

# Mutual Funds' Discretionary Trades on Stock ESG Information

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## Abstract

This paper analyzes the drivers and consequences of active stock trading decisions made by ESG and conventional mutual funds using a global sample of holdings from 2014 to 2022. By decomposing trades into discretionary and expected components, we examine how fund managers incorporate both backward-looking ESG ratings and forward-looking ES incidents into their portfolio allocations. We find that while both fund types deem ESG information financially material, ESG funds exhibit a significantly stronger propensity to trade on ESG ratings. However, we identify a critical "ESG constraint": relative to conventional funds, ESG funds appear less flexible in trading away from stocks with negative ES incidents when those firms maintain high aggregate ESG scores. Interestingly, we find that this lack of flexibility is costly; a greater propensity to trade on high ESG scores is associated with reduced risk-adjusted performance for ESG funds compared to conventional funds. Nevertheless, investors reward ESG funds for preempting future ES incidents and maintaining high-ESG profiles, even when these trades do not generate risk-adjusted returns. Our results suggest that ESG fund managers face a trade-off between maximizing discretionary trading returns and meeting the non-pecuniary mandates of their investor base.

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# 1 Introduction

The Global Sustainable Investment Alliance (GSIA) in 2022 estimated that USD 30.1 trillion was invested in sustainable assets worldwide. Furthermore, a 2024 survey by Morgan Stanley Institute for Sustainable Investing (2024) found that 84 percent of U.S. individual investors are interested in sustainable investing. Not surprisingly, in response to this growing base of investors with sustainable investment preferences, a considerable number of mutual funds now offer the integration of environmental, social, and governance (ESG) issues in investment decisions (Riedl and Smeets, 2017). However, work by Gantchev et al. (2023) provides evidence that financial motivations primarily drive investors toward sustainable funds. This suggests that to meet the demands of their investor base, ESG funds may select and actively trade their portfolio holdings differently than conventional funds. Thus, the prominent rise of ESG-focused mutual funds raises questions about the added value of ESG fund managers' discretionary trading relative to that of conventional mutual funds.

The core objective of this paper is to analyze the drivers and consequences of active stock trading decisions made by ESG and conventional funds. Specifically, we examine the extent to which ESG and conventional funds make different changes to their portfolio composition in terms of trading on stock ESG scores and information on negative ES incidents. The typical actively managed mutual fund incorporates relevant information into security analysis and investments to enhance risk-adjusted returns. Providers of ESG-labeled investments often market their products as financially superior by claiming that the integration of ESG factors in the investment process helps to improve that objective. Indeed, a recent survey by Edmans et al. (2025) finds that 91 percent of ESG mutual funds incorporate ESG factors in stock selection. Furthermore, in theoretical work by Pedersen et al. (2021), “ESG aware” investors integrate financially material ESG criteria in stock selection more than “ESG unaware” investors<sup>1</sup>. Hence, one might expect that ESG mutual fund managers who prioritize financial returns use ESG information in security selection more effectively than conventional funds.

However, a theoretical counterargument is that ESG and conventional funds that pursue superior returns have the same motive to trade on relevant ESG information, and ultimately should not differ in using ESG information for security selection. According to the Edmans et al. (2025) survey, ESG and conventional fund managers have similar beliefs on the capital market pricing of ES(G) issues,

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<sup>1</sup>Consistent with the notion that certain ESG information is financially material, several empirical studies link firm-level ESG metrics to analyst forecast revisions, analyst surprises, short-term stock returns, firm fundamentals, earnings announcement returns, and long-term abnormal stock returns.

and that “73% of sustainable investors expect good ES performers to deliver positive alpha, and a notable 45% of traditional investors agree” (p. 3). Beliefs about ES(G) outperformance in investments may surpass “conventional” vs. “ESG” fund labels.

Importantly, an additional feature of many ESG funds is that they attract investors with non-pecuniary ESG preferences. For example, studies document that many investors express ethical, social, moral, and other non-pecuniary demands for portfolios that satisfy certain ESG criteria, such as ‘sin’ stock exclusion (Hong and Kacperczyk, 2009; Derwall and Koedijk, 2009; Renneboog et al., 2011). Catering to these investors may impose non-pecuniary ESG targets as constraints on portfolio return-risk optimization, thereby impeding financially motivated discretionary trading based on ESG information. More importantly, through their prospectus, ESG funds publicly commit themselves to aligning their investments with ESG objectives (Dikolli et al., 2022). Given these constraints, an alternative prediction is that ESG funds may benefit less from discretionary trading on financially material ESG information compared to conventional funds. Therefore, we additionally analyze the costs and benefits of making changes to the funds’ portfolio allocation based on ESG information in terms of overall fund performance and future fund flows.

To better understand if and how ESG and conventional mutual funds differ in the use of ESG information, we study mutual fund trades inferred from holdings data. We derive equity trades of 11,144 ESG and conventional equity mutual funds from around the world, using fund data from Morningstar matched with FactSet’s quarterly holdings data over the period 2014 to 2022. For each firm in a fund’s portfolio, we distinguish its *discretionary* trades from *expected* trades. We measure discretionary trades as the change in stock holdings net of ‘expected trades’ that should occur if a fund invests (divests) its quarterly flows in proportion to recent portfolio weights. We interpret discretionary trades as active positions taken by fund managers in a given quarter.

In the first part of our analysis, we study how portfolio positions of ESG and conventional mutual funds vary with recent and past ESG scores from MSCI and ES incidents from RepRisk. Based on a quarterly fund-holding panel, we find that both conventional and ESG funds increase their discretionary positions in stocks with higher ESG ratings, but ESG funds respond with greater magnitude. With respect to stocks’ past ES incidents, however, ESG and conventional funds exhibit opposite discretionary trading responses: conventional funds’ discretionary trades rise in firms with more incidents, whereas ESG funds’ discretionary trades slightly fall. Altogether, these results support the idea that ESG and conventional funds both deem ESG information relevant, but they also suggest that ESG funds may have different views on how this information matters for stock

selection. In addition, ESG funds and conventional funds exhibit different responses in expected trades to ESG criteria, implying they differ in recent portfolio weights. To illustrate, following capital inflows, we expect conventional funds to purchase fewer shares of firms with higher ESG scores in smaller proportions, whereas ESG funds have an intuitively plausible larger exposure to firms with higher ESG ratings.

Interestingly, expected trades suggest that conventional funds have a relatively lower exposure to firms with more ES incidents than ESG funds, which is perhaps counterintuitive. This could imply that investors mainly expect ESG-labeled funds to hold portfolios that tilt towards higher ESG ratings only. If so, this expectation may impede ESG fund managers in discretionary trading based on other material ESG information, consistent with financial theory (e.g., Pedersen et al., 2021) and survey evidence (Edmans et al., 2025). To delve deeper into this possibility, we explore whether ESG funds face constraints in actively trading away from stocks with ES incidents when they are expected to hold portfolios with high ESG scores to meet investors’ ESG preferences and/or their mandates’ ESG objectives. In a triple interaction specification with various fixed effects specifications, we find that relative to conventional funds, only for the set of stocks with above-median high ESG scores do ESG funds exhibit greater discretionary positions *increases* in firms with more ES incidents. For other stocks, ESG funds’ discretionary positions decrease with more ES incidents. These findings could indicate that, due to explicit or implicit mandates, ESG mutual funds may be more restricted than conventional funds in discretionary trading on ESG information.

Even if ESG and conventional funds are to respond differently to ESG information, this does not necessarily mean that they possess different stock-picking abilities. In subsequent sections of the paper, we investigate this ability in two ways. First, we study how well fund discretionary trades anticipate developments in firms’ future social and environmental performance. In our fund-firm-quarter panel, we estimate that ESG and conventional funds’ *total* position changes in a stock are unrelated to the stock’s future ES incidents, but ESG funds are more likely than conventional funds to make *discretionary* trades away from stocks with more incidents in subsequent quarters. We find similar results when we limit our sample to incidents flagged as ‘severe’ by RepRisk and take place four quarters into the future, or when we control for firms that never experienced a negative ES incident in the sample. This suggests that ESG funds may, to some degree, increase their positions in stocks that see fewer negative ES incidents in the future.

Next, in an alternative analysis, we estimate at the fund level a fund’s average quarterly propensity to pick stocks with fewer future ES incidents, controlling for fund category-fixed effects and

fund characteristics. Here, we find no apparent significant difference in this propensity measure *between* ESG and conventional funds across time. Instead, it is our propensity measure on past ESG ratings that convincingly corroborates that ESG funds, primarily in Europe, have a greater propensity to trade on past ESG ratings than their conventional peers.

Second, we turn to the question of whether the extent of discretionary trading on ESG information matters for overall mutual fund performance. Even though funds might not differ in propensities to stock-pick on ES(G) information, their performance can nevertheless differ if funds take active positions in a somewhat alternative set of stocks that perform differently. Therefore, controlling for fund-time fixed effects and time-varying fund characteristics, we relate discretionary trading propensities to quarterly risk-adjusted returns as predicted by Fama-French and Carhart models, respectively. Interestingly, we find that a greater propensity to trade away from stocks with future ES incidents reduces conventional fund performance, although this effect is less pronounced once we consider cross-sectional variation by replacing fund-fixed effects with Morningstar fund category-fixed effects. Nevertheless, ESG funds are not unequivocally better able to translate discretionary trading ahead of ES incidents into higher returns. We instead observe that a greater propensity of discretionary trading on MSCI's ESG ratings positively relates to conventional fund performance, but this relation largely disappears for ESG funds. Thus, despite exhibiting a lower average propensity to increase active positions in firms with higher ESG scores, only conventional funds are able to improve their performance when increasing those active positions. These results could further suggest that ESG funds face greater constraints in discretionary trading on financially material ESG information, despite their greater tendency to integrate stock-level ESG ratings in their active portfolio management.

Because investors interested in ESG investing may not focus exclusively on financial returns, it is possible that funds are incentivized to undertake discretionary trading on (forward-looking) ESG information due to investors' ESG preferences. These investors may prefer discretionary trading on certain ESG topics while accepting a lower return (see e.g., Riedl and Smeets, 2017; Hartzmark and Sussman, 2019).

In the third part of our paper, we thus examine how the aforementioned propensities relate to fund flows. In the cross-section, controlling for category-fixed effects, in line with former literature, we document that a 1.6 percentage point higher flow is associated with having an ESG classification. We find little evidence that funds enjoy additional flows from discretionary trades based on ESG ratings. However, investors additionally reward ESG funds when they trade more than expected

toward firms with fewer ES incidents in the future. These results indicate that ESG funds may have some flow-based incentives to actively pick stocks based on ESG information: investors may reward ESG funds that have a positive track record of picking stocks without negative (future) ES incidents.

Taken together, our study provides five key insights into mutual funds’ discretionary trading on ESG information. First, we present evidence that both ESG and conventional funds deem certain ESG criteria important for their portfolio’s discretionary stock selection. This complements recent professional investor surveys indicating that ESG information is material to institutional investors beyond those with an explicit ESG label (e.g., Edmans et al., 2025; Bauer et al., 2024); studies on the portfolio compositions of institutional investors and mutual funds (e.g., Gibson Brandon et al., 2022; Berg et al., 2024; Jin et al., 2025); and a large literature on the link between ESG factors, firm value and stock returns<sup>2</sup>. Second, while both groups trade on this data, ESG funds exhibit significantly stronger conviction regarding past ESG ratings and, to a lesser extent, ES incidents. Third, we note a ‘ESG constraint’: relative to conventional funds, ESG mutual funds appear less flexible in their discretionary trading on ESG information due to—implicit or explicit—investor expectations for high aggregate ESG rating funds (consistent with Berg et al., 2024; Edmans et al., 2025). Fourth, we find that this lack of flexibility in discretionary trading is costly. In fact, compared to conventional funds, ESG funds with a greater propensity to actively trade on high ESG scores experienced reduced fund performance. Fifth, we show that this behavior is driven by flow-based incentives: ESG managers are rewarded with quarterly inflows for preempting future incidents even when it does not improve alpha.

Our results contribute to the literature on ESG information in active investment management. Recent studies primarily utilize U.S. data to explore how fund managers incorporate ESG metrics, such as “Active ESG Share” (Cremers et al., 2024), financially material “pulse scores” (Chen et al., 2024), or proactive “ESG skill” (Ceccarelli et al., 2023). While these works document that ESG-tilting can predict returns (Chen et al., 2024; Cremers et al., 2024) or signal manager persistence (Ceccarelli et al., 2023), they do not consider the specific mechanics of discretionary trading.

We extend this literature in three ways. First, we expand the geographical scope beyond the U.S. to a global sample, finding that discretionary ESG trading particularly contributes to returns among European funds. Second, we identify a critical trade-off that managers face: tilting toward high ESG scores versus reacting to immediate negative ES news. Moreover, whereas previous work

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<sup>2</sup>For example, see the work by Krüger (2015); Eccles et al. (2014); Pedersen et al. (2021); Pástor et al. (2022); Derrien et al. (2022); Serafeim and Yoon (2023); Zhang (2025)

focuses on aggregate “green tilts” (Pastor et al., 2025), we specifically analyze how discretionary changes in portfolio weights impact fund performance as well as fund flows.

Furthermore, our paper also contributes to the recent literature that discusses portfolio selection of ESG funds. Work by Jin et al. (2025) and Albuquerque et al. (2025) finds that while ESG funds cater to both “value-based” investors and “values-based” investors<sup>3</sup>, they show little holding deviations from conventional funds. By controlling for fund- and stock-time fixed effects, our paper indeed shows that ESG and conventional funds largely trade the same set of stock holdings. Additionally, we extend on this by not only examining the static portfolio holdings of funds but also by focusing on how ESG and conventional funds actively adjust their positions. By decomposing trades into expected and discretionary position changes, we show that ESG funds exhibit a significantly higher propensity to trade on ESG ratings than conventional funds. This is especially true for our sample of European mutual funds. However, we identify that ESG funds are less flexible in trading away from negative ES incidents when these stocks maintain relatively high ESG scores. We show that while this lack of flexibility is costly for ESG fund performance.

Last, our study contributes to investor surveys that inquire about the perceived financial materiality of ESG information, and in particular, survey evidence from the mutual fund industry (Bauer et al., 2024; Edmans et al., 2025). These surveys suggest that institutional investors-both conventional investors and those explicitly ESG-labeled-deem ESG information financially material. Our study provides evidence that ESG information is indeed material in the context of discretionary trading, but also suggests that ESG mutual funds may be constrained in the integration of ESG information in active stock selection.

Our paper study proceeds as follows. Section 2 describes the data and our measures of expected and discretionary position changes of our sample of funds. Section 3 examines the trading behavior of ESG and conventional funds on stock-level ESG information. Section 4 analyzes the differences in fund performance and investor flows of ESG and conventional funds’ propensities to trade on past and forward-looking ES(G) information. Section 5 concludes.

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<sup>3</sup>Derwall et al. (2011); Starks (2023); Yang and Yasuda (2025).

## 2 Data

### 2.1 Fund level data

From Morningstar Direct, we retrieved monthly data (in USD) on a sample of European and US open-end equity mutual funds between December 2014 and December 2022. We filter for mutual funds domiciled in Europe<sup>4</sup> or the United States, and similar to Ceccarelli et al. (2024), we remove regional and sector-specific equity funds<sup>5</sup>. We drop funds that we cannot match to FactSet Ownership. For our sample of fund share classes with an available ISIN, we download the funds’ net expense ratios from Datastream (LSEG). While Morningstar provides data at share-class level, we use their FundId identifier to aggregate returns, net expense ratios, and assets under management (AUM). To aggregate share-class returns to the fund level, we value-weight the returns and expense ratios using the share classes’ lagged total net assets. We calculate the age of the fund based on inception date of the oldest share class. We calculate fund portfolio turnover by taking the lesser of purchases or sales, and dividing that by the fund’s quarterly net assets at the end of the previous quarter.

Table 1 reports descriptive statistics on fund-level variables. Following Ceccarelli et al. (2024), we limit our sample to fund periods in which mutual funds are at least 1 year old. Additionally, we require them to have assets under management of at least 1 million USD in our sample. In addition, consistent with the price pressure literature, we remove funds that experienced extreme changes in TNA (Coval and Stafford, 2007). We require funds to experience TNA changes within the bounds of  $-0.5 < \Delta TNA_{i,t}/TNA_{i,t-1} < 2.0$ . Lastly, we trim the values of the fund expense ratio and portfolio turnover on the 0.5th and 99.5th percentiles.

The median quarterly fund flow is -0.84%, consistent with the literature that investigates flows of equity funds (Gantchev et al., 2023; Wang, 2024), but the values on the 1st and 99th percentiles show extensive variation in fund flow over time.

To identify the funds that are classified as ‘ESG’ funds, we use the Morningstar Sustainable Attributes framework that identifies funds deemed a ‘General ESG Investment’. Morningstar, in their 2022 report, describes that “General ESG Investments endeavor to promote sustainability and

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<sup>4</sup>This includes all countries part of the EEA as well as the United Kingdom, Norway, Switzerland, and Liechtenstein.

<sup>5</sup>We include funds with the following Morningstar Categories: ‘Global Emerging Markets Equity’, ‘Global Equity Large Cap’, ‘Global Equity Mid/Small Cap’, ‘Europe Emerging Markets Equity’, ‘Europe Equity Large Cap’, ‘Europe Equity Mid/Small Cap’, ‘Equity Miscellaneous’, ‘UK Equity Large Cap’, ‘UK Equity Mid/Small Cap’, ‘US Equity Large Cap Blend’, ‘US Equity Large Cap Growth’, ‘US Equity Large Cap Value’, ‘US Equity Mid Cap’, ‘US Equity Small Cap’

minimize negative impact, without focusing on a specific theme or area of action” (p. 1)<sup>6</sup>. Morningstar determines whether a mutual fund is an ESG Investment “after a review of the prospectus or offering documents most relevant in the investment products country of registration” (p. 1). We consider a mutual fund to be ‘ESG’ fund if, during the majority of our time series, the respective fund is classified as such by Morningstar. In our sample of fund-quarters, 28% are from ESG Funds, and we consider the remaining 72% to pertain to conventional funds.

## 2.2 Holdings panel

We match the Morningstar data with data on mutual fund holdings from FactSet ownership (see also the work by Ferreira and Matos, 2008; Ceccarelli et al., 2023). Using the ISINs of the share classes reported by Morningstar, we gathered from FactSet (formerly Lionshares) the quarterly equity holdings of the funds in our sample from December 2014 to December 2022.

Each quarter, starting in 2014-12 and ending in 2022-12, we retrieved for each holding in a fund the local FactSet identifier<sup>7</sup>, the position, and the weight in the fund’s portfolio. Although funds are often made up of multiple share classes, they are matched to one single portfolio of holdings. Therefore, for every fund, in every quarter, we identify the first share class for which FactSet reports its holdings. Consequently, our share-class level holdings data is mapped to the fund level. In total, our sample contains 53,603 unique FactSet holding identifiers.

To link holdings with company-level data, we match holding identifiers to FactSet’s permanent security identifier “*FSYM\_SECURITY\_ID*”<sup>8</sup>. From FactSet Prices and FactSet Reference Data, we additionally retrieve information on the security type of the holdings. In our fund holdings panel, we only keep holdings that are categorized as shares. Lastly, from FactSet Fundamentals, we retrieve information on whether the stock in our holdings database is the primary security of the respective company<sup>9</sup>. Our final sample contains 31,824 unique global *FSYM\_SECURITY\_IDs*.

To identify unique fund-holding combinations, in every quarter we combine the Morningstar

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<sup>6</sup>Morningstar Sustainable Attributes, 2022: [https://assets.contentstack.io/v3/assets/blt4eb669caa7dc65b2/bltd622f21f7860fdb4/Morningstar\\_Sustainable\\_Attributes\\_Definitions.pdf](https://assets.contentstack.io/v3/assets/blt4eb669caa7dc65b2/bltd622f21f7860fdb4/Morningstar_Sustainable_Attributes_Definitions.pdf)

<sup>7</sup>In FactSet’s ownership module, we use the function “*OS\_TOP\_HLDG\_LOCID*” to gather the identifier for the holdings. FactSet uses the historical ticker, the header ticker, the Sedol, or cusip to identify the individual holdings.

<sup>8</sup>In cases FactSet did not provide a link between holding identifier, *OS\_TOP\_HLDG\_LOCID*, and the permanent security identifier, “*FSYM\_SECURITY\_ID*”, we would (1) identify the specific funds and quarters in which that holding was present, and (2) we would manually download the specific funds’ holdings again using an alternative identifier from the FactSet ownership module, using *OS\_TOP\_HLDG\_SEDOL* or *OS\_TOP\_HLDG\_CUSIP* and *OS\_TOP\_HLDG\_NAME* to assign a different identifier as well as the correct holding name to the local holding identifier *OS\_TOP\_HLDG\_LOCID*. Lastly, (3) we would use the manually gathered identifier to make a correct match to FactSet’s permanent security identifier.

<sup>9</sup>As multiple local FactSet identifiers can be matched to a single FactSet permanent security identifier, we gather this data for both identifiers. First, we filter out the FactSet permanent identifiers that are not the primary security. We then additionally filter out the remaining FactSet local identifiers that are not deemed a primary security.

*FundId* with the FactSet Permanent Security Identifier, *FSYM\_SECURITY\_ID*. We make sure that the fund-holding-quarter panel is balanced by creating an empty dataframe ranging from Q4 2014 to Q4 2022 for all unique *FundId* - *FSYM\_SECURITY\_ID* combinations. To this balanced panel, we merge the fund-holding-quarter level data, such as the holding positions and weights of the respective funds. As we are interested in measuring trades of funds based on the current and last quarter’s reporting date, we drop funds for which we find that FactSet has gaps concerning the funds’ holding information. We find that 361 Morningstar *FundIds* have gaps in their holdings data as gathered through FactSet Ownership. Additionally, we follow the literature and impose that the funds in our sample should have at least 10 individual holdings in their portfolio at one moment<sup>10</sup>.

Finally, we reduce the fund-quarter observations for which cash as a percentage of assets under management exceeds the 0.5 and 99.5 percentiles<sup>11</sup>.

### 2.2.1 Stock level characteristics

We match 31,824 primary stocks in our global sample with quarterly accounting- and market-based data from Compustat and CRSP, following Jensen et al. (2022). To analyze the active trading behavior of mutual funds with respect to stocks’ ESG characteristics, we consider various metrics that we match to our fund-holding-quarter panel: firm-level MSCI ESG scores and RepRisk environmental and social (ES) incidents.

Recent literature emphasizes the role that firm ESG ratings play in influencing the trading decisions of mutual funds (Gantchev et al., 2023; Berg et al., 2024; Ceccarelli et al., 2023; Chen et al., 2024). MSCI in particular seems to be one of the most influential (Berg et al., 2024; Serafeim and Yoon, 2023): of the largest 100 ESG funds globally, 17% of these used MSCI for benchmarks and ESG data in 2022<sup>12</sup>. ESG scores issued by MSCI assess the extent to which firms are exposed to financially material Environmental, Social, and Governance risks. Moreover, MSCI assesses how the firm manages these risks. MSCI calculates an “Industry-Adjusted Score” that benchmarks raw key issue scores to industry peers. The score ranges from 0 to 10, where a score of 0 indicates the

<sup>10</sup>Here, we follow Huang et al. (2023) as we are interested in the variation in changes in the portfolio allocations of funds. Work on pressure trading and position changes by Coval and Stafford (2007) and Gantchev et al. (2023) impose a restriction of at least 20 holdings per fund in their sample period.

