | 1.407*** | 0.969*** | 1.144*** | 1.952*** |
| | (6.34) | (2.74) | (4.27) | (4.61) |
| Greenwashing | 1.290*** | 1.132*** | 1.118*** | 2.227*** |
| | (6.98) | (3.85) | (4.44) | (5.60) |
| Ad-indifferent | 0.142 | -0.942*** | | |
| | (0.69) | (-2.88) | | |
| $N$ | 117,327 | 117,327 | 79,413 | 79,413 |
| Adj. $R^2$ | 0.095 | 0.324 | 0.098 | 0.324 |

**Table A9. Alternative specifications on future flows with comment letters**

This table reproduces the analyses in Table 6. "ESG funds" panels exclude Non-ESG funds. "All funds" panel uses all equity mutual funds. Columns (3) to (6) replace the Greenwashing fund dummy with Walk-and-Talk.

| | ESG funds | | All funds | | ESG funds | |
|---|---|---|---|---|---|---|
| | High | Low | High | Low | High | Low |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Greenwashing × Comment Letter | -9.225*** | 3.969 | | | | |
| | (-4.42) | (1.34) | | | | |
| Walk-and-talk × Comment Letter | | | 9.773*** | -1.211 | 10.524*** | -1.334 |
| | | | (4.88) | (-0.69) | (3.75) | (-0.59) |
| *N* | 11,215 | 14,491 | 16,991 | 21,071 | 11,215 | 14,491 |
| Adj. $R^2$ | 0.202 | 0.052 | 0.195 | 0.043 | 0.201 | 0.052 |