<sup>11</sup>We control for sudden abnormalities in the FactSet ownership data. For example, for fund Sparinvest SICAV - European Value with ISIN code LU1616402803, FactSet Ownership for < Q1 2017 shows an average percentage of cash and or short-term positions of about 2.5%. In Q1 2017 and Q2 2017, the weights of the stock holdings are inflated to make up a total stock portfolio of 2,181.69% and 2,286.69%, respectively. Hence, FactSet Ownership sets the total weights of the cash and short-term positions equal, respectively, -2,080.69% and -2,186.69% to ensure that the final equity portfolio adds up to 100.0%. From Q3 2017 onward, the fund’s percentage of cash within the portfolio falls to 1.64-2.10%. A search in the official Sparinvest semiannual report for Q2 2017 showed that cash as a percentage of net assets in reality was 3.44%.

<sup>12</sup><https://www.opimas.com/research/874/detail/>

worst management of ESG risks<sup>13</sup>.

We complement these two metrics with data from RepRisk. RepRisk screens, on a daily basis, large sets of documents and media (e.g., print media, government bodies, social media, and newsletters), in which it monitors material ESG risks of companies in 23 different languages. They purposely omit information coming from company-disclosed information. From 2007 onward, RepRisk has recorded company-level risk incidents, classifying them according to 28 mutually exclusive ESG issues<sup>14</sup>. Environmental issues include, for example, climate change, pollution, and waste. Social issues include child labor, human rights abuses, and discrimination.

In this paper, we collect the number of incidents labeled by RepRisk as negative environmental or social (ES) issues for each firm-quarter. RepRisk’s coverage increases over time both in terms of reported incidents as well as unique firms (He et al., 2023; Derrien et al., 2022)<sup>15</sup>. The number of environmental and social incidents<sub>*t*</sub> denotes the number of all RepRisk incidents of firm *j* that are characterized as an environmental or social issue in quarter *t*. Table 2 reports the stock level characteristics in our fund-holding panels. Panel B shows that the median number of environmental and social incidents per fund-firm per quarter is 0. The mean (1.547) and 99th percentile (24 incidents) show that the majority of fund holdings do not have a RepRisk incident in the respective quarter. As RepRisk is news-based instead of being based on company disclosures, it may better reflect the company’s outcomes of management of ESG risks than ESG scores.

Active investment decisions may respond to past incidents or use forward-looking information to stock-pick holdings that see fewer environmental and social incidents in the future. For our sample of stock holdings, we consider the current quarter, the previous quarter, and the next two or four quarters’ cumulative number of ES incidents<sup>16</sup>.

All non-USD market information is converted to USD using the foreign-USD exchange rates from Compustat. Following Jensen et al. (2022), all accounting data assumes a four-month lag between the end of the firm’s fiscal period and the public availability of the data. Values in local, non-US currencies are again converted using the last available foreign exchange rate of Compustat. We follow Fang et al. (2014); Gantchev et al. (2023): 1) We calculate the natural logarithm of the company’s market capitalization, *Ln Market Capitalization*; 2) the ratio of gross debt to book

<sup>13</sup>The Industry-Adjusted Company scores are finally mapped to MSCI’s letter ratings, aiding investors in distinguishing the leaders, laggards, and average ESG-performing firms.

<sup>14</sup>The Issues were defined per key international standards set by, for example, the World Bank, OECD, and United Nations. <https://www.reprisk.com/content/static/reprisk-esg-issues-definitions.pdf>

<sup>15</sup>RepRisk, additionally, ranks the reported incidents on ‘severity’ based on the incident’s consequences regarding ESG issues. Severity is measured on a scale from one to three, where two and three represent ‘Severe’ and ‘Very severe’, respectively.

<sup>16</sup>That is, in *t* + 4, we cumulatively count all E and S incidents that occur in quarters *t* + 1 to *t* + 4.

value of assets, *Leverage*; 3) the firm’s book value over the most recent market capitalization, *Book/Market*; 4) the quarterly stock return *Quarterly stock returns*; 5) the firm’s 1-year sales growth, *Sales Growth*; 6) the firm’s quarterly income scaled by the book value of total assets, *ROA*; and 7) the stock turnover which is defined as the stock’s quarterly trading volume over its total shares outstanding, *Stock turnover*. We report the descriptives in Table 2

### 2.3 Measuring trades by mutual funds

For our sample of European and US mutual funds, we are interested in the active—discretionary—trading behavior of ESG and conventional funds.

To quantify the active trading behavior of mutual funds from their total trading, we need to isolate the funds’ discretionary trading. Literature on fund trading behavior (e.g., Coval and Stafford, 2007; Van der Beck, 2021; Heath et al., 2023; Albuquerque et al., 2025) delineates the flow-driven or ‘mechanic’ trades from funds’ discretionary trades. ‘Expected’ trades assume that mutual funds maintain their percentage of holdings of stock  $j$  at the beginning of the quarter,  $w_{i,j,t-1}$ , and reinvest incoming dollar flows proportionally. Coval and Stafford (2007) finds that between 1980 and 2004, funds maintain 27 to 45 percent of their positions following different degrees of inflows and outflows. Hence, key to estimating fund  $i$ ’s discretionary trades of stock  $j$  between quarter  $t - 1$  and quarter  $t$ , is estimating the fund’s flow-driven, expected trades of the individual stock.

First, following Ceccarelli et al. (2024); Gantchev et al. (2023); Giannetti and Jotikasthira (2024), we define fund  $i$ ’s total trades of stock holding  $j$  between quarters  $t - 1$  and  $t$  as the total dollar position changes in holding  $j$ , over the fund’s previous quarter’s total assets under management: *Position change* in a stock, measured as the change in the position of fund  $i$  in stock  $j$  in quarter  $t$ :

$$Position\ change_{i,j,t} = \frac{Price_{j,t-1} \times (NumberShares_{i,j,t} - NumberShares_{i,j,t-1})}{AUM_{i,t-1}} \quad (1)$$

*Position change* <sub>$i,j,t$</sub>  captures both flows-driven expected trades and discretionary trades. To We first determine the quarterly flows of fund  $i$  between quarters  $t - 1$  and  $t$  following Sirri and Tufano (1998):

$$Flow_{i,t} = \frac{[TNA_{i,t} - TNA_{i,t-1} * (1 + R_{i,t})]}{TNA_{i,t-1}} \quad (2)$$

where  $TNA_{i,t}$  is the total net assets for fund  $i$  at the end of the quarter  $t$ , and  $R_{i,t}$  is the quarterly return for fund  $i$  in quarter  $t$ . As our fund data from Morningstar is on a monthly basis, we

compound our monthly fund returns into quarterly fund returns.

Second, for our baseline, we define expected trades of stock  $j$  for every quarter  $t$  as the buys of shares (sales) resulting from a prorated dollar flow coming in (out of) the fund, keeping previous quarters' holding weights constant:

$$\begin{aligned} \text{Expected position change}_{i,j,t} &= \frac{\text{Weight}_{i,j,t-1} \times (\text{Flow}_{i,t} \times \text{TNA}_{i,t-1})}{\text{TNA}_{i,t-1}} \\ &= \frac{\text{Position}_{i,j,t-1} \times \text{Price}_{j,t-1} \times \text{Flow}_{i,t}}{\text{TNA}_{i,t-1}} \end{aligned} \quad (3)$$

where  $\text{Position}_{i,j,t-1}$  is the number of shares held of stock  $j$  by fund  $i$  in quarter  $t - 1$  and  $\text{Weight}_{i,j,t-1}$  is the weights of stock holding  $j$  in fund  $i$  in quarter  $t - 1$ <sup>17</sup>.  $\text{Flow}_{i,t}$  are percentage quarterly flows as defined in Equation (2). Simplifying Equation (3), we estimate the expected position changes of fund  $i$  in stock  $j$  in  $t$  as  $\text{Weight}_{i,j,t-1} \times \text{Flow}_{i,t}$ <sup>18</sup>.

In our study, we are particularly interested in measuring deviations of the expected trading behavior of funds. We estimate active discretionary position changes as the difference between fund  $i$ 's total position changes and fund  $i$ 's expected position changes of stock holding  $j$  between  $t - 1$  and  $t$ :

$$\text{Discretionary position change}_{i,j,t} = \text{Position change}_{i,j,t} - \text{Expected position change}_{i,j,t} \quad (4)$$

Stocks that in quarter  $t - 1$  were not being held by the fund (i.e.,  $\text{Position}_{i,j,t-1} = 0$ ) would see an expected trade of 0. To minimize measurement error and control for index inclusions in our main analyses, we will limit our fund-holding-quarter panel to funds' trades of their pre-existing holdings—that is  $\text{Position}_{i,j,t-1} \neq 0$ )<sup>19</sup>.

To control for outliers in our trade estimates, we trim the measures  $\text{Position change}_{i,j,t}$  and  $\text{Expected position change}_{i,j,t}$  on the 0.5 and 99.5th percentiles.  $\text{Discretionary position change}_{i,j,t}$  is the difference of these two trimmed measures.

Panel A of Table 2 shows summary statistics on the measures of the quarterly position changes and ownership changes for our full sample of funds, while Panel B shows summary statistics for

<sup>17</sup>While we use the weights provided by the FactSet Ownership module, one may calculate these portfolio weights manually as  $\frac{\text{Price}_{j,t-1} \times \text{NumberShares}_{i,j,t-1}}{\text{TNA}_{i,t-1}}$ .

<sup>18</sup>While we normalize the expected trades of Equation (3) by the assets under management of fund  $i$  in  $t - 1$ , as a robustness, we additionally normalize the expected trades by the shares outstanding of firm  $j$  (see the literature on changes in ownership: Coval and Stafford, 2007; Ekholm and Maury, 2014; Wardlaw, 2020; Huang et al., 2023).

<sup>19</sup>We run our estimates also for the full sample, whose results we report in Appendix B. In this specification, we include discretionary trades made by funds to holdings they, in the previous quarter  $t - 1$ , did not yet hold. Similarly, we include holdings that are completely sold off between quarter  $t - 1$  and  $t$ . On the extensive margin, funds may make informed decisions about which holdings to include and which to divest fully.

trades using only funds’ pre-existing holdings. One insight from Table 2 is that discretionary position changes exhibit greater volatility in Panel A. Part of this discretionary trade variation arises whenever a fund includes, in a given quarter, a company that was not held in the previous quarter. To better understand how discretionary ownership relates to a firm’s future ESG performance, we report standardized coefficients across all regressions that are central to this paper.

### 3 Empirical results

Existing literature describes that beliefs about the financial materiality of ESG remain heterogeneous (Pástor et al., 2021; Starks, 2023). However, the extent to which this heterogeneity is polarized by traditional ESG vs. non-ESG fund categories has recently been nuanced: survey evidence by Edmans et al. (2025) finds that both ESG and conventional institutional investors indicate they believe that ES(G) performance can lead to stock outperformance. Instead, ES-related constraints (e.g., funds with an ESG mandate and/ or an investor base with non-pecuniary preferences) can affect the portfolio allocation of European and US-domiciled equity mutual funds (Edmans et al., 2025). Hence, we seek to better understand if and how ESG funds trade differently on ESG information than conventional funds. Specifically, we examine the extent to which ESG and conventional funds actively change their portfolio allocation on stock ESG scores; the extent to which they respond to negative ES incidents, or trade to preempt future (severe) incidents; and the extent to which ESG and conventional funds may face a trade-off between trading on said ESG scores and ES incidents within and between their discretionary and expected position changes.

#### 3.1 Mutual funds’ discretionary trades and past ESG information

In this section, we analyze the extent to which ESG and conventional mutual funds’ quarterly trades vary with recent and past (changes in) ESG scores and ES incidents. Considering three trading estimates—total, expected, and discretionary position changes—we estimate using a fund–firm–time panel:

$$\begin{aligned} Trades_{i,j,t}^* = & \beta_1 MSCI\ ESG_{j,t-1} + \beta_2 MSCI\ ESG_{j,t} \times ESG\ Fund_i + \beta_3 \# ES\ Incidents_{j,t} + \\ & \beta_4 \# ES\ Incidents_{j,t} \times ESG\ Fund_i + \gamma' \mathbf{X}_{j,t-1} + \theta_{i,t} + \varepsilon_{i,j,t} \end{aligned} \quad (5)$$

where we regress fund  $i$ ’s total, expected, and discretionary position changes of holding  $j$  between

quarters  $t - 1$  and  $t$  on the firm’s MSCI ESG score, interacting this with an indicator of whether the fund that trades is an ESG fund based on Morningstar’s classification<sup>20</sup>.

We include fund  $\times$  year-quarter fixed effects,  $\theta_{i,t}$ , to control for funds’ potential tendency to trade in a given quarter. Additionally, with term  $\gamma' \mathbf{X}_{j,t-1}$  we control for lagged time-varying stock characteristics that could be correlated with the firm’s ESG scores, such as firm size, leverage, sales growth, return on assets, and past stock return, similar to Gantchev et al. (2023).

Table 3 shows the results. The first main insight from columns (a)-(f) in Table 3 is that both ESG funds and conventional funds use current and one-quarter lagged ESG ratings to make discretionary trades. In contrast, conventional funds’ total position changes appear unresponsive to ratings (see columns a and b), unlike total position changes of ESG funds. Hence, it appears that total position changes may conceal the importance that ESG fund managers assign to ESG information for the purpose of stock selection, relative to conventional mutual funds.

Second, however, the interaction terms in columns (c) and (d) do indicate that the discretionary trades of ESG funds and conventional funds differ in magnitude in their response to ESG ratings. Conventional funds tend increase their positions slightly for every unit increase in a stock’s industry-adjusted MSCI ESG score, and this estimated response is significant at 5% in columns (c) to (f). In contrast, the estimated interaction effects between *MSCI ESG* and *ESG Fund* consistently indicate that ESG funds’ response to MSCI’s ESG ratings is significantly more positive. On aggregate, in columns (a) and (b), ESG Funds increase their positions in stocks that have a higher ESG score.

The second main result from Table 3<sup>21</sup> concerns fund managers’ trading response to RepRisk’s current and past ES incidents. In columns (a) and (b), we do not see a statistically significant response from either fund group. However, columns (c) and (d) indicate that ESG funds and conventional funds differently integrate recent ESG incidents in active stock selection. ESG funds somewhat decrease their discretionary positions in stocks with more ES incidents in the current and past quarter, whereas conventional funds increase their discretionary positions. This result interestingly contrasts with the direction of funds’ expected trades in columns (e) and (f). Conventional funds’ expected trades move away from stocks with more ES incidents. Since expected trades are determined by fund flows pro-rated by the stock  $j$ ’s weight in fund  $i$ ’s portfolio, it appears that conventional funds in our sample had smaller portfolio weights in stocks with more incidents. To isolate the effect of funds’ ESG mandate more robustly, in Table 4 we also control for stock  $\times$

<sup>20</sup>As Morningstar bases its indicator on funds’ prospectuses, we argue that Morningstar’s ESG Fund indicator proxies for whether the fund has an ESG mandate.

<sup>21</sup>We present the unstandardized estimates in Table 15.

year-quarter fixed effects. In this respective setting, we not only measure if ESG funds are more sensitive to ES incidents than conventional funds when choosing *between* stocks in their portfolio. Instead, we can additionally control for unobserved firm-level shocks: we identify the difference in trading behavior between an ESG fund  $i$  and a conventional fund  $k$  holding the exact same stock  $j$  in the exact same quarter. Our results in columns (1)-(3) are consistent in terms of magnitude and significance with those presented in 3.

Interestingly, the positive coefficients on the interaction between *#ES Incidents* and *ESG Fund* in Tables 4 and 3 suggest that ESG funds’ previous quarter’s portfolio tilts are relatively *stronger* in firms with recent or past ES incidents. One explanation for this limited response may lie in the dual objective that ESG funds may pursue. ESG investing attracts not only ”value-based” investors but also ”values-based” investors (Derwall et al., 2011; Starks, 2023), who may have intrinsic preferences to hold a portfolio that satisfies specific ESG constraint such as exposure to stocks with high ESG scores. Indeed, Hartzmark and Sussman (2019) shows that U.S. funds receiving a high Morningstar sustainability rating experienced more capital inflows than those with a low-rating right after the launch of these ratings, and they provide evidence that investors partially have non-pecuniary motives to invest in high-rated funds. If fund managers seek to cater to values-based investors by investing in high-ESG stocks, they may be hindered in discretionary trading on the basis of other material ESG information that would serve pecuniary goals. Survey evidence (Edmans et al., 2025) suggests that fund managers do experience certain constraints when investing based on ESG.

In Table 5, we explore whether ESG funds face such constraints when actively trading on past ES incidents. We present a triple interaction between *ESG Fund*, previous quarter’s ES incidents of stock  $j$ ,  $\# ES Incidents_{t-1}$ ; and an indicator whether the stock  $j$  has a (i) top 50% or (ii) ‘Leaders’ ESG score,  $Top ESG_{t-1}^{50\%}$  or  $Top ESG_{t-1}^{Leader}$ , respectively<sup>22</sup>. When controlling for both fund  $\times$  year-quarter and stock  $\times$  year-quarter fixed effects, we measure how ESG funds differ from conventional funds in responding to stock-level ES incidents, depending on whether that stock  $j$ ’s ESG score is high or low. Columns (1)-(2) show that while ESG funds trade away from stocks that in the past saw ES incidents ( $\# ES Incidents_{t-1} \times ESG Fund$ ), the triple interaction effect with  $Top ESG_{t-1}^{50\%}$  on both total and discretionary position changes is positive and significant at 1%. This indicate that ESG-mandated funds are less likely to divest (partly) from a high-ESG scoring firm after an incident compared to a low-ESG firm. The effect is stronger for firms that are assigned a ‘ESG Leader’ label (columns (4)-(5)). These results could imply that ESG-mandated funds face a tradeoff between tilting their portfolios to high ESG-rated stocks and being able to respond to ES-related

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<sup>22</sup>MSCI labels the top ESG scoring firms—i.e., those with a score between 7.142 and 10—as ‘ESG Leaders’.

incidents.

On the whole, we corroborate that past ESG information matters for discretionary trading by fund managers, not just those ESG funds but also those of conventional funds. However, we also conclude that conventional funds differ from ESG in their response to past ESG information. Furthermore, our results suggest that ESG funds could be constrained in ESG-based discretionary trading as a result of having to tilt portfolios to stocks with high ESG scores<sup>23</sup>.

### 3.2 Mutual funds’ discretionary trades and future ESG information

The previous section analyzed how ESG and conventional funds use *past* ESG information in discretionary trades. A standard view in literature is that fund managers take active (dictionary) positions in those stocks they expect to experience improved performance going forward, while underweighting stocks they predict will underperform. Whether the active positions of ESG and conventional funds to some extent successfully anticipate stocks’ *future* ESG performance is the focus of this section.

A large literature on mutual fund performance reports mixed evidence on whether managers have the skill to select future positive-alpha stocks (e.g., Solomon et al., 2014; Kacperczyk et al., 2014; Akepanidaworn et al., 2023). In relation to firms’ ESG performance, prior related work presents some evidence of “ESG skill” among ESG fund managers; e.g., (e.g., Ceccarelli et al., 2023), Cremers et al. (2024). Given their explicit focus on ESG issues, one could reason that ESG funds possess proprietary information about future developments in firms’ ESG performance. On the other hand, survey evidence by Edmans et al. (2025) suggests that the ESG performance of firms may be (indirectly) financially material, affecting factors such as “operational performance or corporate culture” (p. 15). Given this financial materiality, one could expect that also conventional managers have an interest in predicting firms’ future ESG performance if doing so benefits fund performance.<sup>24</sup> Moreover, as our results in Section 3.1 suggest, funds with an ESG mandate may face ESG constraints, which could hinder implementation of discretionary trades that would successfully anticipate future ES incidents.

Again, using a fund–firm–time panel, we consider three trading estimates—total, expected, and discretionary position changes:

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<sup>23</sup>In Table 16 we log transform our measure of ES RepRisk incidents,  $\#ES\ Incidents$ , by  $\ln(1 + \#ES\ Incidents)$ . The results are very similar to our main specification.

<sup>24</sup>Work by Derrien et al. (2022) shows that negative ESG news negatively affects analyst forecasts on future firm value. The authors find that the forecasters expect lower future sales and are correct in their downward revision.

$$\begin{aligned}
Trades_{i,j,t}^* = & \beta_1 MSCI\ ESG_{j,t-1} + \beta_2 MSCI\ ESG_{j,t-1} \times ESG\ Fund_i + \\
& \beta_3 \# ES\ Incidents_{j,t+s}^{cumulative} + \\
& \beta_4 \# ES\ Incidents_{j,t+s}^{cumulative} \times ESG\ Fund_i + \gamma' \mathbf{X}_{j,t-1} + \theta_{i,t} + \varepsilon_{i,j,t}
\end{aligned} \tag{6}$$

where  $t+s$  with  $s \in \{2, 4\}$  such that  $\# ES\ Incidents_{t+2}^{cumulative}$  and  $\# ES\ Incidents_{t+4}^{cumulative}$  denote the cumulative number of ES incidents within quarters  $[t+1, t+2]$  and  $[t+1, t+4]$ , respectively<sup>25</sup>. We control for fund  $\times$  year-quarter fixed effects,  $\theta_{i,t}$ , as well as lagged MSCI ESG score, and time-varying stock characteristics such as firm size, leverage, sales growth, return on assets, and past stock return.

Table 6 presents the results of Equation (6). ESG and conventional funds do not show a significantly different behavior when it comes to their total position changes away or towards stocks that exhibit a higher number of ES incidents in the upcoming half or full calendar year (columns (a)-(b)). Instead, ESG funds tend to tilt their portfolios towards firms with higher ESG scores (columns (a)-(f)). Nevertheless, columns (c)-(d) indicate that ESG funds are more likely than conventional funds to trade away from stocks that in the next quarters will have more ES incidents. The results of the interaction effects are similar when we merely focus on future incidents in a short-term window,  $t+1$ , or log-transform the total number of incidents. We present these results in Table 7. While not presented in the paper, the results Table 6 additionally remain consistent when we remove fund-holding observations for which the count of cumulative ES incidents is zero.

We additionally use an alternative set-up in Table 8 in which we aim to control for any anticipation effects of RepRisk ES incidents in the market. We do this by limiting our sample of incidents to those denoted as ‘severe’ by RepRisk to control for systematic, smaller incidents. Moreover, we focus only on severe ES incidents that occur in quarter  $t+4$ , rather than cumulating all incidents in the window  $[t+1, t+4]$ . Similar to Derrien et al. (2022), we give equal weights to firms with 1 incident versus those with multiple, and create a dummy variable that takes on the value 1 when holding  $j$  in future quarter  $t+4$  has 1 or more severe incidents. We both include fund  $\times$  year-quarter fixed effects (columns (1)-(3)), and fund  $\times$  year-quarter fixed effects and stock  $\times$  year-quarter fixed effects (columns (4)-(9)) to control for fund- and stock-specific shocks that incentivize trading.

ESG-mandated funds actively decrease their positions by 0.35-0.69 basis points in firms that in four quarters from now will have 1 or more severe ES incidents. Interesting from columns (7)-(8) is the observation that ESG funds tend to keep holding on to stocks that are considered by MSCI

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<sup>25</sup>In this sense we follow the specification of He et al. (2023).

as ‘ESG Leaders’, regardless of whether these stocks are flagged for a severe ES incident in four quarters from now<sup>26</sup>.

We can interpret the results of Table 8 as follows: at first glance, one may argue that ESG funds are potentially more able than conventional funds to detect proprietary ES information that helps them detect and trade on (severe) negative ES incidents in advance (i.e., have “ESG skill”). This interpretation is consistent with Ceccarelli et al. (2023), who suggest that proactive ESG funds are able to predict future changes in ESG ratings. Interestingly, the effect is strongest when we only consider trades made on the intensive margin: instead of actively excluding stocks for preempting (severe) future ES incidents, ESG funds sell more than expected certain holdings by reweighting their holdings on the intensive margin. Section 3.3 further explores the ESG and conventional funds’ tendency to actively trade toward holdings with fewer future ES incidents or higher ESG scores.

### 3.3 Fund-level propensities to trade on past or future ESG information

So far, our study provides some evidence that, on average, discretionary trading by ESG-oriented and conventional funds seems, to some degree, to have predictive power in the future developments in firms’ ESG performance. Additionally, ESG funds’ portfolio holdings are expected to contain high ESG stocks. In Section 3.1, we reveal that ESG funds are *less* likely to sell stocks with past ES incidents if that stock was considered an “ESG Leader”.

Therefore, in this section, we investigate at the fund level how much ESG and conventional funds vary over time in their *propensity* to trade stocks before future ES incidents occur. Comparing the development of ESG funds’ propensities with those of conventional funds allows us to further assess whether these funds trade in a meaningfully different way when it comes to anticipating a firm’s future ESG performance and whether these differences are costly in terms of fund performance.

Inspired by Fang et al. (2014) and Chen et al. (2024), we estimate (i) the propensity of funds to increase their discretionary positions in stocks that experience fewer ES incidents in the future,  $\text{Propensity}_{i,t}^{ES \text{ Incidents}_{t+1}}$ ; and (ii) the propensity of funds to increase their discretionary positions in stocks with higher ESG scores,  $\text{Propensity}_{i,t}^{ESG \text{ Score}_{t-1}}$ . For each fund  $i$  in quarter  $t$ , we estimate in a rolling eight-quarter window the following two equations<sup>27</sup>:

<sup>26</sup>We run the same analyses with a dummy indicating 1 or more RepRisk incidents (severe and non-severe), a continuous variable for the total number of (severe) ES incidents, a log-transformed variable for the total number of (severe) ES incidents, or changing the lead to  $t + 2$  instead of  $t + 4$ . The main results do not change.

<sup>27</sup>We estimate these regressions in our main analyses for pre-existing holdings only. Analyses using our full holding panel are presented in Appendix B. Additionally, we estimate the propensity scores for discretionary stock ownership

$$\text{Discret. position changes}_{i,j,t} = \beta_0 + \beta_{i,t} \times \text{ES Incidents}_{j,t+1} + \gamma'_{i,t} \mathbf{X}_{j,t-1} + \varepsilon_{i,j,t} \quad (7)$$

and

$$\text{Discret. position changes}_{i,j,t} = \beta_0 + \beta_{i,t} \times \text{MSCI ESG}_{j,t-1} + \gamma'_{i,t} \mathbf{X}_{j,t-1} + \varepsilon_{i,j,t} \quad (8)$$

where  $\text{ES Incidents}_{j,t+1} = -1 \times \ln(1 + \# \text{ES incidents}_{j,t+1})$  to ensure that  $\hat{\beta}_1$  indicates the relation between fewer future ES incidents and discretionary position changes (this follows Fang et al., 2014).  $\text{MSCI ESG}_{j,t-1}$  is stock  $j$ 's previous quarters' industry-weighted MSCI ESG score. In  $\mathbf{X}_{j,t-1}$ , we control for lagged stock turnover, book-over-market ratio, and natural logarithm of firm size. We estimate Equations (7) and (8) using *standardized* coefficients. Standard errors are clustered at the firm level. To estimate a fund's propensity to invest in stocks with fewer ES incidents in the next quarter, we use the OLS regression results of four quarters:

$$\text{Propensity}_{i,t}^* = \frac{1}{\left(\frac{1}{\sigma_{i,t}^2} + \frac{1}{\sigma_{i,t-1}^2} + \frac{1}{\sigma_{i,t-2}^2} + \frac{1}{\sigma_{i,t-3}^2}\right)} \times \left(\frac{\beta_{i,t}}{\sigma_{i,t}^2} + \frac{\beta_{i,t-1}}{\sigma_{i,t-1}^2} + \frac{\beta_{i,t-2}}{\sigma_{i,t-2}^2} + \frac{\beta_{i,t-3}}{\sigma_{i,t-3}^2}\right) \quad (9)$$

where  $\text{Propensity}_{i,t}^*$  denotes the precision-weighted average beta coefficient of Equation (7) or Equation (8),  $\text{Propensity}_{i,t}^{\text{ES Incidents}_{t+1}}$  and  $\text{Propensity}_{i,t}^{\text{ESG Score}_{t-1}}$ , respectively, based on four quarterly regressions using the 8-quarter rolling window.  $\beta_{i,t-s}$  denotes the key beta coefficient for quarter  $t-s$ , and  $\sigma_{i,t-s}^2$  denotes its corresponding variance. The term  $\frac{1}{\sigma_{i,t-s}^2}$  therefore indicates the precision of the estimated beta  $\hat{\beta}_{i,t-s}$ .

Hence, we establish the interpretation of both propensity measures as follows: (i) When fund  $i$  in quarter  $t$  has a higher  $\text{Propensity}_{i,t}^{\text{ES Incidents}_{t+1}}$ , its discretionary trades are more strongly associated with fewer future ES incidents; (ii) for a higher  $\text{Propensity}_{i,t}^{\text{ESG Score}_{t-1}}$ , fund  $i$  in quarter  $t$  has its discretionary trades more strongly associated with stocks with higher ESG scores. To reduce estimation noise, we trim the two propensity measures on the 0.5th and 99.5th percentiles<sup>28</sup>.

For our propensity measure, we use the standardized coefficients of Equations (7) and (8). This allows us to measure the propensity measures in standard deviations, making the values of  $\text{Propensity}_{i,t}^{\text{ES Incidents}_{t+1}}$  directly comparable to those of  $\text{Propensity}_{i,t}^{\text{ESG Score}_{t-1}}$ . The mean (median) of  $\text{Propensity}_{i,t}^{\text{ES Incidents}_{t+1}}$  is 0.0024 (0.0004). For  $\text{Propensity}_{i,t}^{\text{ESG Score}_{t-1}}$  this is -0.0037 (-0.0007). In economic terms, using our full sample, for a fund  $i'$  with an average  $\text{Propensity}_{i,t}^{\text{ESG Score}_{t-1}}$

(discretionary trades scaled by the stock's total shares outstanding in  $t-1$ ).

<sup>28</sup>Fang et al. (2014) group funds into deciles rather than relying on the point estimates. However, in this paper, we explore the granular differences in propensities over time.

of -0.00367 and a TNA of \$1.39 billion (the mean TNA in levels), the additional trades of a stock with a maximum ESG score of 10 compared to a stock with a median ESG score of 5.5 amount to  $(10 - 5.5) \times [-0.00367/2.2826 \times 0.0037] \times \$1.39 \text{ billion} = -\$37210.4815$  in fewer buying.

Table 9 reports the correlations between our fund characteristics and the estimated propensity measures. The propensity scores show a positive, but low correlation (0.0194) with each other, indicating that these two propensity measures are not perfectly identical<sup>29</sup>.

To explore the development of fund propensities to trade on fewer future ES incidents or higher historic ESG scores over time, we use the following two fund-level panel regression specifications:

$$\text{Propensity}_{i,t}^{ES \text{ Incidents}_{t+1}} = \beta_0 + \beta_1(ESG \text{ Fund}_i \times Q_t) + \beta_2 Q_t + \delta' \mathbf{C}_{i,t-1} + \eta_{i(c)} + \varepsilon_{i,t} \quad (10)$$

and

$$\text{Propensity}_{i,t}^{ESG \text{ Score}_{t-1}} = \beta_0 + \beta_1(ESG \text{ Fund}_i \times Q_t) + \beta_2 Q_t + \delta' \mathbf{C}_{i,t-1} + \eta_{i(c)} + \varepsilon_{i,t} \quad (11)$$

where  $\text{Propensity}_{i,t}^{ES \text{ Incidents}_{t+1}}$  and  $\text{Propensity}_{i,t}^{ESG \text{ Score}_{t-1}}$  are estimated following Equations (7) and (8), respectively.  $ESG \text{ Fund}_i$  indicates whether fund  $i$  is an ESG-mandated fund,  $Q_t$  is a dummy variable for each quarter, with 2016-Q4 (i.e., 2016-12) as the reference quarter.  $\eta_{i(c)}$  represents Morningstar Fund Category fixed effects.  $\mathbf{C}_{i,t-1}$  denotes a vector of fund level lagged control variables: quarterly fund flows, the natural logarithm of fund TNA, the natural logarithm of fund age, quarterly returns, portfolio turnover rate, and fund net expense ratio.

Figures 1 and 2 plot the interaction effects for ESG funds ( $\beta_1 + \beta_2$ , solid blue line) and conventional funds ( $\beta_2$ , dashed red line) over 2016-12 to 2022-12<sup>30</sup>. The shaded area represents the 95% confidence interval on  $\beta_1$ . As we standardize the coefficients  $\beta_{i,t}^*$  in Equations (8) and (9), the y-axis denotes the precision-weighted average beta coefficients of the respective equations in standard deviations discretionary position changes per standard deviation in fewer log incidents and/ or higher ESG scores.

Although Section 3.2 shows evidence that ESG funds do better in predicting and trading away from holdings that are subjected to future incidents, controlling for fund category fixed effects

<sup>29</sup>We also estimate propensity measures measuring funds' tendency to increase their discretionary *ownership*—as scaled by stock  $j$ 's lagged shares outstanding—in stocks with fewer future ES incidents and/ or higher ESG scores. The correlation  $\text{Propensity}_{i,t}^{ES \text{ Incidents}_{t+1}}$  and  $\text{Propensity}_{i,t}^{ES \text{ Incidents}_{t+1} \text{ Ownership}}$  is 0.318, and of  $\text{Propensity}_{i,t}^{ESG \text{ Score}_{t-1}}$  and  $\text{Propensity}_{i,t}^{ESG \text{ Score}_{t-1} \text{ Ownership}}$  is 0.3127.

<sup>30</sup>As we use a rolling window of eight quarters in Equations (8) and (9), we lose the first seven quarters of our sample.

and lagged fund time varying controls, Figure 1 no longer shows an apparent significant difference between the two fund groups’ predictive power of ES incidents. Only in the last two quarters—2022-09 and 2022-12—the interaction effect of  $ESG\ Fund_i$  and  $Q_t$  is positive and statistically significant. This brings on additional evidence to the argument that ESG and conventional funds do not have strongly deviating beliefs on the financial materiality of ES(G) characteristics.

Lastly, we split our sample of funds into two groups: US-domiciled and European funds. Figure 3 presents the interaction effects for ESG funds ( $\beta_1 + \beta_2$ , solid blue line) and conventional funds ( $\beta_2$ , dashed red line) of two samples, US (sub-figures (a) and (c)) and European (sub-figures (b) and (d)) funds. Panel A presents the coefficients of Equation (10). Although sub-figure (a) shows no significant *difference* between US-domiciled ESG and conventional funds to trade towards fewer future ES incidents stocks,  $\beta_2$  (i.e., conventional US funds) is statistically significant (between 1 and 10% levels) in the later quarters of our panel (2021-Q2 to 2022-Q3). This differs from the results of sub-figure (b): European ESG funds have a greater tendency to trade ahead of stock-level ES incidents.  $\beta_1$  is significant in quarters 2016-Q4 to 2017-Q2 and 2022-Q3 to 2022-Q4<sup>31</sup>.

Furthermore, Panel B (sub-figure (c)) reveals that, within a sample of US-domiciled funds, the trading magnitudes of ESG-mandated and conventional funds in higher-ESG-scoring stocks show little variation over time. Specifically, US ESG funds exhibit converging propensities of ESG-mandated and conventional funds to trade in higher-ESG-scoring stocks from 2018-Q2 onward ( $\beta_1$  becomes insignificant, and the blue solid line falls to the dashed red line). In contrast, in our sample of European funds, we observe a slight widening of the space between the blue (ESG funds) and the red dashed (conventional funds) lines in the second half of our panel’s quarters. European conventional and European ESG funds trade on higher ESG-scoring stocks. European ESG funds’ propensity to do so is greater in magnitude than that of their conventional counterpart.

Figure 2 clearly shows that ESG funds exhibit a significantly greater propensity to trade on higher ESG scores throughout our time series. This finding is consistent with recent literature (e.g., Gantchev et al., 2023; Berg et al., 2024; Albuquerque et al., 2025). Interestingly, we find that this effect is strongest for our sample of European ESG funds. On the contrary, US ESG funds’ propensity to trade on high ESG scores is no longer statistically higher than that of US conventional funds three years post the 2015 Paris Agreement. Work by Pástor et al. (2022) indicates that ESG stocks may outperform as climate concerns strengthen. In line with this reasoning, our findings intersect with the introduction of the 2018 EU taxonomy for sustainable activities. These results

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<sup>31</sup> $\beta_2$  is statistically significant in three of our sample’s quarters: 2018-Q2, 2018-Q3, and 2021-Q2.

raise the question of the extent to which ESG funds are constrained in their trading decisions by the requirement to tilt their portfolios toward high ESG-scoring stocks. Section 4.1 examines whether ESG funds and conventional funds (preempting) trading decisions on ESG information have performance implications, assessed by risk-adjusted returns and fund flows.

## 4 Implications for ESG and Conventional Funds

This section analyzes the effects of ESG and conventional funds’ propensity to trade discretionarily on past and forward-looking ESG information on conventional and ESG fund performance. Funds are bound to a fiduciary duty: the standard objective of a typical fund is to maximize financial risk-adjusted return. Regarding incorporating ESG objectives, recent survey evidence by Edmans et al. (2025) reports that “73% of sustainable investors expect good ES performers to deliver positive alpha, and a notable 45% of traditional investors agree” (p. 3). We nevertheless note that ESG funds appear less flexible in using ESG information in their discretionary position changes for stocks with higher ESG ratings. While we find that both conventional and ESG funds trade on high ESG scores, ESG funds do so significantly stronger. In Sections 4.1 and 4.2, we, respectively, examine the implications of fund discretionary trading on their quarterly risk-adjusted returns and future relative flows.

### 4.1 Fund return implications of funds’ propensities to trade on future ES incidents and past ESG scores

In this section, we examine how a fund’s future risk-adjusted return depends on its propensity to trade on past ESG scores as well as its propensity to trade ahead of future ES incidents. Sustainability-driven trading may be costly in terms of impairing fund performance: Gantchev et al. (2023) attributes underperforming ESG trades to fund managers “not using their information and usual investment strategies in their ESG-driven trades” (p. 14).

In Tables 10 and 11 we regress fund risk-adjusted returns on 1-quarter lagged propensity scores. For each fund in each quarter, Fama-French three-factor returns (columns (1) and (3)) are calculated using fund returns of the past 36 months. We also calculate quarterly Carhart’s 4-factor returns (columns (2) and (4)) using fund returns of the past 36 months. We denominate the quarterly risk-adjusted returns in basis points per month (coefficients are scaled by 100). Following, we estimate:

$$\begin{aligned}
Abnormal\ Return_{i,t} = & \beta_0 + \beta_1 Propensity_{i,t-1}^{ES\ Incidents_{t+1}} + \beta_2 (Propensity_{i,t-1}^{ES\ Incidents_{t+1}} \times ESG\ Fund_i) + \\
& \beta_3 Propensity_{i,t-1}^{ESG\ Score_{t-1}} + \beta_4 (Propensity_{i,t-1}^{ESG\ Score_{t-1}} \times ESG\ Fund_i) + \\
& \delta' \mathbf{C}_{i,t-1} + \varphi_i + \varphi_t + \varepsilon_{i,t}
\end{aligned} \tag{12}$$

where  $\varphi_i$  and  $\varphi_t$ , respectively, denote fund fixed effects and year-quarter fixed effects, and  $\mathbf{C}_{i,t-1}$  is a vector containing the same specified lagged time-varying fund controls as in Equations (10) and (11).

Table 10 shows the estimates of Equation (12). Controlling for fund fixed effects, in columns (3)-(4), we note that the previous quarter's  $Propensity_{i,t-1}^{ES\ Incidents_{t+1}}$  is negatively related to fund risk-adjusted returns in quarter  $t$ . In column (3), the interaction effect with  $ESG\ Fund_i$  is positive and marginally significant when we exclude the momentum factor. However, when we control for fund-category fixed effects  $\varphi_{c(i)}$  in Table 11, we find that this coefficient becomes insignificant. Instead, the time-invariant ESG Fund indicator is positive and statistically significant.

More striking are the positive coefficients of  $Propensity_{i,t-1}^{ESG\ Score_{t+1}}$  in Tables 10 and 11 (columns (3)-(4)). We find that investing based on higher historic ESG scores is positively and significantly related to fund risk-adjusted returns. Conventional funds see significant abnormal returns of 4.1 to 6.7 basis points per quarter for a one-unit (i.e., standard deviations of discretionary position changes per standard deviation in higher ESG scores) increase in their propensity to invest in higher ESG scoring stocks. However, the interaction effect of  $Propensity_{i,t-1}^{ESG\ Score_{t+1}}$  and  $ESG\ Fund$  is negative and incrementally diminishes any positive abnormal returns by 5.9 to 6.2 basis points. In columns (1)-(2), we use our alternative propensity measures, substituting discretionary position changes for our measure of discretionary changes in stock ownership. We find similar results.

Our results suggest that ESG funds are not unequivocally better able to translate discretionary trading ahead of ES incidents into higher returns<sup>32</sup>. We instead observe that a greater propensity of discretionary trading on MSCI's ESG ratings positively relates to conventional fund performance, but this relation largely disappears for ESG funds. Thus, despite exhibiting a lower average propensity to increase active positions in firms with higher ESG scores, only conventional funds are able to improve their performance when increasing those active positions. These results could further suggest that ESG funds face greater constraints in discretionary trading on financially material ESG information, despite their greater tendency to integrate stock-level ESG ratings in their active portfolio management. For example, ESG funds may need to avoid ESG-improving stocks that do

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<sup>32</sup>As suggested by the work of Chen et al. (2024) and Cremers et al. (2024).

not (yet) meet their current ESG mandates or by forgoing usual investment strategies to try to improve their portfolio ESG scores<sup>33</sup>.

Furthermore, in Table 12 we distinguish the risk-adjusted return implications of the trading behavior of US-domiciled funds from that of European funds. We see that only in our sample of European funds (columns (1)-(2)), ESG funds that have a higher tendency to trade on higher past ESG scores see lower quarterly abnormal returns than European conventional funds (9.5 - 8.5 basis points)<sup>34</sup>

Our results support our hypothesis that ESG funds can face relatively costly constraints in their discretionary trading decisions.

## 4.2 Flow responses to funds' propensities to trade on future ES incidents and past ESG scores

In Table 13, we analyze how investors respond to Funds' propensities to trade more or less on historic high-ESG scores and/ or fewer future ES incidents. From previous literature, we know that investor flows are affected by sustainability signals such as fund ESG scores and fund renamings (Hartzmark and Sussman, 2019; Ceccarelli et al., 2024; Gibbon et al., 2023). Moreover, investor demand for high-ESG mutual funds may flatten if funds' trades to improve their portfolio ESG scores start to underperform (Gantchev et al., 2023). To see how investors value the stock-picking behavior on ESG information, we regress quarterly fund flows on a fund's propensity to trade away from future ES risky stocks ( $Propensity_{i,t-1}^{ES\ Incidents_{t+1}}$ ), trade toward higher ESG stocks ( $Propensity_{i,t-1}^{ESG\ Score_{t-1}}$ ), controlling for lagged (ln) assets under management, (ln) fund age, fund portfolio turnover, quarterly returns, and expense ratio:

$$\begin{aligned} Flow_{i,t} = & \beta_0 + \beta_1 Propensity_{i,t-1}^{ES\ Incidents_{t+1}} + \beta_2 (Propensity_{i,t-1}^{ES\ Incidents_{t+1}} \times ESG\ Fund_i) + \\ & \beta_3 Propensity_{i,t-1}^{ESG\ Score_{t-1}} + \beta_4 (Propensity_{i,t-1}^{ESG\ Score_{t-1}} \times ESG\ Fund_i) + \\ & \delta' C_{i,t-1} + \varphi_i + \varphi_t + \varepsilon_{i,t} \end{aligned} \quad (13)$$

where  $Flow_{i,t}$  reflects the relative quarterly fund flows as defined by Equation (2),  $\varphi_i$  and  $\varphi_t$ ,

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<sup>33</sup>Literature shows that ESG ratings often do not reflect which firms are 'improving' their ES(G) performance. Therefore, as bound by their mandate, ESG funds will be unable to include (or scale up their) holdings in 'ESG laggards' even if these will improve their ES performance in the future (Hartzmark and Shue, 2023).

<sup>34</sup>Anecdotaly, Edmans et al. (2025) frames the constraints of the SFDR for sustainable funds. A European asset manager in their survey wrote that their "biggest gripe with the SFDR Article 9 classification is that, according to [their] lawyers, it does not allow to invest in 'ESG improvers,' which is really where any ESG alpha should come from" (p. 24).

respectively, denote fund fixed effects and year-quarter fixed effects, and  $\mathbf{C}_{i,t-1}$  is a vector containing lagged time-varying fund controls. We alternatively control for Morningstar fund category fixed effects  $\eta_{i(c)}$ , also adding the ESG dummy variable (column (3)).

In Table 13 we examine whether the aforementioned propensities relate to flows differently for ESG funds compared to conventional funds. Interestingly, the coefficients of Propensity $_{i,t-1}^{ESG\ Score_{t+1}}$  and its interaction with *ESG Fund* are statistically insignificant (columns (3)-(4)). Instead, we find that ESG funds in the cross-section (while controlling for category fixed effects) enjoy, every quarter, higher inflows of 1.6% than conventional funds. Investors additionally reward ESG funds more extensively when they trade more than expected toward firms that in the future see fewer ES incidents<sup>35</sup>

The latter finding indicates that ESG investors value ESG funds that make active trading decisions using forward-looking ES information. An alternative explanation is that ESG-oriented investors exhibit a preference for ESG investment funds whose performance history over the preceding eight quarters is characterized by relatively lower portfolio weights in firms that subsequently experience non-zero environmental and social (ES) incidents in future quarters.

## 5 Conclusion

We study the drivers and consequences of active stock trading decisions made by ESG and conventional funds, and specifically whether ESG and conventional funds differently adjust portfolio composition in response to ESG information. For each equity mutual fund in our global sample, we measure active trading decisions by quarterly discretionary position changes; i.e., position changes net of ‘expected’ changes that a fund would make when it reinvests capital flows based on the most recent portfolio weights. First, we document evidence that recent firm-level ESG ratings and ES incidents significantly affect the discretionary position changes of both ESG funds and conventional funds. Second, however, discretionary trades by ESG funds react differently to this information. ESG funds appear to assign stronger weights to past ESG ratings and ES incidents. Third, we observe that ESG funds appear less flexible in using ESG information in discretionary position changes for stocks with higher ESG ratings. This limited response suggests that ESG funds may experience an ‘ESG constraint’, which arises from investors expecting ESG-labeled funds to hold stocks with higher ESG ratings. Fourth, this lack of flexibility in discretionary trading appears

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<sup>35</sup>In columns (1)-(2), we use our alternative propensity measures, substituting discretionary position changes for our measure of discretionary changes in stock ownership. We find similar results.

to be costly; while conventional funds with a greater propensity to actively trade on past ESG scores experienced higher fund performance, ESG funds experience reduced risk-adjusted returns from a greater propensity to trade on these scores. Fifth, we document that trading to preempt future incidents is associated with reduced performance regardless of a fund's label, but there are nonetheless flows-based incentives to undertake these trades: ESG managers are rewarded with quarterly inflows for preempting future incidents even when it does not improve alpha.

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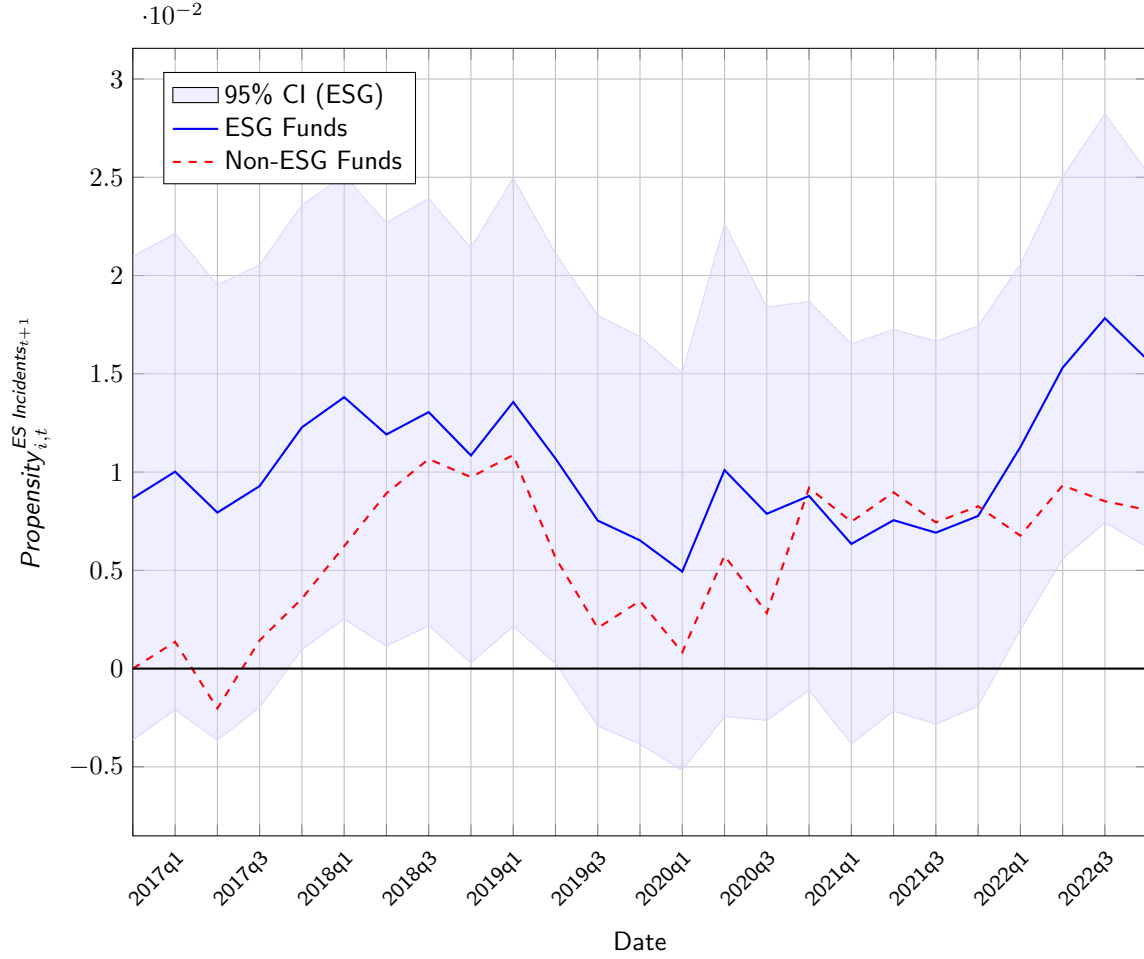
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# Appendices

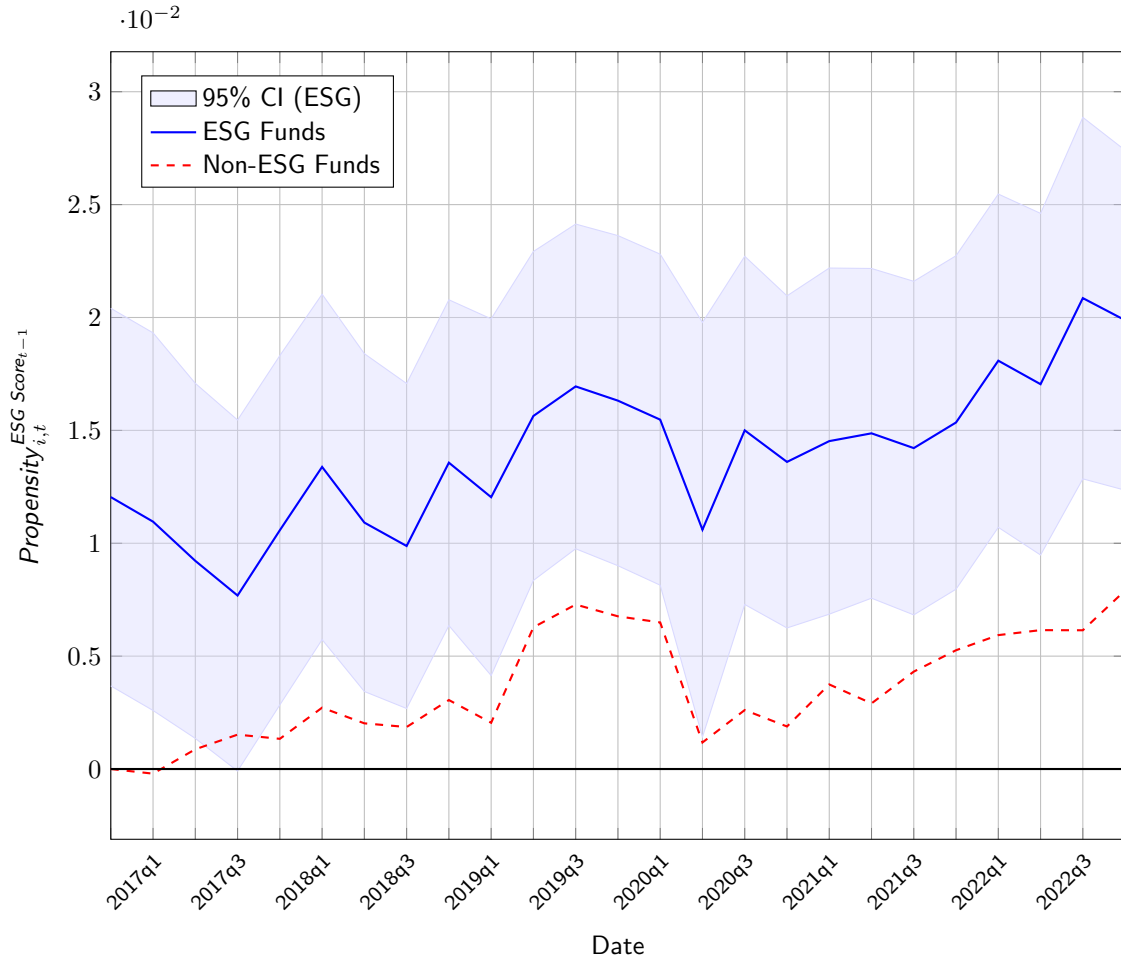
## A Figures

**Figure 1:** Propensity to Trade on Fewer Future ES Incidents for ESG and Non-ESG Funds, Pre-existing Holdings Only



**Notes:** This figure plots the estimated coefficients on  $Propensity_{i,t}^{ES Incidents_{t+1}}$  for ESG,  $\beta_1 + \beta_2$  (blue solid line), and conventional fund,  $\beta_2$  (red dashed line), from Equation (10) over 2016-Q4 to 2022-Q4. The difference between the lines denotes the difference in funds' propensity to invest using future (next quarter's)  $\ln 1 + \#$  ES incidents between ESG and conventional funds in standard deviations. ESG Fund takes on the value 1 if the fund is denoted by Morningstar to be a "General ESG Investment", 0 otherwise. We control for lagged  $\ln TNA$ ,  $Returns$ ,  $quarterly\ flow$ ,  $\ln Age$ ,  $Fund\ turnover$ , and  $Expense\ Ratio$ . Fund portfolio turnover and the fund expense ratio are trimmed at the 0.5 and 99.5 percentiles. We control for fund category fixed effects. Standard errors are clustered at the fund level. Shaded areas represent the 95% confidence intervals for the ESG fund estimates ( $\beta_1$ ).

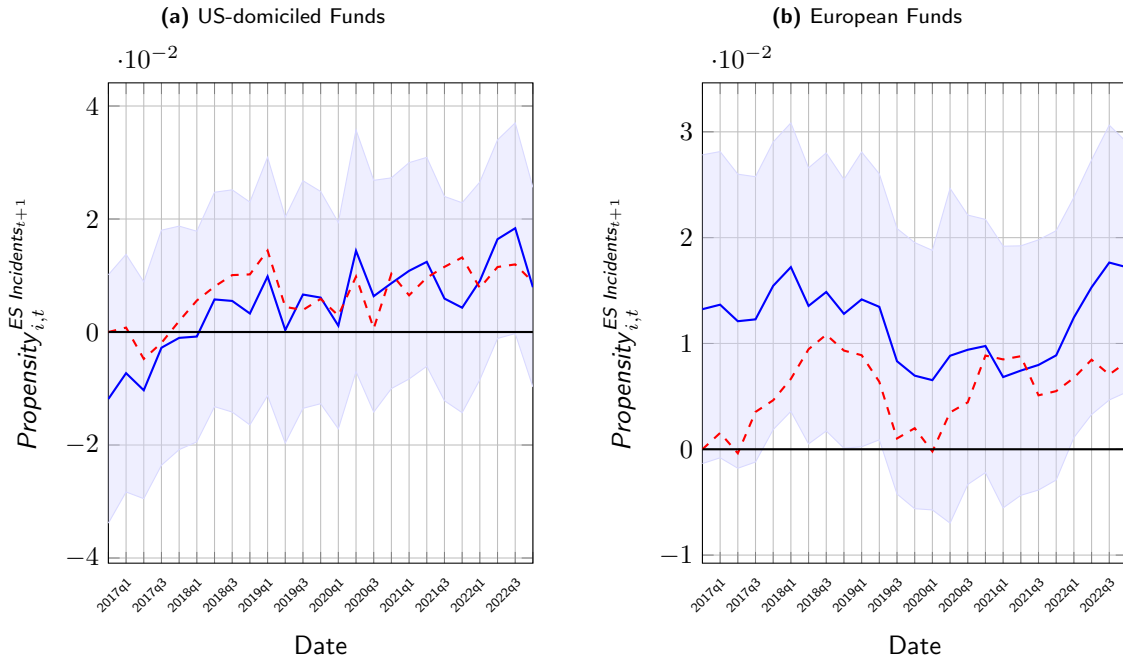
**Figure 2:** Propensity to Trade on Higher Past ESG Scores for ESG and Non-ESG Funds, Pre-existing Holdings Only



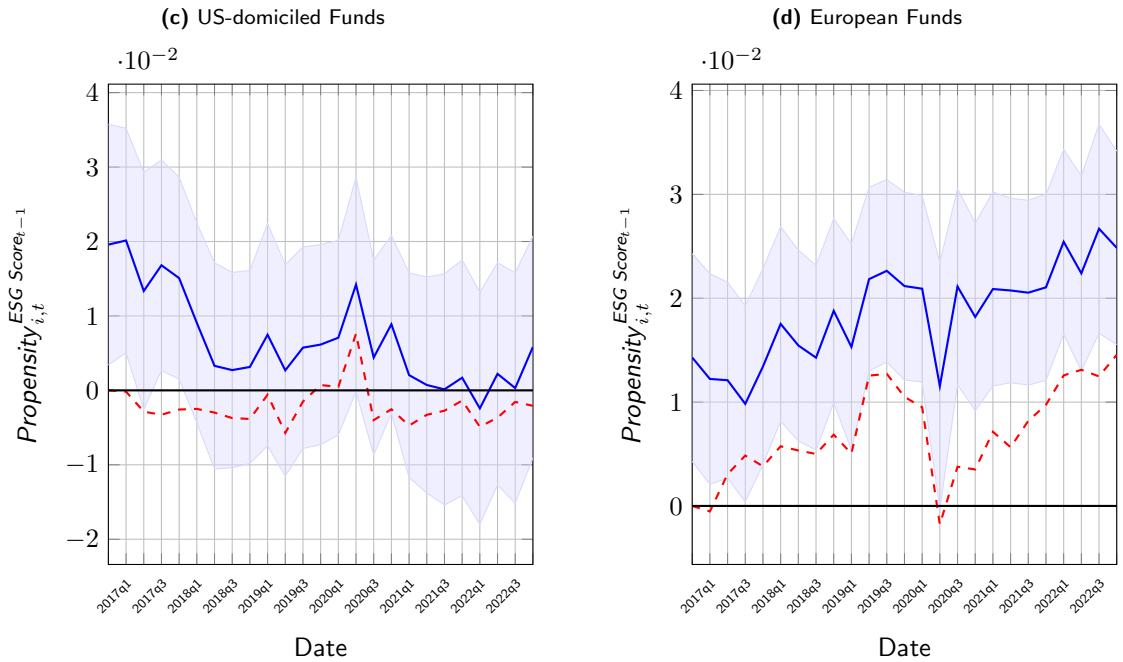
**Notes:** This figure plots the estimated coefficients on  $Propensity_{i,t}^{ESG Score_{t-1}}$  for ESG,  $\beta_1 + \beta_2$  (blue solid line), and conventional fund,  $\beta_2$  (red dashed line), from Equation (11) over 2016-Q4 to 2022-Q4. The difference between the lines denotes the difference in funds' propensity to invest using historic (previous quarter's) ESG scores between ESG and conventional funds in standard deviations. ESG Fund takes on the value 1 if the fund is denoted by Morningstar to be a "General ESG Investment", 0 otherwise. We control for lagged  $\ln TNA$ ,  $Returns$ , quarterly flow,  $\ln Age$ ,  $Fund turnover$ , and  $Expense Ratio$ . Fund portfolio turnover and the fund expense ratio are trimmed at the 0.5 and 99.5 percentiles. We control for fund category fixed effects. Standard errors are clustered at the fund level. Shaded areas represent the 95% confidence intervals for the ESG fund estimates ( $\beta_1$ ).

**Figure 3: European and US-domiciled Fund Propensity to Trade on ES Incidents and ESG Scores**

**Panel A: Propensity of European and US Funds (ESG and Conventional) to Trade on Fewer Future ES Incidents, Pre-existing Holdings Only**



**Panel B: Propensity of European and US Funds (ESG and Conventional) to Trade on Higher Past ESG Scores, Pre-existing Holdings Only**



**Notes:** This figure plots estimated coefficients from Equations (10) and (11) over 2016:Q4 to 2022:Q4 separately for US and European funds. Panel A focuses on future ES incidents (Equation (10)), while Panel B focuses on historic ESG scores (Equation (11)). Blue solid lines represent ESG funds ( $\beta_1 + \beta_2$ ), and red dashed lines represent conventional funds ( $\beta_2$ ). Shaded areas represent 95% confidence intervals for ESG fund estimates. All models control for TNA, returns, flow, age, turnover, and expense ratio with category fixed effects. Standard errors are clustered at the fund level.

## B Tables

**Table 1:** Summary statistics - Fund-level variables (quarterly)

|                                | N       | Mean    | 1st pct | Median  | 99th pct | Std Dev |
|--------------------------------|---------|---------|---------|---------|----------|---------|
| ln TNA                         | 258,127 | 19.0691 | 14.7416 | 19.0630 | 23.5577  | 1.9112  |
| Excess returns                 | 258,127 | 0.0150  | -0.2726 | 0.0261  | 0.2508   | 0.1009  |
| Fama French 3-Factors $\alpha$ | 182,903 | -0.0015 | -0.0102 | -0.0014 | 0.0072   | 0.0036  |
| Carhart 4-Factors $\alpha$     | 182,903 | -0.0015 | -0.0102 | -0.0014 | 0.0075   | 0.0036  |
| Quarterly flow                 | 258,127 | 0.0062  | -0.3029 | -0.0084 | 0.5876   | 0.1450  |
| ln Age                         | 258,127 | 2.3616  | 0.1702  | 2.5500  | 4.0087   | 0.8798  |
| Fund turnover                  | 228,280 | 0.1497  | 0.0000  | 0.0629  | 1.7821   | 0.3301  |
| Expense ratio                  | 247,944 | 1.1584  | 0.0003  | 1.1000  | 3.0500   | 0.6984  |
| ESG Fund                       | 258,127 | 0.2808  | 0.0000  | 0.0000  | 1.0000   | 0.4494  |

Notes: The sample includes all European and US-domiciled open-end equity funds from December 2014 to December 2022. The mean, median, 1st percentile, 99th percentile, and standard deviation of various quarterly fund-level characteristics are reported. The data is recorded on a fund-quarter level. *ln TNA* denotes the natural logarithms of total assets under management at the quarter-end in USD. *Excess returns* are the quarterly net returns of a fund minus the risk-free rate. *Fama French 3-Factors  $\alpha$*  is the fund's average quarterly alpha estimated using Fama-French three-factor model on a monthly rolling-window between month  $t - 36$  and  $t$ . *Carhart 4-Factors  $\alpha$*  is the fund's average quarterly alpha estimated using Fama-French-Carhart four-factor model on a monthly rolling-window between month  $t - 36$  and  $t$ . *Quarterly flow* is defined as the dollar flows normalized by the fund's previous quarter's TNA. *Fund turnover* is the fund's quarterly portfolio turnover calculated following Morningstar's definition of taking the lesser of purchases or sales and dividing by the fund's quarterly net assets at the end of the previous quarter. The values are trimmed at the 0.5th and 99.5h percentiles. *ln Age* is the natural logarithm of the number of years between the inception date of the oldest share class of the fund and the date of observation. *Expense ratio* is the fund's net expense ratio, back-filled over the year's quarters. The values are trimmed at the 0.5th and 99.5h percentiles. *ESG Fund* takes on the value 1 if the fund is denoted by Morningstar to be a "General ESG Investment", 0 otherwise.

**Table 2: Summary statistics - Fund-Holding Panel (quarterly)**

| <b>Panel A: All Holdings</b>                        |            |         |           |         |            |         |
|-----------------------------------------------------|------------|---------|-----------|---------|------------|---------|
|                                                     | N          | Mean    | 0.5th pct | Median  | 99.5th pct | Std Dev |
| <b>Quarterly Trades</b>                             |            |         |           |         |            |         |
| All Trades (Scaled by Shares Outstanding)           | 29,840,102 | 0.0000  | -0.0050   | 0.0000  | 0.0051     | 0.0005  |
| Expected Trades (Scaled by Shares Outstanding)      | 29,840,102 | -0.0000 | -0.0010   | 0.0000  | 0.0008     | 0.0001  |
| Discretionary Trades (Scaled by Shares Outstanding) | 29,840,102 | 0.0000  | -0.0057   | 0.0000  | 0.0061     | 0.0005  |
| All Trades (Scaled by Fund AUM)                     | 29,871,114 | 0.0000  | -0.0426   | 0.0000  | 0.0439     | 0.0043  |
| Expected Trades (Scaled by Fund AUM)                | 29,871,114 | -0.0000 | -0.0089   | 0.0000  | 0.0122     | 0.0010  |
| Discretionary Trades (Scaled by Fund AUM)           | 29,871,114 | 0.0000  | -0.0547   | 0.0000  | 0.0524     | 0.0043  |
|                                                     | N          | Mean    | 1st pct   | Median  | 99th pct   | Std Dev |
| <b>Stock Level Characteristics</b>                  |            |         |           |         |            |         |
| Number of Stock ES Incidents                        | 25,551,165 | 1.5253  | 0.0000    | 0.0000  | 24.0000    | 4.7335  |
| MSCI ESG Score                                      | 26,534,150 | 5.4664  | 0.0000    | 5.5000  | 10.0000    | 2.2820  |
| Leverage                                            | 30,380,749 | 0.2570  | 0.0000    | 0.2483  | 0.8272     | 0.1720  |
| Book-Market                                         | 30,380,749 | 0.5564  | 0.0202    | 0.3923  | 3.8275     | 0.5695  |
| In Market Capitalization                            | 30,380,749 | 8.8572  | -2.2318   | 8.9382  | 14.8810    | 1.8959  |
| Quarterly Stock Return (×100%)                      | 30,380,749 | 2.2844  | -46.5047  | 2.0223  | 61.2876    | 18.3556 |
| Sales Growth                                        | 30,380,749 | 0.1094  | -0.5924   | 0.0569  | 1.8370     | 0.3176  |
| ROA                                                 | 30,380,749 | 0.0128  | -0.1210   | 0.0120  | 0.0939     | 0.0265  |
| Stock turnover                                      | 30,365,988 | 0.0066  | 0.0003    | 0.0049  | 0.0359     | 0.0061  |
| <b>Panel B: Excluding New Holdings</b>              |            |         |           |         |            |         |
|                                                     | N          | Mean    | 0.5th pct | Median  | 99.5th pct | Std Dev |
| <b>Quarterly Trades</b>                             |            |         |           |         |            |         |
| All Trades (Scaled by Shares Outstanding)           | 27,771,062 | -0.0000 | -0.0053   | 0.0000  | 0.0034     | 0.0004  |
| Expected Trades (Scaled by Shares Outstanding)      | 27,771,062 | -0.0000 | -0.0011   | -0.0000 | 0.0008     | 0.0001  |
| Discretionary Trades (Scaled by Shares Outstanding) | 27,771,062 | -0.0000 | -0.0061   | -0.0000 | 0.0044     | 0.0004  |
| All Trades (Scaled by Fund AUM)                     | 27,801,365 | -0.0004 | -0.0460   | 0.0000  | 0.0310     | 0.0037  |
| Expected Trades (Scaled by Fund AUM)                | 27,801,365 | -0.0000 | -0.0095   | -0.0000 | 0.0131     | 0.0011  |
| Discretionary Trades (Scaled by Fund AUM)           | 27,801,365 | -0.0004 | -0.0588   | -0.0000 | 0.0403     | 0.0037  |
|                                                     | N          | Mean    | 1st pct   | Median  | 99th pct   | Std Dev |
| <b>Stock Level Characteristics</b>                  |            |         |           |         |            |         |
| Number of Stock ES Incidents                        | 23,798,723 | 1.5470  | 0.0000    | 0.0000  | 24.0000    | 4.7844  |
| MSCI ESG Score                                      | 24,734,591 | 5.4744  | 0.0000    | 5.5000  | 10.0000    | 2.2826  |
| Leverage                                            | 28,265,238 | 0.2572  | 0.0000    | 0.2485  | 0.8272     | 0.1717  |
| Book-Market                                         | 28,265,238 | 0.5601  | 0.0202    | 0.3950  | 3.8275     | 0.5725  |
| In Market Capitalization                            | 28,265,238 | 8.8658  | -2.2318   | 8.9497  | 14.8810    | 1.9069  |
| Quarterly Stock Return (×100%)                      | 28,265,238 | 2.0827  | -46.5047  | 1.8922  | 61.2876    | 18.1792 |
| Sales Growth                                        | 28,265,238 | 0.1075  | -0.5924   | 0.0562  | 1.8370     | 0.3148  |
| ROA                                                 | 28,265,238 | 0.0128  | -0.1210   | 0.0120  | 0.0939     | 0.0263  |
| Stock turnover                                      | 28,251,401 | 0.0065  | 0.0003    | 0.0049  | 0.0359     | 0.0061  |

Notes: The sample includes all firms for which the primary share was held by our sample of European and US-domiciled open-end equity funds from December 2014 to December 2022. The mean, median, 0.5th percentile, 99.5th percentile, and standard deviation of various quarterly fund-holding level trades are reported. We define fund  $i$ 's trades of stock  $j$  between quarter  $t - 1$  and  $t$  twofold: (i) changes in ownership of stock  $j$  defined as  $\frac{(Holding_{i,j,t} - Holding_{i,j,t-1})}{Shares\ outstanding_{j,t-1}}$  (Based on the fire-sale literature: Coval and Stafford, 2007; Huang et al.,

2023), and (ii) changes in stock  $j$ 's concentration in the portfolio of fund  $i$  defined as  $\frac{Price_{j,t-1} \times (Holding_{i,j,t} - Holding_{i,j,t-1})}{AUM_{i,t-1}}$ .

We disentangle from these two measures of fund trades: flow-driven 'expected' trades of fund  $i$  of stock  $j$  as well as the 'discretionary' trades—i.e., trades by fund  $i$  of stock  $j$  that deviate from its expected trades. To account for measurement error, we trim our two measures of fund trades on the 0.5th and 99.5th percentiles. We do the same for our measures of expected trades and use these trimmed measures of total trades and expected trades to calculate the discretionary trades for our sample of funds. Additionally, firm-level characteristics are reported. *Number of Stock ES incidents<sub>t</sub>* denotes the number of all RepRisk incidents of firm  $j$  that are characterized as an environmental or social issue in quarter  $t$ . *MSCI ESG Score<sub>t</sub>* is the firm-level industry-adjusted MSCI ESG score of stock  $j$ . *In Market Cap.<sub>j,t-1</sub>* is the natural logarithm of the company  $j$ 's market capitalization in quarter  $t$ . *Quarterly stock returns<sub>j,t-1</sub>* are the quarterly stock returns of stock  $j$  in future quarter  $t - 1$ . *Book/Market<sub>j,t-1</sub>* is the firm  $j$ 's book value over its most recent market capitalization. *ROA<sub>j,t-1</sub>* is the firm  $j$ 's quarterly income scaled by the book value of assets. *Leverage<sub>j,t-1</sub>* denotes the ratio of firm  $j$ 's gross debt to the book value of assets in quarter  $t - 1$ . We winsorize this set of firm-level control variables on the 1st and 99th percentiles.

**Table 3:** Standardized OLS Regression Results: Types of Mutual Fund Position Changes and Stocks' (past) ES Incidents, Pre-Existing Positions Only

|                                         | Changes in positions    |                         |                           |                         |                           |                         |
|-----------------------------------------|-------------------------|-------------------------|---------------------------|-------------------------|---------------------------|-------------------------|
|                                         | (1)                     |                         | (2)                       |                         | (3)                       |                         |
|                                         | Position Changes        |                         | Discret. Position Changes |                         | Expected Position Changes |                         |
|                                         | (a)                     | (b)                     | (c)                       | (d)                     | (e)                       | (f)                     |
|                                         | $t$                     | $t-1$                   | $t$                       | $t-1$                   | $t$                       | $t-1$                   |
| # ES Incidents $_{t-s}$                 | -0.001<br>(-1.0653)     | -0.000<br>(-0.6275)     | 0.003***<br>(6.5183)      | 0.003***<br>(6.9910)    | -0.012***<br>(-11.9929)   | -0.012***<br>(-12.2602) |
| # ES Incidents $_{t-s} \times$ ESG Fund | -0.000<br>(-0.8082)     | -0.000<br>(-0.4571)     | -0.004***<br>(-7.9897)    | -0.004***<br>(-7.3974)  | 0.013***<br>(10.6012)     | 0.013***<br>(10.4694)   |
| MSCI ESG $_{t-1}$                       | 0.000<br>(0.1317)       | 0.000<br>(0.1736)       | 0.001**<br>(1.9957)       | 0.001**<br>(2.0707)     | -0.002***<br>(-4.3572)    | -0.002***<br>(-4.4302)  |
| MSCI ESG $_{t-1} \times$ ESG Fund       | 0.009***<br>(9.6731)    | 0.009***<br>(9.6731)    | 0.007***<br>(7.8510)      | 0.007***<br>(7.8352)    | 0.007***<br>(6.1193)      | 0.007***<br>(6.1496)    |
| In Market Capitalization $_{t-1}$       | -0.007***<br>(-7.7533)  | -0.008***<br>(-7.9183)  | -0.007***<br>(-8.7634)    | -0.007***<br>(-9.0174)  | -0.003<br>(-1.3171)       | -0.003<br>(-1.2597)     |
| Book-Market $_{t-1}$                    | 0.003***<br>(9.0950)    | 0.003***<br>(8.9376)    | 0.002***<br>(8.5114)      | 0.002***<br>(8.2866)    | 0.001***<br>(3.6169)      | 0.001***<br>(3.8408)    |
| Leverage $_{t-1}$                       | 0.000*<br>(1.9320)      | 0.000*<br>(1.9287)      | 0.000<br>(1.5175)         | 0.000<br>(1.5015)       | 0.000<br>(1.3782)         | 0.000<br>(1.4135)       |
| ROA $_{t-1}$                            | -0.005***<br>(-16.6701) | -0.004***<br>(-16.6401) | -0.005***<br>(-17.3084)   | -0.004***<br>(-17.2771) | -0.000<br>(-0.7831)       | -0.000<br>(-0.7891)     |
| Sales Growth $_{t-1}$                   | 0.000<br>(1.5178)       | 0.000<br>(1.5428)       | 0.000<br>(0.8246)         | 0.000<br>(0.8532)       | 0.001***<br>(3.1534)      | 0.001***<br>(3.1411)    |
| Quarterly Stock Return $_{t-1}$         | -0.013***<br>(-18.8956) | -0.013***<br>(-18.8833) | -0.013***<br>(-18.6402)   | -0.013***<br>(-18.6303) | -0.001***<br>(-3.4470)    | -0.001***<br>(-3.4186)  |
| Fund-Year-Quarter FE                    | YES                     | YES                     | YES                       | YES                     | YES                       | YES                     |
| Observations                            | 21,533,124              | 21,533,124              | 21,533,124                | 21,533,124              | 21,533,124                | 21,533,124              |
| R-squared                               | 0.175                   | 0.175                   | 0.155                     | 0.155                   | 0.682                     | 0.682                   |
| Within R-squared                        | 0.000                   | 0.000                   | 0.000                     | 0.000                   | 0.001                     | 0.000                   |
| F-statistic                             | 69.38***                | 69.37***                | 81.61***                  | 81.46***                | 20.52***                  | 21.20***                |

Notes: OLS regressions on mutual fund trades. Position Changes is the change in the position of fund  $i$  in stock  $j$  in quarter  $t$  estimated as  $\frac{Price_{j,t-1}(NumberShares_{i,j,t} - NumberShares_{i,j,t-1})}{AUM_{i,t-1}}$  (Gantchev et al., 2023; Giannetti and Jotikasthira, 2024).

Expected Position Changes are estimated as the dollar flow-induced trades, keeping previous quarters' holding weights constant:  $\frac{Weight_{i,j,t-1} \times (flow_{i,t} \times AUM_{i,t-1})}{AUM_{i,t-1}}$  where  $flow_{i,t}$  is the relative flow, with  $flow_{i,t} \times AUM_{i,t-1}$  denoting the dollar flow to fund

$i$  between  $t-1$  and  $t$ . Alternatively, this can be written as  $\frac{Position_{i,j,t-1} \times Price_{j,t-1} \times flow_{i,t}}{AUM_{i,t-1}}$ . Discretionary Position Changes are

estimated as  $Position\ Changes_{i,j,t} - Expected\ Position\ Changes_{i,j,t}$ . Position Changes, Expected Position Changes, and Discretionary Position Changes are trimmed at the 0.5 and 99.5 percentiles. The sample only considers fund holdings that the fund held in the previous quarter. ES incidents denote the number of environmental and social RepRisk incidents of firm  $j$  in quarter  $t$ . ESG Fund takes on value 1 if the fund  $i$  is denoted as an ESG fund following Morningstar's "General ESG Fund" indicator. We control for the previous quarter's industry-adjusted MSCI ESG score, the natural logarithm of firm market capitalization, book over market, leverage ratio, return on assets, 12-month sales growth, and quarterly stock return. All lagged continuous control variables are winsorized at the 1 and 99 percentiles. Regressions include fund  $\times$  year-quarter fixed effects. Standard errors are clustered at the fund level. Coefficients are standardized, and  $t$ -statistics are reported in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table 4:** Types of Mutual Fund Position Changes on Stocks' (past) ES Incidents and ESG Scores, Pre-Existing Positions Only

|                                         | Changes in positions ( $\times 100\%$ ) |                           |                           |
|-----------------------------------------|-----------------------------------------|---------------------------|---------------------------|
|                                         | (1)                                     | (2)                       | (3)                       |
|                                         | Position Changes                        | Discret. Position Changes | Expected Position Changes |
| # ES Incidents $_{t-1} \times$ ESG Fund | -0.0001<br>(-1.2392)                    | -0.0007***<br>(-8.3107)   | 0.0006***<br>(10.5831)    |
| MSCI ESG $_{t-1} \times$ ESG Fund       | 0.0011***<br>(8.6679)                   | 0.0008***<br>(6.3668)     | 0.0003***<br>(7.3821)     |
| Constant                                | -0.0460***<br>(-241.6619)               | -0.0437***<br>(-247.6407) | -0.0024***<br>(-29.2441)  |
| Fund-Year-Quarter FE                    | YES                                     | YES                       | YES                       |
| Stock-Year-Quarter FE                   | YES                                     | YES                       | YES                       |
| Observations                            | 21,533,057                              | 21,533,057                | 21,533,057                |
| R-squared                               | 0.187                                   | 0.168                     | 0.685                     |
| Within R-squared                        | 0.000                                   | 0.000                     | 0.000                     |
| F-statistic                             | 40.36***                                | 58.19***                  | 57.97***                  |

Notes: OLS regressions on mutual fund trades. Position Changes is the change in the position of fund  $i$  in stock  $j$  in quarter  $t$  estimated as  $\frac{Price_{j,t-1}(NumberShares_{i,j,t} - NumberShares_{i,j,t-1})}{AUM_{i,t-1}}$  (Gantchev et al., 2023; Giannetti and Jotikasthira, 2024). Expected Position Changes are estimated as the dollar flow-induced trades, keeping previous quarters' holding weights constant:  $\frac{Weight_{i,j,t-1} \times (flow_{i,t} \times AUM_{i,t-1})}{AUM_{i,t-1}}$  where  $flow_{i,t}$  is the relative flow, with  $flow_{i,t} \times AUM_{i,t-1}$  denoting the dollar flow to fund  $i$  between  $t-1$  and  $t$ . Alternatively, this can be written as  $\frac{Position_{i,j,t-1} \times Price_{j,t-1} \times flow_{i,t}}{AUM_{i,t-1}}$ . Discretionary Position Changes are estimated as  $PositionChanges_{i,j,t} - ExpectedPositionChanges_{i,j,t}$ . Position Changes, Expected Position Changes, and Discretionary Position Changes are trimmed at the 0.5 and 99.5 percentiles. The sample only considers fund holdings that the fund held in the previous quarter. ES incidents denote the number of environmental and social RepRisk incidents of firm  $j$  in quarter  $t$ . MSCI ESG $_{t-1}$  is the holding's industry-adjusted MSCI ESG Score. ESG Fund takes on value 1 if the fund  $i$  is denoted as an ESG fund following Morningstar's "General ESG Fund" indicator. Regressions include fund  $\times$  year-quarter and stock  $\times$  year-quarter fixed effects. Standard errors are clustered at the fund level. T-statistics are reported in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table 5:** Types of Mutual Fund Position Changes on Stocks' (past) ES Incidents Conditioned on ESG Scores, Pre-Existing Positions Only

|                                                                                                   | Changes in positions ( $\times 100\%$ ) |                               |                               |                           |                               |                               |
|---------------------------------------------------------------------------------------------------|-----------------------------------------|-------------------------------|-------------------------------|---------------------------|-------------------------------|-------------------------------|
|                                                                                                   | Top ESG <sup>50%</sup>                  |                               |                               | Top ESG <sup>Leader</sup> |                               |                               |
|                                                                                                   | Position Changes (1)                    | Discret. Position Changes (2) | Expected Position Changes (3) | Position Changes (4)      | Discret. Position Changes (5) | Expected Position Changes (6) |
| # ES Incidents <sub>t-1</sub> $\times$ ESG Fund                                                   | -0.0004***<br>(-2.8928)                 | -0.0010***<br>(-7.7855)       | 0.0006***<br>(8.7156)         | -0.0002*<br>(-1.9425)     | -0.0008***<br>(-8.1918)       | 0.0006***<br>(9.8515)         |
| Top ESG <sup>50%</sup> <sub>t-1</sub> $\times$ ESG Fund                                           | 0.0028***<br>(5.2532)                   | 0.0020***<br>(3.9754)         | 0.0008***<br>(4.0719)         |                           |                               |                               |
| # ES Incidents <sub>t-1</sub> $\times$ Top ESG <sup>50%</sup> <sub>t-1</sub> $\times$ ESG Fund    | 0.0005***<br>(3.2336)                   | 0.0005***<br>(3.1868)         | 0.0000<br>(0.2756)            |                           |                               |                               |
| Top ESG <sup>Leader</sup> <sub>t-1</sub> $\times$ ESG Fund                                        |                                         |                               |                               | 0.0039***<br>(6.2502)     | 0.0027***<br>(4.4344)         | 0.0012***<br>(5.9050)         |
| # ES Incidents <sub>t-1</sub> $\times$ Top ESG <sup>Leader</sup> <sub>t-1</sub> $\times$ ESG Fund |                                         |                               |                               | 0.0005***<br>(2.8929)     | 0.0004***<br>(2.6238)         | 0.0001<br>(0.9911)            |
| Constant                                                                                          | -0.0449***<br>(-504.9018)               | -0.0429***<br>(-523.0547)     | -0.0020***<br>(-46.3780)      | -0.0448***<br>(-696.0616) | -0.0428***<br>(-728.3559)     | -0.0020***<br>(-59.4979)      |
| Fund-Year-Quarter FE                                                                              | YES                                     | YES                           | YES                           | YES                       | YES                           | YES                           |
| Stock-Year-Quarter FE                                                                             | YES                                     | YES                           | YES                           | YES                       | YES                           | YES                           |
| Observations                                                                                      | 21,533,057                              | 21,533,057                    | 21,533,057                    | 21,533,057                | 21,533,057                    | 21,533,057                    |
| R-squared                                                                                         | 0.187                                   | 0.168                         | 0.685                         | 0.187                     | 0.168                         | 0.685                         |
| Within R-squared                                                                                  | 0.000                                   | 0.000                         | 0.000                         | 0.000                     | 0.000                         | 0.000                         |
| F-statistic                                                                                       | 19.26***                                | 35.83***                      | 38.82***                      | 23.29***                  | 35.63***                      | 42.51***                      |

Notes: OLS regressions on mutual fund trades. Position Changes is the change in the position of fund  $i$  in stock  $j$  in quarter  $t$  estimated as  $\frac{Price_{j,t-1}(NumberShares_{i,j,t} - NumberShares_{i,j,t-1})}{AUM_{i,t-1}}$  (Gantchev et al., 2023; Giannetti and Jotikasthira, 2024).

Expected Position Changes are estimated as the dollar flow-induced trades, keeping previous quarters' holding weights constant:  $\frac{Weight_{i,j,t-1} \times (flow_{i,t} \times AUM_{i,t-1})}{AUM_{i,t-1}}$  where  $flow_{i,t}$  is the relative flow, with  $flow_{i,t} \times AUM_{i,t-1}$  denoting the dollar flow to fund

$i$  between  $t-1$  and  $t$ . Alternatively, this can be written as  $\frac{Position_{i,j,t-1} \times Price_{j,t-1} \times flow_{i,t}}{AUM_{i,t-1}}$ . Discretionary Position Changes are

estimated as  $Position\ Changes_{i,j,t} - Expected\ Position\ Changes_{i,j,t}$ . Position Changes, Expected Position Changes, and Discretionary Position Changes are trimmed at the 0.5 and 99.5 percentiles. The sample only considers fund holdings that the fund held in the previous quarter. ES incidents denote the number of environmental and social RepRisk incidents of firm  $j$  in quarter  $t$ . MSCI ESG<sub>t-1</sub> is the holding's industry-adjusted MSCI ESG Score. Top ESG<sup>50%</sup><sub>t-1</sub> takes on the value 1 for stocks  $j$  that in the previous quarter had an above-median ESG score, 0 otherwise. Top ESG<sup>Leader</sup><sub>t-1</sub> takes on the value 1 for stocks  $j$  that in the previous quarter had an ESG score higher than 7.142, 0 otherwise. ESG Fund takes on value 1 if the fund  $i$  is denoted as an ESG fund following Morningstar's "General ESG Fund" indicator. Regressions include fund  $\times$  year-quarter and stock  $\times$  year-quarter fixed effects. Standard errors are clustered at the fund level. T-statistics are reported in parentheses. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

**Table 6:** Standardized OLS Regression Results: Types of Mutual Fund Position Changes and Future Cumulative ES Incidents by ESG and Conventional Funds, Pre-Existing Positions Only

|                                                    | Changes in positions    |                         |                           |                         |                           |                         |
|----------------------------------------------------|-------------------------|-------------------------|---------------------------|-------------------------|---------------------------|-------------------------|
|                                                    | (1)                     |                         | (2)                       |                         | (3)                       |                         |
|                                                    | Position Changes        |                         | Discret. Position Changes |                         | Expected Position Changes |                         |
|                                                    | (a)                     | (b)                     | (c)                       | (d)                     | (e)                       | (f)                     |
|                                                    | $t+2$                   | $t+4$                   | $t+2$                     | $t+4$                   | $t+2$                     | $t+4$                   |
| Cumulative # ES Incidents $_{t+s}$                 | -0.001<br>(-1.4294)     | -0.001<br>(-1.4549)     | 0.003***<br>(6.3191)      | 0.003***<br>(6.3541)    | -0.013***<br>(-12.0880)   | -0.014***<br>(-12.0882) |
| Cumulative # ES Incidents $_{t+s} \times$ ESG Fund | -0.000<br>(-0.7458)     | -0.000<br>(-0.6486)     | -0.005***<br>(-7.9463)    | -0.005***<br>(-7.8834)  | 0.014***<br>(10.5108)     | 0.014***<br>(10.5111)   |
| MSCI ESG $_{t-1}$                                  | 0.000<br>(0.0996)       | 0.000<br>(0.1006)       | 0.001**<br>(1.9801)       | 0.001**<br>(1.9713)     | -0.002***<br>(-4.3990)    | -0.002***<br>(-4.3806)  |
| MSCI ESG $_{t-1} \times$ ESG Fund                  | 0.009***<br>(9.6818)    | 0.009***<br>(9.6885)    | 0.007***<br>(7.8668)      | 0.007***<br>(7.8862)    | 0.007***<br>(6.1048)      | 0.007***<br>(6.0802)    |
| In Market Capitalization $_{t-1}$                  | -0.007***<br>(-7.6412)  | -0.007***<br>(-7.6418)  | -0.007***<br>(-8.7815)    | -0.007***<br>(-8.8381)  | -0.002<br>(-1.1045)       | -0.002<br>(-1.0085)     |
| Book-Market $_{t-1}$                               | 0.003***<br>(9.2125)    | 0.003***<br>(9.2181)    | 0.002***<br>(8.4982)      | 0.002***<br>(8.4467)    | 0.001***<br>(4.1425)      | 0.001***<br>(4.3552)    |
| Leverage $_{t-1}$                                  | 0.000*<br>(1.9303)      | 0.000*<br>(1.9250)      | 0.000<br>(1.5206)         | 0.000<br>(1.5266)       | 0.000<br>(1.3647)         | 0.000<br>(1.3325)       |
| ROA $_{t-1}$                                       | -0.005***<br>(-16.6870) | -0.005***<br>(-16.6769) | -0.005***<br>(-17.3200)   | -0.005***<br>(-17.3003) | -0.000<br>(-0.8070)       | -0.000<br>(-0.8482)     |
| Sales Growth $_{t-1}$                              | 0.000<br>(1.5242)       | 0.000<br>(1.5305)       | 0.000<br>(0.8092)         | 0.000<br>(0.8097)       | 0.001***<br>(3.2634)      | 0.001***<br>(3.2923)    |
| Quarterly Stock Return $_{t-1}$                    | -0.013***<br>(-18.9000) | -0.013***<br>(-18.8985) | -0.013***<br>(-18.6476)   | -0.013***<br>(-18.6439) | -0.001***<br>(-3.4237)    | -0.001***<br>(-3.4452)  |
| Fund-Year-Quarter FE                               | YES                     | YES                     | YES                       | YES                     | YES                       | YES                     |
| Observations                                       | 21,533,124              | 21,533,124              | 21,533,124                | 21,533,124              | 21,533,124                | 21,533,124              |
| R-squared                                          | 0.175                   | 0.175                   | 0.155                     | 0.155                   | 0.682                     | 0.682                   |
| Within R-squared                                   | 0.000                   | 0.000                   | 0.000                     | 0.000                   | 0.001                     | 0.001                   |
| F-statistic                                        | 69.39***                | 69.35***                | 81.74***                  | 81.86***                | 21.12***                  | 21.27***                |

Notes: OLS regressions on mutual fund trades. Position Changes is the change in the position of fund  $i$  in stock  $j$  in quarter  $t$  estimated as  $\frac{Price_{j,t-1}(NumberShares_{i,j,t} - NumberShares_{i,j,t-1})}{AUM_{i,t-1}}$  (Gantchev et al., 2023; Giannetti and Jotikasthira, 2024).

Expected Position Changes are estimated as the dollar flow-induced trades, keeping previous quarters' holding weights constant:  $\frac{Weight_{i,j,t-1} \times (flow_{i,t} \times AUM_{i,t-1})}{AUM_{i,t-1}}$  where  $flow_{i,t}$  is the relative flow, with  $flow_{i,t} \times AUM_{i,t-1}$  denoting the dollar flow to fund

$i$  between  $t-1$  and  $t$ . Alternatively, this can be written as  $\frac{Position_{i,j,t-1} \times Price_{j,t-1} \times flow_{i,t}}{AUM_{i,t-1}}$ . Discretionary Position Changes are estimated as  $Position\ Changes_{i,j,t} - Expected\ Position\ Changes_{i,j,t}$ . Position Changes, Expected Position Changes, and Discretionary Position Changes are trimmed at the 0.5 and 99.5 percentiles. The sample only considers fund holdings that the fund held in the previous quarter. ES incidents denote the number of environmental and social RepRisk incidents of firm  $j$  in quarter  $t$ . ESG Fund takes on value 1 if the fund  $i$  is denoted as an ESG fund following Morningstar's "General ESG Fund" indicator. We control for the previous quarter's industry-adjusted MSCI ESG score, the natural logarithm of firm market capitalization, book over market, leverage ratio, return on assets, 12-month sales growth, and quarterly stock return. All lagged continuous control variables are winsorized at the 1 and 99 percentiles. Regressions include fund  $\times$  year-quarter fixed effects. Standard errors are clustered at the fund level. Coefficients are standardized, and t-statistics are reported in parentheses. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

**Table 7:** Standardized OLS Regression Results: Types of Mutual Fund Position Changes on Stocks' Future ES Incidents by ESG and Conventional Funds, Pre-Existing Positions Only

|                                               | Changes in positions    |                               |                               |                         |                               |                               |
|-----------------------------------------------|-------------------------|-------------------------------|-------------------------------|-------------------------|-------------------------------|-------------------------------|
|                                               | # ES Incidents          |                               |                               | ln(1+ # ES Incidents)   |                               |                               |
|                                               | Position Changes (1)    | Discret. Position Changes (2) | Expected Position Changes (3) | Position Changes (4)    | Discret. Position Changes (5) | Expected Position Changes (6) |
| # ES Incidents <sub>t+1</sub>                 | -0.001**<br>(-2.0826)   | 0.003***<br>(5.3638)          | -0.013***<br>(-12.0370)       |                         |                               |                               |
| # ES Incidents <sub>t+1</sub> × ESG Fund      | -0.000<br>(-0.7316)     | -0.004***<br>(-7.7319)        | 0.013***<br>(10.5166)         |                         |                               |                               |
| ln 1 + ES Incidents <sub>t+1</sub>            |                         |                               |                               | -0.001**<br>(-1.9807)   | 0.002***<br>(5.7395)          | -0.011***<br>(-12.2241)       |
| ln 1 + ES Incidents <sub>t+1</sub> × ESG Fund |                         |                               |                               | 0.000<br>(0.1619)       | -0.004***<br>(-7.5399)        | 0.014***<br>(10.8484)         |
| MSCI ESG <sub>t-1</sub>                       | 0.000<br>(0.0477)       | 0.001*<br>(1.9057)            | -0.002***<br>(-4.3612)        | 0.000<br>(0.2195)       | 0.000<br>(1.5531)             | -0.001***<br>(-3.2125)        |
| MSCI ESG <sub>t-1</sub> × ESG Fund            | 0.009***<br>(9.6863)    | 0.007***<br>(7.8727)          | 0.007***<br>(6.0993)          | 0.009***<br>(9.7789)    | 0.007***<br>(8.3578)          | 0.005***<br>(5.2272)          |
| ln Market Capitalization <sub>t-1</sub>       | -0.007***<br>(-7.4606)  | -0.006***<br>(-8.4438)        | -0.002<br>(-1.2482)           | -0.007***<br>(-7.6125)  | -0.006***<br>(-8.4598)        | -0.003<br>(-1.4724)           |
| Book-Market <sub>t-1</sub>                    | 0.003***<br>(9.3962)    | 0.002***<br>(8.7831)          | 0.001***<br>(3.7850)          | 0.003***<br>(9.4001)    | 0.002***<br>(8.8719)          | 0.001***<br>(3.5554)          |
| Leverage <sub>t-1</sub>                       | 0.000*<br>(1.9325)      | 0.000<br>(1.5167)             | 0.000<br>(1.3819)             | 0.000**<br>(2.0904)     | 0.000<br>(1.3323)             | 0.001**<br>(2.3219)           |
| ROA <sub>t-1</sub>                            | -0.005***<br>(-16.7251) | -0.005***<br>(-17.3769)       | -0.000<br>(-0.7467)           | -0.005***<br>(-16.7200) | -0.005***<br>(-17.3607)       | -0.000<br>(-0.8619)           |
| Sales Growth <sub>t-1</sub>                   | 0.000<br>(1.4923)       | 0.000<br>(0.7910)             | 0.001***<br>(3.1946)          | 0.000<br>(1.4655)       | 0.000<br>(0.8398)             | 0.000***<br>(2.8320)          |
| Quarterly Stock Return <sub>t-1</sub>         | -0.013***<br>(-18.9075) | -0.013***<br>(-18.6629)       | -0.001***<br>(-3.3494)        | -0.013***<br>(-18.8951) | -0.013***<br>(-18.6620)       | -0.001***<br>(-3.2657)        |
| Fund-Year-Quarter FE                          | YES                     | YES                           | YES                           | YES                     | YES                           | YES                           |
| Observations                                  | 21,533,124              | 21,533,124                    | 21,533,124                    | 21,533,124              | 21,533,124                    | 21,533,124                    |
| R-squared                                     | 0.175                   | 0.155                         | 0.682                         | 0.175                   | 0.155                         | 0.682                         |
| Within R-squared                              | 0.000                   | 0.000                         | 0.001                         | 0.000                   | 0.000                         | 0.000                         |
| F-statistic                                   | 69.44***                | 80.80***                      | 20.81***                      | 69.30***                | 79.46***                      | 20.63***                      |

Notes: OLS regressions on mutual fund trades. Position Changes is the change in the position of fund  $i$  in stock  $j$  in quarter  $t$  estimated as  $\frac{Price_{j,t-1}(NumberShares_{i,j,t} - NumberShares_{i,j,t-1})}{AUM_{i,t-1}}$  (Gantchev et al., 2023; Giannetti and Jotikasthira, 2024).

Expected Position Changes are estimated as the dollar flow-induced trades, keeping previous quarters' holding weights constant:  $\frac{Weight_{i,j,t-1} \times (flow_{i,t} \times AUM_{i,t-1})}{AUM_{i,t-1}}$  where  $flow_{i,t}$  is the relative flow, with  $flow_{i,t} \times AUM_{i,t-1}$  denoting the dollar flow to fund

$i$  between  $t-1$  and  $t$ . Alternatively, this can be written as  $\frac{Position_{i,j,t-1} \times Price_{j,t-1} \times flow_{i,t}}{AUM_{i,t-1}}$ . Discretionary Position Changes are estimated as  $PositionChanges_{i,j,t} - ExpectedPositionChanges_{i,j,t}$ . Position Changes, Expected Position Changes, and Discretionary Position Changes are trimmed at the 0.5 and 99.5 percentiles. The sample only considers fund holdings that the fund held in the previous quarter. ES incidents denote the number of environmental and social RepRisk incidents of firm  $j$  in quarter  $t$ . ln ES incidents denotes the natural logarithm of 1 + the number of environmental and social RepRisk incidents of firm  $j$  in quarter  $t$ . ESG Fund takes on value 1 if the fund  $i$  is denoted as an ESG fund following Morningstar's "General ESG Fund" indicator. We control for the previous quarter's industry-adjusted MSCI ESG score, the natural logarithm of firm market capitalization, book over market, leverage ratio, return on assets, 12-month sales growth, and quarterly stock return. All lagged continuous control variables are winsorized at the 1 and 99 percentiles. Regressions include fund × year-quarter fixed effects. Standard errors are clustered at the fund level. Coefficients are standardized, and t-statistics are reported in parentheses. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

**Table 8:** Types of Mutual Fund Position Changes on Stocks' (past) ES Incidents Conditioned on ESG Scores, Pre-Existing Positions Only

|                                                                                          | Changes in positions ( $\times 100\%$ ) |                                 |                                 |                           |                                 |                                 |                           |                                 |                                 |
|------------------------------------------------------------------------------------------|-----------------------------------------|---------------------------------|---------------------------------|---------------------------|---------------------------------|---------------------------------|---------------------------|---------------------------------|---------------------------------|
|                                                                                          | Position<br>Changes                     | Discret.<br>Position<br>Changes | Expected<br>Position<br>Changes | Position<br>Changes       | Discret.<br>Position<br>Changes | Expected<br>Position<br>Changes | Position<br>Changes       | Discret.<br>Position<br>Changes | Expected<br>Position<br>Changes |
|                                                                                          | (1)                                     | (2)                             | (3)                             | (4)                       | (5)                             | (6)                             | (7)                       | (8)                             | (9)                             |
| $\geq 1$ ES Incidents $_{t+4}^{severe}$                                                  | -0.0001<br>(-0.3212)                    | 0.0015***<br>(4.9531)           | -0.0016***<br>(-10.7963)        |                           |                                 |                                 |                           |                                 |                                 |
| $\geq 1$ ES Incidents $_{t+4}^{severe} \times$ ESG Fund                                  | -0.0009<br>(-1.1811)                    | -0.0050***<br>(-7.2235)         | 0.0041***<br>(10.3279)          | -0.0016**<br>(-2.0556)    | -0.0058***<br>(-8.1803)         | 0.0042***<br>(10.5654)          | -0.0024**<br>(-2.5615)    | -0.0069***<br>(-8.1590)         | 0.0045***<br>(9.6494)           |
| MSCI ESG $_{t-1}$                                                                        | 0.0000<br>(0.2332)                      | 0.0001<br>(1.4967)              | -0.0001***<br>(-3.0635)         |                           |                                 |                                 |                           |                                 |                                 |
| MSCI ESG $_{t-1} \times$ ESG Fund                                                        | 0.0012***<br>(9.8230)                   | 0.0010***<br>(8.3833)           | 0.0002***<br>(5.2428)           | 0.0011***<br>(8.8731)     | 0.0008***<br>(6.9844)           | 0.0003***<br>(6.5402)           |                           |                                 |                                 |
| Top ESG $_{t-1}^{Leader} \times$ ESG Fund                                                |                                         |                                 |                                 |                           |                                 |                                 | 0.0041***<br>(6.5600)     | 0.0029***<br>(4.8004)           | 0.0012***<br>(5.9308)           |
| $\geq 1$ ES Incidents $_{t+4}^{severe} \times$ Top ESG $_{t-1}^{Leader} \times$ ESG Fund |                                         |                                 |                                 |                           |                                 |                                 | 0.0027**<br>(2.1600)      | 0.0035***<br>(2.9003)           | -0.0008**<br>(-2.2204)          |
| In Market Cap $_{t-1}$                                                                   | -0.0019***<br>(-7.8653)                 | -0.0015***<br>(-8.0961)         | -0.0004**<br>(-2.3830)          |                           |                                 |                                 |                           |                                 |                                 |
| Book-Market $_{t-1}$                                                                     | 0.0018***<br>(8.9663)                   | 0.0018***<br>(9.1459)           | 0.0000<br>(0.4509)              |                           |                                 |                                 |                           |                                 |                                 |
| Leverage $_{t-1}$                                                                        | 0.0009**<br>(1.9745)                    | 0.0006<br>(1.4044)              | 0.0003*<br>(1.8121)             |                           |                                 |                                 |                           |                                 |                                 |
| ROA $_{t-1}$                                                                             | -0.0761***<br>(-16.6772)                | -0.0757***<br>(-17.4414)        | -0.0004<br>(-0.3110)            |                           |                                 |                                 |                           |                                 |                                 |
| Sales Growth $_{t-1}$                                                                    | 0.0005<br>(1.5376)                      | 0.0002<br>(0.8076)              | 0.0002***<br>(3.3493)           |                           |                                 |                                 |                           |                                 |                                 |
| Stock Return $_{t-1}$                                                                    | -0.0003***<br>(-18.8843)                | -0.0003***<br>(-18.6777)        | -0.0000***<br>(-3.0248)         |                           |                                 |                                 |                           |                                 |                                 |
| Constant                                                                                 | -0.0279***<br>(-11.9896)                | -0.0297***<br>(-16.3812)        | 0.0019<br>(1.2469)              | -0.0460***<br>(-245.5399) | -0.0438***<br>(-250.0898)       | -0.0022***<br>(-30.3422)        | -0.0448***<br>(-688.4779) | -0.0428***<br>(-725.9643)       | -0.0019***<br>(-62.9472)        |
| Fund-Year-Quarter FE                                                                     | YES                                     | YES                             | YES                             | YES                       | YES                             | YES                             | YES                       | YES                             | YES                             |
| Stock-Year-Quarter FE                                                                    | NO                                      | NO                              | NO                              | YES                       | YES                             | YES                             | YES                       | YES                             | YES                             |
| Observations                                                                             | 21,533,124                              | 21,533,124                      | 21,533,124                      | 21,533,057                | 21,533,057                      | 21,533,057                      | 21,533,057                | 21,533,057                      | 21,533,057                      |
| R-squared                                                                                | 0.175                                   | 0.155                           | 0.682                           | 0.187                     | 0.168                           | 0.685                           | 0.187                     | 0.168                           | 0.685                           |
| Within R-squared                                                                         | 0.000                                   | 0.000                           | 0.000                           | 0.000                     | 0.000                           | 0.000                           | 0.000                     | 0.000                           | 0.000                           |
| F-statistic                                                                              | 69.74***                                | 77.84***                        | 15.94***                        | 43.55***                  | 59.60***                        | 56.74***                        | 24.20***                  | 37.19***                        | 40.92***                        |

Notes: OLS regressions on mutual fund trades. Position Changes is the change in the position of fund  $i$  in stock  $j$  in quarter  $t$  estimated as  $\frac{Price_{j,t-1}(NumberShares_{i,j,t} - NumberShares_{i,j,t-1})}{AUM_{i,t-1}}$  (Gantchev et al., 2023; Giannetti and Jotikasthira, 2024).

Expected Position Changes are estimated as the dollar flow-induced trades, keeping previous quarters' holding weights constant:  $\frac{Weight_{i,j,t-1} \times (flow_{i,t} \times AUM_{i,t-1})}{AUM_{i,t-1}}$  where  $flow_{i,t}$  is the relative flow, with  $flow_{i,t} \times AUM_{i,t-1}$  denoting the dollar flow to fund

$i$  between  $t-1$  and  $t$ . Alternatively, this can be written as  $\frac{Position_{i,j,t-1} \times Price_{j,t-1} \times flow_{i,t}}{AUM_{i,t-1}}$ . Discretionary Position Changes are

estimated as  $Position\ Changes_{i,j,t} - Expected\ Position\ Changes_{i,j,t}$ . Position Changes, Expected Position Changes, and Discretionary Position Changes are trimmed at the 0.5 and 99.5 percentiles. The sample only considers fund holdings that the fund held in the previous quarter.  $\geq 1$  ES Incidents $_{t+4}^{severe}$  is given value 1 if the number of environmental and social RepRisk incidents of firm  $j$  in quarter  $t+4$  is 1 or higher. MSCI ESG $_{t-1}$  is the holding's industry-adjusted MSCI ESG Score. Top ESG $_{t-1}^{Leader}$  takes on the value 1 for stocks  $j$  that in the previous quarter had an ESG score higher than 7.142, 0 otherwise. ESG Fund takes on value 1 if the fund  $i$  is denoted as an ESG fund following Morningstar's "General ESG Fund" indicator. We control for the previous quarter's industry-adjusted MSCI ESG score, the natural logarithm of firm market capitalization, book over market, leverage ratio, return on assets, 12-month sales growth, and quarterly stock return. All lagged continuous control variables are winsorized at the 1 and 99 percentiles. Regressions include fund  $\times$  year-quarter (columns (1)-(3)), and fund  $\times$  year-quarter and stock  $\times$  year-quarter fixed effects (columns (4)-(9)). Standard errors are clustered at the fund level. T-statistics are reported in parentheses. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

**Table 9:** Correlation between propensity to trade on future ES incidents and past ESG scores and other fund characteristics

| Variables                                                                  | (1)      | (2)      | (3)      | (4)      | (5)      | (6)      | (7)     | (8)    | (9)    |
|----------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------|---------|--------|--------|
| (1) ESG Fund                                                               | 1.0000   |          |          |          |          |          |         |        |        |
| (2) Propensity <sup>ES Incidents<sub>t+1</sub></sup> <sub><i>i,t</i></sub> | 0.0092*  | 1.0000   |          |          |          |          |         |        |        |
| (3) Propensity <sup>ESG Score<sub>t-1</sub></sup> <sub><i>i,t</i></sub>    | 0.0387*  | 0.0194*  | 1.0000   |          |          |          |         |        |        |
| (4) ln TNA                                                                 | 0.0112*  | 0.0080*  | -0.0098* | 1.0000   |          |          |         |        |        |
| (5) ln Age                                                                 | -0.0524* | 0.0010   | -0.0026  | 0.3131*  | 1.0000   |          |         |        |        |
| (6) Expense ratio                                                          | 0.0174*  | -0.0115* | 0.0034   | -0.3768* | 0.0762*  | 1.0000   |         |        |        |
| (7) Flow                                                                   | 0.0569*  | 0.0124*  | 0.0021   | -0.0026  | -0.1656* | -0.0109* | 1.0000  |        |        |
| (8) Fund turnover                                                          | 0.0765*  | -0.0072* | -0.0020  | -0.0565* | -0.0364* | 0.0487*  | 0.0213* | 1.0000 |        |
| (9) Returns                                                                | -0.0013  | 0.0009   | -0.0073* | 0.0382*  | 0.0013   | -0.0188* | 0.0378* | 0.0011 | 1.0000 |

Notes: This table presents the correlation coefficients between ESG Fund, Propensity<sup>ES Incidents<sub>t+1</sub></sup><sub>*i,t*</sub>, Propensity<sup>ESG Score<sub>t-1</sub></sup><sub>*i,t*</sub>, ESG Fund, ln TNA, ln Age, Flow, Returns, Fund turnover, and Expense ratio. *ESG Fund* takes on the value 1 if the fund is denoted by Morningstar to be a "General ESG Investment", 0 otherwise. *ln TNA* denotes the natural logarithms of total assets under management at the quarter-end in USD. *Returns* are the quarterly net returns of a fund. *Flow* is defined as the quarterly dollar flows normalized by the fund's previous quarter's TNA. *Fund turnover* is the fund's quarterly portfolio turnover calculated following Morningstar's definition of taking the lesser of purchases or sales and dividing by the fund's quarterly net assets at the end of the previous quarter. The values are trimmed at the 0.5th and 99.5h percentiles. *ln Age* is the natural logarithm of the number of years between the inception date of the oldest share class of the fund and the date of observation. *Expense ratio* is the fund's net expense ratio, back-filled over the year's quarters. The values are trimmed at the 0.5th and 99.5h percentiles. \* p<0.01.

**Table 10:** Impact of integrating future ES risks and past ESG scores on Returns (Fund Fixed Effects), pre-existing holdings only

| Trading measure                                                                                             | Risk-adjusted Returns                 |                                   |                                       |                                   |
|-------------------------------------------------------------------------------------------------------------|---------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------|
|                                                                                                             | Changes in ownership                  |                                   | Changes in positions                  |                                   |
|                                                                                                             | (1)<br>Fama-French 3-Factors $\alpha$ | (2)<br>Carhart 4-Factors $\alpha$ | (3)<br>Fama-French 3-Factors $\alpha$ | (4)<br>Carhart 4-Factors $\alpha$ |
| Propensity <sub><math>t-1</math></sub> <sup>ES Incidents<sub><math>t+1</math></sub></sup>                   | -0.036*<br>(0.019)                    | -0.032*<br>(0.019)                | -0.039**<br>(0.016)                   | -0.032*<br>(0.017)                |
| Propensity <sub><math>t-1</math></sub> <sup>ES Incidents<sub><math>t+1</math></sub></sup> $\times$ ESG Fund | 0.049<br>(0.041)                      | 0.053<br>(0.042)                  | 0.051*<br>(0.028)                     | 0.047<br>(0.029)                  |
| Propensity <sub><math>t-1</math></sub> <sup>ESG Score<sub><math>t-1</math></sub></sup>                      | 0.099***<br>(0.027)                   | 0.090***<br>(0.028)               | 0.067***<br>(0.020)                   | 0.058***<br>(0.020)               |
| Propensity <sub><math>t-1</math></sub> <sup>ESG Score<sub><math>t-1</math></sub></sup> $\times$ ESG Fund    | -0.127**<br>(0.050)                   | -0.120**<br>(0.051)               | -0.065*<br>(0.037)                    | -0.068*<br>(0.037)                |
| ln TNA <sub><math>t-1</math></sub>                                                                          | 0.057***<br>(0.005)                   | 0.070***<br>(0.005)               | 0.057***<br>(0.005)                   | 0.070***<br>(0.005)               |
| ln Age <sub><math>t-1</math></sub>                                                                          | -0.028<br>(0.018)                     | -0.043**<br>(0.018)               | -0.022<br>(0.018)                     | -0.035*<br>(0.018)                |
| Turnover <sub><math>t-1</math></sub>                                                                        | -0.017***<br>(0.004)                  | -0.019***<br>(0.004)              | -0.018***<br>(0.004)                  | -0.020***<br>(0.004)              |
| Flow <sub><math>t-1</math></sub>                                                                            | 0.129***<br>(0.008)                   | 0.128***<br>(0.008)               | 0.159***<br>(0.009)                   | 0.157***<br>(0.009)               |
| Expense Ratio <sub><math>t-1</math></sub>                                                                   | -0.004<br>(0.011)                     | 0.003<br>(0.012)                  | -0.004<br>(0.011)                     | 0.003<br>(0.012)                  |
| Constant                                                                                                    | -1.173***<br>(0.096)                  | -1.379***<br>(0.098)              | -1.178***<br>(0.095)                  | -1.400***<br>(0.097)              |
| Fund FE                                                                                                     | Yes                                   | Yes                               | Yes                                   | Yes                               |
| Category FE                                                                                                 | No                                    | No                                | No                                    | No                                |
| Year-quarter FE                                                                                             | Yes                                   | Yes                               | Yes                                   | Yes                               |
| Observations                                                                                                | 147,152                               | 147,152                           | 146,405                               | 146,405                           |
| R-squared                                                                                                   | 0.611                                 | 0.593                             | 0.611                                 | 0.593                             |
| Within R-squared                                                                                            | 0.018                                 | 0.022                             | 0.019                                 | 0.022                             |
| F-statistic                                                                                                 | 57.29***                              | 61.95***                          | 62.51***                              | 67.01***                          |

Notes: The table reports the relation between the lagged propensity to invest based on future firm ES risks (Propensity <sub>$t-1$</sub> <sup>ES Incidents <sub>$t+1$</sub></sup> ) or historical firm ESG score (Propensity <sub>$t-1$</sub> <sup>ESG Score <sub>$t-1$</sub></sup> ) using discretionary ownership and discretionary position changes, and fund risk-adjusted return. The sample only considers fund holdings that were held by the fund in the previous quarter. The two propensity measures are defined as per Fang et al. (2014) and Chen et al. (2024) on discretionary ownership (columns 1 and 2) and discretionary position changes (columns 3 and 4) and are standardized. Standardized propensity scores are trimmed on the 0.5 and 99.5 percentiles. For each fund in each quarter, Fama-French three-factor returns (columns (1) and (3)) are calculated using fund returns of the past 36 months. Quarterly Carhart's 4-factor returns (columns (2) and (4)) are calculated using fund returns of the past 36 months. We denominate quarterly risk-adjusted returns in basis points per month (coefficients are scaled by 100). ESG Fund takes on the value 1 if the fund is denoted by Morningstar to be a "General ESG Investment", 0 otherwise. Fund portfolio turnover and the fund expense ratio are trimmed at the 0.5 and 99.5 percentiles. All other continuous control variables are lagged by one quarter and winsorized at the 1 and 99 percentiles. We control for fund and year-quarter fixed effects. Standard errors are clustered at the fund level and are reported in parentheses. Note: ESG Fund indicator is absorbed by fund fixed effects and therefore not included in the regression. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

**Table 11:** Impact of integrating future ES risks and past ESG scores on Returns (Category Fixed Effects), pre-existing holdings only

| Trading measure                                                            | Risk-adjusted Returns                 |                                   |                                       |                                   |
|----------------------------------------------------------------------------|---------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------|
|                                                                            | Changes in ownership                  |                                   | Changes in positions                  |                                   |
|                                                                            | (1)<br>Fama-French 3-Factors $\alpha$ | (2)<br>Carhart 4-Factors $\alpha$ | (3)<br>Fama-French 3-Factors $\alpha$ | (4)<br>Carhart 4-Factors $\alpha$ |
| ESG Fund                                                                   | 0.036***<br>(0.005)                   | 0.036***<br>(0.004)               | 0.035***<br>(0.005)                   | 0.035***<br>(0.004)               |
| Propensity <sup>ES Incidents<sub>t+1</sub></sup> <sub>t-1</sub>            | -0.021<br>(0.018)                     | -0.021<br>(0.018)                 | -0.026*<br>(0.015)                    | -0.022<br>(0.015)                 |
| Propensity <sup>ES Incidents<sub>t+1</sub></sup> <sub>t-1</sub> × ESG Fund | 0.022<br>(0.037)                      | 0.023<br>(0.037)                  | 0.036<br>(0.026)                      | 0.035<br>(0.026)                  |
| Propensity <sup>ESG Score<sub>t-1</sub></sup> <sub>t-1</sub>               | 0.060**<br>(0.027)                    | 0.053**<br>(0.027)                | 0.057***<br>(0.020)                   | 0.041**<br>(0.020)                |
| Propensity <sup>ESG Score<sub>t-1</sub></sup> <sub>t-1</sub> × ESG Fund    | -0.044<br>(0.047)                     | -0.040<br>(0.047)                 | -0.062*<br>(0.033)                    | -0.059*<br>(0.033)                |
| ln TNA <sub>t-1</sub>                                                      | 0.021***<br>(0.001)                   | 0.021***<br>(0.001)               | 0.020***<br>(0.001)                   | 0.021***<br>(0.001)               |
| ln Age <sub>t-1</sub>                                                      | -0.023***<br>(0.003)                  | -0.023***<br>(0.003)              | -0.020***<br>(0.003)                  | -0.021***<br>(0.003)              |
| Turnover <sub>t-1</sub>                                                    | -0.001<br>(0.005)                     | -0.003<br>(0.005)                 | -0.002<br>(0.005)                     | -0.004<br>(0.005)                 |
| Flow <sub>t-1</sub>                                                        | 0.255***<br>(0.011)                   | 0.258***<br>(0.011)               | 0.298***<br>(0.012)                   | 0.299***<br>(0.012)               |
| Expense Ratio <sub>t-1</sub>                                               | -0.074***<br>(0.004)                  | -0.073***<br>(0.004)              | -0.074***<br>(0.004)                  | -0.073***<br>(0.004)              |
| Constant                                                                   | -0.416***<br>(0.024)                  | -0.413***<br>(0.024)              | -0.411***<br>(0.024)                  | -0.411***<br>(0.024)              |
| Fund FE                                                                    | No                                    | No                                | No                                    | No                                |
| Category FE                                                                | Yes                                   | Yes                               | Yes                                   | Yes                               |
| Year-quarter FE                                                            | Yes                                   | Yes                               | Yes                                   | Yes                               |
| Observations                                                               | 147,398                               | 147,398                           | 146,656                               | 146,656                           |
| R-squared                                                                  | 0.340                                 | 0.329                             | 0.344                                 | 0.333                             |
| Within R-squared                                                           | 0.073                                 | 0.071                             | 0.075                                 | 0.072                             |
| F-statistic                                                                | 190.05***                             | 188.48***                         | 197.66***                             | 195.37***                         |

Notes: The table reports the relation between the lagged propensity to invest based on future firm ES risks (Propensity<sup>ES Incidents<sub>t+1</sub></sup><sub>t-1</sub>) or historical firm ESG score (Propensity<sup>ESG Score<sub>t-1</sub></sup><sub>t-1</sub>) using discretionary ownership and discretionary position changes, and fund risk-adjusted return. The sample only considers fund holdings that were held by the fund in the previous quarter. The two propensity measures are defined as per Fang et al. (2014) and Chen et al. (2024) on discretionary ownership (columns 1 and 2) and discretionary position changes (columns 3 and 4) and are standardized. Standardized propensity scores are trimmed on the 0.5 and 99.5 percentiles. For each fund in each quarter, Fama-French three-factor returns (columns (1) and (3)) are calculated using fund returns of the past 36 months. Quarterly Carhart's 4-factor returns (columns (2) and (4)) are calculated using fund returns of the past 36 months. We denominate quarterly risk-adjusted returns in basis points per month (coefficients are scaled by 100). ESG Fund takes on the value 1 if the fund is denoted by Morningstar to be a "General ESG Investment", 0 otherwise. Fund portfolio turnover and the fund expense ratio are trimmed at the 0.5 and 99.5 percentiles. All other continuous control variables are lagged by one quarter and winsorized at the 1 and 99 percentiles. We control for fund category and year-quarter fixed effects. Standard errors are clustered at the fund level and are reported in parentheses. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

**Table 12:** Impact of integrating future ES risks and past ESG scores by European and US-domiciled Funds on Returns, pre-existing holdings only

| Sample                                                                                               | Risk-adjusted Returns             |                                   |                                   |                                   |
|------------------------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
|                                                                                                      | European Funds                    |                                   | US-domiciled Funds                |                                   |
|                                                                                                      | (1)<br>Carhart 4-Factors $\alpha$ | (2)<br>Carhart 4-Factors $\alpha$ | (3)<br>Carhart 4-Factors $\alpha$ | (4)<br>Carhart 4-Factors $\alpha$ |
| Propensity <sub><math>t-1</math></sub> <sup>ES Incidents<sub><math>t+1</math></sub></sup>            | -0.025<br>(0.021)                 |                                   | -0.058**<br>(0.025)               |                                   |
| Propensity <sub><math>t-1</math></sub> <sup>ES Incidents<sub><math>t+1</math></sub></sup> × ESG Fund | 0.024<br>(0.031)                  |                                   | 0.184<br>(0.121)                  |                                   |
| Propensity <sub><math>t-1</math></sub> <sup>ESG Score<sub><math>t-1</math></sub></sup>               |                                   | 0.095***<br>(0.024)               |                                   | -0.011<br>(0.038)                 |
| Propensity <sub><math>t-1</math></sub> <sup>ESG Score<sub><math>t-1</math></sub></sup> × ESG Fund    |                                   | -0.085**<br>(0.039)               |                                   | 0.006<br>(0.143)                  |
| ln TNA <sub><math>t-1</math></sub>                                                                   | 0.074***<br>(0.005)               | 0.072***<br>(0.005)               | 0.059***<br>(0.009)               | 0.062***<br>(0.009)               |
| ln Age <sub><math>t-1</math></sub>                                                                   | 0.011<br>(0.022)                  | 0.010<br>(0.022)                  | -0.066*<br>(0.034)                | -0.068*<br>(0.035)                |
| Turnover <sub><math>t-1</math></sub>                                                                 | -0.015***<br>(0.004)              | -0.015***<br>(0.004)              | -0.036***<br>(0.011)              | -0.037***<br>(0.011)              |
| Flow <sub><math>t-1</math></sub>                                                                     | 0.103***<br>(0.009)               | 0.106***<br>(0.009)               | 0.296***<br>(0.025)               | 0.299***<br>(0.025)               |
| Expense Ratio <sub><math>t-1</math></sub>                                                            | 0.007<br>(0.012)                  | 0.003<br>(0.012)                  | 0.012<br>(0.032)                  | 0.007<br>(0.034)                  |
| Constant                                                                                             | -1.656***<br>(0.114)              | -1.610***<br>(0.114)              | -0.987***<br>(0.184)              | -1.033***<br>(0.187)              |
| Fund FE                                                                                              | Yes                               | Yes                               | Yes                               | Yes                               |
| Category FE                                                                                          | No                                | No                                | No                                | No                                |
| Year-quarter FE                                                                                      | Yes                               | Yes                               | Yes                               | Yes                               |
| Observations                                                                                         | 98,071                            | 97,556                            | 49,948                            | 50,013                            |
| R-squared                                                                                            | 0.585                             | 0.586                             | 0.487                             | 0.489                             |
| Within R-squared                                                                                     | 0.021                             | 0.021                             | 0.030                             | 0.030                             |
| F-statistic                                                                                          | 57.26***                          | 58.61***                          | 29.44***                          | 27.53***                          |

Notes: The table reports the relation between the lagged propensity to invest based on future firm ES risks (Propensity <sub>$t-1$</sub> <sup>ES Incidents <sub>$t+1$</sub></sup> ) or historical firm ESG score (Propensity <sub>$t-1$</sub> <sup>ESG Score <sub>$t-1$</sub></sup> ) using discretionary position changes and fund risk-adjusted return. The sample only considers fund holdings that were held by the fund in the previous quarter. The two propensity measures are defined as per Fang et al. (2014) and Chen et al. (2024) and are standardized. We split our sample into European funds (columns 1 and 2) and US-domiciled funds (columns 3 and 4). Standardized propensity scores are trimmed on the 0.5 and 99.5 percentiles. Quarterly Carhart's 4-factor returns are calculated using fund returns of the past 36 months. We denominate quarterly risk-adjusted returns in basis points per month (coefficients are scaled by 100). ESG Fund takes on the value 1 if the fund is denoted by Morningstar to be a "General ESG Investment", 0 otherwise. Fund portfolio turnover and the fund expense ratio are trimmed at the 0.5 and 99.5 percentiles. All other continuous control variables are lagged by one quarter and winsorized at the 1 and 99 percentiles. We control for fund and year-quarter fixed effects. Standard errors are clustered at the fund level and are reported in parentheses. Note: ESG Fund indicator is absorbed by fund fixed effects and therefore not included in the regression. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

**Table 13:** Impact of integrating future ES risks and past ESG scores on Flows, pre-existing holdings only

| Trading measure                                                            | Quarterly Fund Flows |                      |                      |                      |
|----------------------------------------------------------------------------|----------------------|----------------------|----------------------|----------------------|
|                                                                            | Changes in ownership |                      | Changes in positions |                      |
|                                                                            | (1)                  | (2)                  | (3)                  | (4)                  |
| ESG Fund                                                                   | 0.017***<br>(0.001)  |                      | 0.016***<br>(0.001)  |                      |
| Propensity <sub>t-1</sub> <sup>ES Incidents<sub>t+1</sub></sup>            | -0.002<br>(0.004)    | -0.009**<br>(0.004)  | 0.001<br>(0.003)     | -0.001<br>(0.004)    |
| Propensity <sub>t-1</sub> <sup>ES Incidents<sub>t+1</sub></sup> × ESG Fund | 0.012*<br>(0.006)    | 0.018**<br>(0.008)   | 0.020***<br>(0.006)  | 0.016**<br>(0.007)   |
| Propensity <sub>t-1</sub> <sup>ESG Score<sub>t-1</sub></sup>               | 0.006<br>(0.005)     | 0.015**<br>(0.006)   | 0.002<br>(0.004)     | -0.002<br>(0.005)    |
| Propensity <sub>t-1</sub> <sup>ESG Score<sub>t-1</sub></sup> × ESG Fund    | -0.005<br>(0.009)    | -0.012<br>(0.011)    | -0.008<br>(0.008)    | -0.015<br>(0.010)    |
| ln TNA <sub>t-1</sub>                                                      | -0.002***<br>(0.000) | -0.046***<br>(0.002) | -0.002***<br>(0.000) | -0.046***<br>(0.002) |
| ln Age <sub>t-1</sub>                                                      | -0.018***<br>(0.001) | -0.041***<br>(0.005) | -0.016***<br>(0.001) | -0.038***<br>(0.005) |
| Turnover <sub>t-1</sub>                                                    | 0.000<br>(0.002)     | 0.001<br>(0.002)     | 0.001<br>(0.001)     | 0.002<br>(0.002)     |
| Expense Ratio <sub>t-1</sub>                                               | -0.000<br>(0.001)    | 0.007<br>(0.004)     | -0.001<br>(0.001)    | 0.005<br>(0.004)     |
| Returns <sub>t-1</sub>                                                     | 0.003***<br>(0.000)  | 0.003***<br>(0.000)  | 0.003***<br>(0.000)  | 0.003***<br>(0.000)  |
| Constant                                                                   | 0.066***<br>(0.006)  | 0.985***<br>(0.036)  | 0.062***<br>(0.006)  | 0.970***<br>(0.036)  |
| Fund FE                                                                    | No                   | Yes                  | Yes                  | No                   |
| Category FE                                                                | Yes                  | No                   | No                   | Yes                  |
| Year-quarter FE                                                            | Yes                  | Yes                  | Yes                  | Yes                  |
| Observations                                                               | 155,228              | 155,007              | 153,835              | 153,620              |
| R-squared                                                                  | 0.034                | 0.193                | 0.033                | 0.189                |
| Within R-squared                                                           | 0.026                | 0.036                | 0.024                | 0.035                |
| F-statistic                                                                | 143.71***            | 171.59***            | 143.19***            | 165.83***            |

Notes: The table reports the relation between the lagged propensity to invest based on future firm ES risks (Propensity<sub>t-1</sub><sup>ES Incidents<sub>t+1</sub></sup>) or historical firm ESG score (Propensity<sub>t-1</sub><sup>ESG Score<sub>t-1</sub></sup>) using discretionary ownership and position changes, and quarterly fund flows. The sample only considers fund holdings that were held by the fund in the previous quarter. The two propensity measures are defined as per Fang et al. (2014) and Chen et al. (2024) on discretionary ownership (columns 1 and 2) and discretionary position changes (columns 3 and 4) and are standardized. Standardized propensity scores are trimmed on the 0.5 and 99.5 percentiles. ESG Fund takes on the value 1 if the fund is denoted by Morningstar to be a "General ESG Investment", 0 otherwise. Fund portfolio turnover and the fund expense ratio are trimmed at the 0.5 and 99.5 percentiles. We control for fund category (columns 1 and 3) or fund (columns 2 and 4), and year-quarter fixed effects. Standard errors are clustered at the fund level and are reported in parentheses. Note: ESG Fund indicator is absorbed by fund fixed effects and therefore not included in the regression. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

**Table 14:** Impact of integrating future ES risks and past ESG scores on fund fees, pre-existing holdings only

| Trading measure                                                                                      | Fund Total Expense Ratio |                      |
|------------------------------------------------------------------------------------------------------|--------------------------|----------------------|
|                                                                                                      | Changes in ownership     | Changes in positions |
|                                                                                                      | (1)                      | (2)                  |
| ESG Fund                                                                                             | 0.017<br>(0.014)         | 0.018<br>(0.014)     |
| Propensity <sub><math>t-1</math></sub> <sup>ES Incidents<sub><math>t+1</math></sub></sup>            | 0.013<br>(0.027)         | -0.036<br>(0.025)    |
| Propensity <sub><math>t-1</math></sub> <sup>ES Incidents<sub><math>t+1</math></sub></sup> × ESG Fund | -0.017<br>(0.061)        | 0.038<br>(0.044)     |
| Propensity <sub><math>t-1</math></sub> <sup>ESG Score<sub><math>t-1</math></sub></sup>               | -0.052<br>(0.043)        | 0.024<br>(0.035)     |
| Propensity <sub><math>t-1</math></sub> <sup>ESG Score<sub><math>t-1</math></sub></sup> × ESG Fund    | 0.019<br>(0.089)         | -0.115*<br>(0.060)   |
| ln TNA <sub><math>t-1</math></sub>                                                                   | -0.142***<br>(0.003)     | -0.141***<br>(0.003) |
| ln Age <sub><math>t-1</math></sub>                                                                   | 0.199***<br>(0.008)      | 0.201***<br>(0.008)  |
| Turnover <sub><math>t-1</math></sub>                                                                 | 0.040***<br>(0.015)      | 0.042***<br>(0.015)  |
| Flow <sub><math>t-1</math></sub>                                                                     | 0.012<br>(0.016)         | 0.007<br>(0.018)     |
| Returns <sub><math>t-1</math></sub>                                                                  | -0.000<br>(0.000)        | -0.000*<br>(0.000)   |
| Constant                                                                                             | 3.328***<br>(0.062)      | 3.289***<br>(0.062)  |
| Category FE                                                                                          | Yes                      | Yes                  |
| Year FE                                                                                              | Yes                      | Yes                  |
| Observations                                                                                         | 155,293                  | 153,898              |
| R-squared                                                                                            | 0.287                    | 0.286                |
| Within R-squared                                                                                     | 0.181                    | 0.180                |
| F-statistic                                                                                          | 207.97***                | 205.57***            |

Notes: The table reports the relation between the lagged propensity to invest based on future firm ES risks (Propensity <sub>$t-1$</sub> <sup>ES Incidents <sub>$t+1$</sub></sup> ) or historical firm ESG score (Propensity <sub>$t-1$</sub> <sup>ESG Score <sub>$t-1$</sub></sup> ) using discretionary ownership and position changes, and fund expense ratios. The sample only considers fund holdings that were held by the fund in the previous quarter. The two propensity measures are defined as per Fang et al. (2014) and Chen et al. (2024) on discretionary ownership (column 1) and discretionary position changes (column 2) and are standardized. Standardized propensity scores are trimmed on the 0.5 and 99.5 percentiles. ESG Fund takes on the value 1 if the fund is denoted by Morningstar to be a "General ESG Investment", 0 otherwise. Fund portfolio turnover and the fund expense ratio are trimmed at the 0.5 and 99.5 percentiles. Fund expense ratios are backfilled over corresponding year-quarters. We control for fund category and year fixed effects. Standard errors are clustered at the fund level and are reported in parentheses. Note: ESG Fund indicator is absorbed by fund fixed effects and therefore not included in the regression. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

## C Internet Appendix

### C.1 Matching different identifiers

Using the approach of Jensen et al. (2022) we match our holdings to security and firm-level variables from CRSP and Compustat. For our set of North American companies<sup>36</sup>, we have a six-step matching procedure:

1. We make use of WRDS' FactSet-CRSP Linking table to match FactSet Permanent Security identifiers to CRSP's permanent security and company identifiers, PERMNOs and PERMCOs, respectively.
2. We use the CRSP/ Compustat database of Jensen et al. (2022) and the bond issuer matching table by Fang (2024) to match PERMNOs and PERMCOs to Compustat GVKEYs.
3. For the remaining holdings, we utilize their ISIN numbers, which we gather from FactSet. Historical ISINs we retrieved from the RepRisk linking table in WRDS. Then:
  - (a) We extract the 9-digit CUSIPs from these ISINs and (i) match these extracted CUSIPs to the 6-digit issuer CUSIPs of Fang (2024) to directly retrieve the GVKEY match, and (ii) match the extracted CUSIPs to the CUSIPs reported in the Compustat quarterly fundamentals table. Hence, we match the FactSet holding identifier to the name and GVKEY reported in Compustat.
  - (b) We make use of the ISIN-GVKEY linking tables of Wenzhi-Ding. We then look up these newly found GVKEYs in Compustat to them to a name.
  - (c) We compare the matches of Wenzhi-Ding by checking and comparing the names<sup>37</sup> of the FactSet holdings to the ones retrieved from Compustat following step (b).
4. We write a fuzzy matching algorithm to name-match the holding names to the Compustat company names. We manually checked these matches. We flag the holdings that we were able to match to a GVKEY using fuzzy name matching.
5. We flag the holdings that are matched to multiple GVKEY-name combinations. We manually looked up these holdings' Tickers and ISINs together with their matched company names, and inferred the correct matches from their SEC filings. The holdings that saw a change in their

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<sup>36</sup>We identify North American companies by the two-digit country codes of US or CA in the security's ISIN number.

<sup>37</sup>We extract the names of the FactSet holdings by using the OS\_SEC\_NAME function.

GVKEY over time are flagged and remain unmatched to a GVKEY in our fund-holdings panel<sup>38</sup>.

6. Through PERMNO numbers reported by Jensen et al. (2022) and by manually looking up Tickers in Compustat’s North American monthly security module, we gather information on the securities’ iid number to allow us to identify the different securities that correspond to the same GVKEY.

Since CRSP only lists securities listed on North American exchanges, we are not able to use the WRDS FactSet - CRSP linking table. As a result, we are required to resort to matching on ISINs:

1. From FactSet Fundamentals, we match the FactSet local holding identifiers to ISINs. We match these ISINs to the ISIN-GVKEY combinations from the Compustat Global quarterly fundamentals table. From Compustat Global, we match the Compustat name and GVKEYs to our sample of FactSet holdings.
2. We match these ISINs to the company names and the historical ISIN list of RepRisk<sup>39</sup>.
3. We make use of the ISIN-GVKEY and ISIN-name linking tables of Wenzhi-Ding to match GVKEYs to the remaining FactSet and RepRisk ISINs. From Compustat Global, we retrieve the names that correspond to the GVKEYs. We verify links by manually looking up exchange information for the ISIN.
4. We write a fuzzy matching algorithm to name-match the holding names to the Compustat Global company names. We manually checked these matches. We flag the holdings that we were able to match to a GVKEY using fuzzy name matching.
5. We manually check the FactSet holdings that are matched to more than one GVKEY. Similar to our North-American sample, we manually look up the ISINs and names that correspond

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<sup>38</sup>In case a company financially restructures, merges with another company, acquires another company, or spins off, it may receive a different GVKEY over time. For example, Ace Aviation used to be the parent company of Air Canada before it was finally dissolved in 2024. For Ace Aviation FactSet—using OS\_TOP\_HLDG\_LOCID—reports in its holdings the Sedol “B8CY812”, and for Air Canada the Canadian ticker “AC\*”. While the holding of Ace Aviation can be linked one-to-one to GVKEY “014999”, based on the ISIN, the holding of Air Canada is matched to two GVKEYs and names in Compustat, “014999” for Ace Aviation Holdings and “164190” for Air Canada. We were unable to match the FactSet permanent security identifier to a PERMCO or PERMNO, making it impossible for us to know for sure whether the header Ticker “AC\*” refers to Ace Aviation or Air Canada. While we can see that the FactSet permanent identifiers for “B8CY812” (HXRJQ6-S) and “AC\*” (WRXC9N-S) are different, we do not know for certain if and exactly when the holding “AC\*” should take on the GVKEY of Ace Aviation.

<sup>39</sup>RepRisk reports the former company name in parentheses. E.g., for FactSet holding “SWN”, Southwestern Energy Co is linked to ISIN number US8454671095. Matching on this ISIN, RepRisk reports the name “Southwestern Energy Co (formerly Arkansas Western Gas Co)”.

to the matched GVKEYs<sup>40</sup>. The holdings that saw a change in their GVKEY over time are flagged and remain unmatched to a GVKEY in our fund-holdings panel.

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<sup>40</sup>E.g., Financial Times, Yahoo Finance, Nasdaq (Nordic or Baltic), Marketscreener, or the websites of the listed companies.

**Table 15:** Non-standardized OLS Regression Results: Types of Mutual Fund Position Changes and Stocks' (past) ES Incidents, Pre-Existing Positions Only

|                                         | Changes in positions ( $\times 100\%$ ) |                           |                           |                           |                           |                           |
|-----------------------------------------|-----------------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
|                                         | (1)                                     |                           | (2)                       |                           | (3)                       |                           |
|                                         | Position Changes                        |                           | Discret. Position Changes |                           | Expected Position Changes |                           |
|                                         | (a)                                     | (b)                       | (c)                       | (d)                       | (e)                       | (f)                       |
|                                         | $t$                                     | $t-1$                     | $t$                       | $t-1$                     | $t$                       | $t-1$                     |
| # ES Incidents $_{t-s}$                 | -0.00005<br>(-1.0653)                   | -0.00003<br>(-0.6275)     | 0.00026***<br>(6.5183)    | 0.00029***<br>(6.9910)    | -0.00031***<br>(-11.9929) | -0.00031***<br>(-12.2602) |
| # ES Incidents $_{t-s} \times$ ESG Fund | -0.00008<br>(-0.8082)                   | -0.00005<br>(-0.4571)     | -0.00071***<br>(-7.9897)  | -0.00066***<br>(-7.3974)  | 0.00063***<br>(10.6012)   | 0.00062***<br>(10.4694)   |
| MSCI ESG $_{t-1}$                       | 0.00001<br>(0.1317)                     | 0.00001<br>(0.1736)       | 0.00009**<br>(1.9957)     | 0.00009**<br>(2.0707)     | -0.00008***<br>(-4.3572)  | -0.00009***<br>(-4.4302)  |
| MSCI ESG $_{t-1} \times$ ESG Fund       | 0.00122***<br>(9.6731)                  | 0.00122***<br>(9.6731)    | 0.00093***<br>(7.8510)    | 0.00093***<br>(7.8352)    | 0.00028***<br>(6.1193)    | 0.00028***<br>(6.1496)    |
| In Market Capitalization $_{t-1}$       | -0.00184***<br>(-7.7533)                | -0.00188***<br>(-7.9183)  | -0.00165***<br>(-8.7634)  | -0.00170***<br>(-9.0174)  | -0.00019<br>(-1.3171)     | -0.00018<br>(-1.2597)     |
| Book-Market $_{t-1}$                    | 0.00191***<br>(9.0950)                  | 0.00187***<br>(8.9376)    | 0.00172***<br>(8.5114)    | 0.00166***<br>(8.2866)    | 0.00019***<br>(3.6169)    | 0.00020***<br>(3.8408)    |
| Leverage $_{t-1}$                       | 0.00090*<br>(1.9320)                    | 0.00090*<br>(1.9287)      | 0.00068<br>(1.5175)       | 0.00067<br>(1.5015)       | 0.00022<br>(1.3782)       | 0.00022<br>(1.4135)       |
| ROA $_{t-1}$                            | -0.07624***<br>(-16.6701)               | -0.07605***<br>(-16.6401) | -0.07517***<br>(-17.3084) | -0.07497***<br>(-17.2771) | -0.00107<br>(-0.7831)     | -0.00108<br>(-0.7891)     |
| Sales Growth $_{t-1}$                   | 0.00047<br>(1.5178)                     | 0.00047<br>(1.5428)       | 0.00025<br>(0.8246)       | 0.00026<br>(0.8532)       | 0.00022***<br>(3.1534)    | 0.00021***<br>(3.1411)    |
| Quarterly Stock Return $_{t-1}$         | -0.00030***<br>(-18.8956)               | -0.00030***<br>(-18.8833) | -0.00029***<br>(-18.6402) | -0.00029***<br>(-18.6303) | -0.00001***<br>(-3.4470)  | -0.00001***<br>(-3.4186)  |
| Constant                                | -0.02847***<br>(-12.5244)               | -0.02808***<br>(-12.3171) | -0.02878***<br>(-16.0097) | -0.02832***<br>(-15.7155) | 0.00032<br>(0.2246)       | 0.00025<br>(0.1751)       |
| Fund-Year-Quarter FE                    | YES                                     | YES                       | YES                       | YES                       | YES                       | YES                       |
| Observations                            | 21,533,124                              | 21,533,124                | 21,533,124                | 21,533,124                | 21,533,124                | 21,533,124                |
| R-squared                               | 0.175                                   | 0.175                     | 0.155                     | 0.155                     | 0.682                     | 0.682                     |
| Within R-squared                        | 0.000                                   | 0.000                     | 0.000                     | 0.000                     | 0.001                     | 0.000                     |
| F-statistic                             | 69.38***                                | 69.37***                  | 81.61***                  | 81.46***                  | 20.52***                  | 21.20***                  |

Notes: Non-standardized OLS regressions on mutual fund trades. Position Changes is the change in the position of fund  $i$  in stock  $j$  in quarter  $t$  estimated as  $\frac{Price_{j,t-1}(NumberShares_{i,j,t} - NumberShares_{i,j,t-1})}{AUM_{i,t-1}}$  (Gantchev et al., 2023; Giannetti and Jotikasthira, 2024). Expected Position Changes are estimated as the dollar flow-induced trades, keeping previous quarters' holding weights constant:  $\frac{Weight_{i,j,t-1} \times (flow_{i,t} \times AUM_{i,t-1})}{AUM_{i,t-1}}$  where  $flow_{i,t}$  is the relative flow, with  $flow_{i,t} \times AUM_{i,t-1}$  denoting the dollar flow to fund  $i$  between  $t-1$  and  $t$ . Alternatively, this can be written as  $\frac{Position_{i,j,t-1} \times Price_{j,t-1} \times flow_{i,t}}{AUM_{i,t-1}}$ . Discretionary Position Changes are estimated as  $PositionChanges_{i,j,t} - ExpectedPositionChanges_{i,j,t}$ . Position Changes, Expected Position Changes, and Discretionary Position Changes are trimmed at the 0.5 and 99.5 percentiles. We multiply the trades by 100%. The sample only considers fund holdings that the fund held in the previous quarter. ES incidents denote the number of environmental and social RepRisk incidents of firm  $j$  in quarter  $t$ . ESG Fund takes on value 1 if the fund  $i$  is denoted as an ESG fund following Morningstar's "General ESG Fund" indicator. We control for the previous quarter's industry-adjusted MSCI ESG score, the natural logarithm of firm market capitalization, book over market, leverage ratio, return on assets, 12-month sales growth, and quarterly stock return. All lagged continuous control variables are winsorized at the 1 and 99 percentiles. Regressions include fund  $\times$  year-quarter fixed effects. Standard errors are clustered at the fund level. T-statistics are reported in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table 16:** Standardized OLS Regression Results: Types of Mutual Fund Position Changes and Stocks' (past) Log ES Incidents, Pre-Existing Positions Only

|                                                            | Changes in positions    |                         |                           |                         |                           |                         |
|------------------------------------------------------------|-------------------------|-------------------------|---------------------------|-------------------------|---------------------------|-------------------------|
|                                                            | (1)                     |                         | (2)                       |                         | (3)                       |                         |
|                                                            | Position Changes        |                         | Discret. Position Changes |                         | Expected Position Changes |                         |
|                                                            | (a)                     | (b)                     | (c)                       | (d)                     | (e)                       | (f)                     |
|                                                            | $t$                     | $t-1$                   | $t$                       | $t-1$                   | $t$                       | $t-1$                   |
| $\ln 1 + \text{ES Incidents}_{t-s}$                        | -0.000<br>(-0.9247)     | -0.000<br>(-0.4970)     | 0.003***<br>(6.7996)      | 0.003***<br>(7.4752)    | -0.011***<br>(-12.0864)   | -0.011***<br>(-12.4687) |
| $\ln 1 + \text{ES Incidents}_{t-s} \times \text{ESG Fund}$ | -0.000<br>(-0.1311)     | 0.001<br>(0.8937)       | -0.004***<br>(-7.9023)    | -0.004***<br>(-6.6705)  | 0.014***<br>(10.7824)     | 0.014***<br>(10.8013)   |
| $\text{MSCI ESG}_{t-1}$                                    | 0.000<br>(0.2216)       | 0.000<br>(0.2498)       | 0.000<br>(1.5827)         | 0.000<br>(1.6337)       | -0.001***<br>(-3.2728)    | -0.001***<br>(-3.3197)  |
| $\text{MSCI ESG}_{t-1} \times \text{ESG Fund}$             | 0.009***<br>(9.7781)    | 0.009***<br>(9.7320)    | 0.007***<br>(8.3275)      | 0.007***<br>(8.2662)    | 0.006***<br>(5.2956)      | 0.006***<br>(5.3289)    |
| $\ln \text{Market Capitalization}_{t-1}$                   | -0.008***<br>(-7.8661)  | -0.008***<br>(-8.1386)  | -0.007***<br>(-8.7419)    | -0.007***<br>(-9.1495)  | -0.003<br>(-1.5390)       | -0.003<br>(-1.4296)     |
| $\text{Book-Market}_{t-1}$                                 | 0.003***<br>(9.0967)    | 0.002***<br>(8.8106)    | 0.002***<br>(8.6110)      | 0.002***<br>(8.2154)    | 0.001***<br>(3.3295)      | 0.001***<br>(3.7022)    |
| $\text{Leverage}_{t-1}$                                    | 0.000**<br>(2.0047)     | 0.000*<br>(1.9077)      | 0.000<br>(1.2654)         | 0.000<br>(1.1242)       | 0.001**<br>(2.2632)       | 0.001**<br>(2.3679)     |
| $\text{ROA}_{t-1}$                                         | -0.005***<br>(-16.6434) | -0.004***<br>(-16.5796) | -0.004***<br>(-17.2721)   | -0.004***<br>(-17.2080) | -0.000<br>(-0.9144)       | -0.000<br>(-0.9186)     |
| $\text{Sales Growth}_{t-1}$                                | 0.000<br>(1.5163)       | 0.000<br>(1.5783)       | 0.000<br>(0.8824)         | 0.000<br>(0.9682)       | 0.000***<br>(2.8689)      | 0.000***<br>(2.7665)    |
| $\text{Quarterly Stock Return}_{t-1}$                      | -0.013***<br>(-18.8862) | -0.013***<br>(-18.8680) | -0.013***<br>(-18.6470)   | -0.013***<br>(-18.6179) | -0.001***<br>(-3.3190)    | -0.001***<br>(-3.4120)  |
| Fund-Year-Quarter FE                                       | YES                     | YES                     | YES                       | YES                     | YES                       | YES                     |
| Observations                                               | 21,533,124              | 21,533,124              | 21,533,124                | 21,533,124              | 21,533,124                | 21,533,124              |
| R-squared                                                  | 0.175                   | 0.175                   | 0.155                     | 0.155                   | 0.682                     | 0.682                   |
| Within R-squared                                           | 0.000                   | 0.000                   | 0.000                     | 0.000                   | 0.000                     | 0.000                   |
| F-statistic                                                | 69.27***                | 69.21***                | 79.97***                  | 79.15***                | 20.08***                  | 21.30***                |

Notes: OLS regressions on mutual fund trades. Position Changes is the change in the position of fund  $i$  in stock  $j$  in quarter  $t$  estimated as  $\frac{\text{Price}_{j,t-1}(\text{NumberShares}_{i,j,t} - \text{NumberShares}_{i,j,t-1})}{\text{AUM}_{i,t-1}}$  (Gantchev et al., 2023; Giannetti and Jotikasthira, 2024).

Expected Position Changes are estimated as the dollar flow-induced trades, keeping previous quarters' holding weights constant:  $\frac{\text{Weight}_{i,j,t-1} \times (\text{flow}_{i,t} \times \text{AUM}_{i,t-1})}{\text{AUM}_{i,t-1}}$  where  $\text{flow}_{i,t}$  is the relative flow, with  $\text{flow}_{i,t} \times \text{AUM}_{i,t-1}$  denoting the dollar flow to fund

$i$  between  $t-1$  and  $t$ . Alternatively, this can be written as  $\frac{\text{Position}_{i,j,t-1} \times \text{Price}_{j,t-1} \times \text{flow}_{i,t}}{\text{AUM}_{i,t-1}}$ . Discretionary Position Changes are

estimated as  $\text{Position Changes}_{i,j,t} - \text{Expected Position Changes}_{i,j,t}$ . Position Changes, Expected Position Changes, and Discretionary Position Changes are trimmed at the 0.5 and 99.5 percentiles. The sample only considers fund holdings that the fund held in the previous quarter. In ES incidents denotes the natural logarithm of 1 + the number of environmental and social RepRisk incidents of firm  $j$  in quarter  $t$ . ESG Fund takes on value 1 if the fund  $i$  is denoted as an ESG fund following Morningstar's "General ESG Fund" indicator. We control for the previous quarter's industry-adjusted MSCI ESG score, the natural logarithm of firm market capitalization, book over market, leverage ratio, return on assets, 12-month sales growth, and quarterly stock return. All lagged continuous control variables are winsorized at the 1 and 99 percentiles. Regressions include fund  $\times$  year-quarter fixed effects. Standard errors are clustered at the fund level. Coefficients are standardized, and t-statistics are reported in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table 17:** Standardized OLS Regression Results: Types of Mutual Fund Position Changes and Stocks' (past) ES Incidents, All Holdings

|                                         | Changes in positions    |                         |                                  |                         |                                  |                         |
|-----------------------------------------|-------------------------|-------------------------|----------------------------------|-------------------------|----------------------------------|-------------------------|
|                                         | (1)<br>Position Changes |                         | (2)<br>Discret. Position Changes |                         | (3)<br>Expected Position Changes |                         |
|                                         | (a)<br>$t$              | (b)<br>$t-1$            | (c)<br>$t$                       | (d)<br>$t-1$            | (e)<br>$t$                       | (f)<br>$t-1$            |
| # ES Incidents $_{t-s}$                 | -0.000<br>(-0.1490)     | 0.000<br>(0.4074)       | 0.003***<br>(6.8923)             | 0.003***<br>(7.5103)    | -0.012***<br>(-11.8588)          | -0.012***<br>(-12.0916) |
| # ES Incidents $_{t-s} \times$ ESG Fund | 0.000<br>(0.2908)       | 0.000<br>(0.5077)       | -0.003***<br>(-6.8319)           | -0.003***<br>(-6.5072)  | 0.013***<br>(10.6365)            | 0.013***<br>(10.5104)   |
| MSCI ESG $_{t-1}$                       | -0.001***<br>(-4.7308)  | -0.001***<br>(-4.6737)  | -0.001***<br>(-3.3261)           | -0.001***<br>(-3.2351)  | -0.002***<br>(-4.1555)           | -0.002***<br>(-4.2250)  |
| MSCI ESG $_{t-1} \times$ ESG Fund       | 0.007***<br>(9.5310)    | 0.007***<br>(9.5296)    | 0.005***<br>(7.6805)             | 0.005***<br>(7.6615)    | 0.007***<br>(6.3153)             | 0.007***<br>(6.3478)    |
| In Market Cap $_{t-1}$                  | -0.002**<br>(-2.1053)   | -0.002**<br>(-2.3250)   | -0.001*<br>(-1.6890)             | -0.001**<br>(-2.0365)   | -0.003<br>(-1.3113)              | -0.003<br>(-1.2611)     |
| Book-Market $_{t-1}$                    | -0.003***<br>(-12.6829) | -0.003***<br>(-12.8974) | -0.003***<br>(-13.4979)          | -0.003***<br>(-13.7630) | 0.001**<br>(2.1083)              | 0.001**<br>(2.3198)     |
| Leverage $_{t-1}$                       | -0.001***<br>(-7.1515)  | -0.001***<br>(-7.1563)  | -0.001***<br>(-7.5769)           | -0.001***<br>(-7.5924)  | 0.000<br>(0.8684)                | 0.000<br>(0.9014)       |
| ROA $_{t-1}$                            | -0.004***<br>(-13.8742) | -0.004***<br>(-13.8382) | -0.004***<br>(-14.3041)          | -0.004***<br>(-14.2665) | -0.000<br>(-0.5680)              | -0.000<br>(-0.5721)     |
| Sales Growth $_{t-1}$                   | 0.003***<br>(12.1563)   | 0.003***<br>(12.1722)   | 0.003***<br>(11.8814)            | 0.003***<br>(11.8992)   | 0.000**<br>(2.2718)              | 0.000**<br>(2.2611)     |
| Stock Return $_{t-1}$                   | 0.004***<br>(4.7303)    | 0.004***<br>(4.7374)    | 0.004***<br>(4.8858)             | 0.004***<br>(4.8908)    | -0.000*<br>(-1.8498)             | -0.000*<br>(-1.8226)    |
| Fund-Year-Quarter FE                    | YES                     | YES                     | YES                              | YES                     | YES                              | YES                     |
| Observations                            | 23,054,428              | 23,054,428              | 23,054,428                       | 23,054,428              | 23,054,428                       | 23,054,428              |
| R-squared                               | 0.072                   | 0.072                   | 0.056                            | 0.056                   | 0.626                            | 0.626                   |
| Within R-squared                        | 0.000                   | 0.000                   | 0.000                            | 0.000                   | 0.000                            | 0.000                   |
| F-statistic                             | 49.65***                | 49.86***                | 54.02***                         | 54.63***                | 17.86***                         | 18.36***                |

Notes: OLS regressions on mutual fund trades. Position Changes is the change in the position of fund  $i$  in stock  $j$  in quarter  $t$  estimated as  $\frac{Price_{j,t-1}(NumberShares_{i,j,t} - NumberShares_{i,j,t-1})}{AUM_{i,t-1}}$  (Gantchev et al., 2023; Giannetti and Jotikasthira, 2024). Expected Position Changes are estimated as the dollar flow-induced trades, keeping previous quarters' holding weights constant:  $\frac{Weight_{i,j,t-1} \times (flow_{i,t} \times AUM_{i,t-1})}{AUM_{i,t-1}}$  where  $flow_{i,t}$  is the relative flow, with  $flow_{i,t} \times AUM_{i,t-1}$  denoting the dollar flow to fund  $i$  between  $t-1$  and  $t$ . Alternatively, this can be written as  $\frac{Position_{i,j,t-1} \times Price_{j,t-1} \times flow_{i,t}}{AUM_{i,t-1}}$ . Discretionary Position Changes are estimated as  $PositionChanges_{i,j,t} - ExpectedPositionChanges_{i,j,t}$ . Position Changes, Expected Position Changes, and Discretionary Position Changes are trimmed at the 0.5 and 99.5 percentiles. ES incidents denote the number of environmental and social RepRisk incidents of firm  $j$  in quarter  $t$ . ESG Fund takes on value 1 if the fund  $i$  is denoted as an ESG fund following Morningstar's "General ESG Fund" indicator. We control for the previous quarter's industry-adjusted MSCI ESG score, the natural logarithm of firm market capitalization, book over market, leverage ratio, return on assets, 12-month sales growth, and quarterly stock return. All lagged continuous control variables are winsorized at the 1 and 99 percentiles. Regressions include fund  $\times$  year-quarter fixed effects. Standard errors are clustered at the fund level. Coefficients are standardized, and t-statistics are reported in parentheses. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

**Table 18:** Standardized OLS Regression Results: Types of Mutual Fund Position Changes and Future Cumulative ES Incidents by ESG and Conventional Funds, All Holdings

|                                                    | Changes in positions    |                         |                               |                         |                           |                         |
|----------------------------------------------------|-------------------------|-------------------------|-------------------------------|-------------------------|---------------------------|-------------------------|
|                                                    | (1)                     |                         | (2)                           |                         | (3)                       |                         |
|                                                    | Position Changes        |                         | All Discret. Position Changes |                         | Expected Position Changes |                         |
|                                                    | (a)                     | (b)                     | (c)                           | (d)                     | (e)                       | (f)                     |
|                                                    | $t + 2$                 | $t + 4$                 | $t + 2$                       | $t + 4$                 | $t + 2$                   | $t + 4$                 |
| Cumulative # ES Incidents $_{t+s}$                 | -0.000<br>(-0.7642)     | -0.000<br>(-0.4792)     | 0.003***<br>(6.3946)          | 0.003***<br>(6.8409)    | -0.013***<br>(-11.8880)   | -0.013***<br>(-11.9097) |
| Cumulative # ES Incidents $_{t+s} \times$ ESG Fund | 0.000<br>(0.6439)       | 0.000<br>(0.7922)       | -0.003***<br>(-6.6083)        | -0.003***<br>(-6.5279)  | 0.013***<br>(10.5085)     | 0.014***<br>(10.5461)   |
| MSCI ESG $_{t-1}$                                  | -0.001***<br>(-4.7724)  | -0.001***<br>(-4.7465)  | -0.001***<br>(-3.3579)        | -0.001***<br>(-3.3381)  | -0.002***<br>(-4.1851)    | -0.002***<br>(-4.1654)  |
| MSCI ESG $_{t-1} \times$ ESG Fund                  | 0.007***<br>(9.5452)    | 0.007***<br>(9.5455)    | 0.005***<br>(7.7031)          | 0.005***<br>(7.7163)    | 0.007***<br>(6.2972)      | 0.007***<br>(6.2713)    |
| In Market Capitalization $_{t-1}$                  | -0.001*<br>(-1.9539)    | -0.001**<br>(-2.0887)   | -0.001*<br>(-1.6476)          | -0.001*<br>(-1.9066)    | -0.002<br>(-1.1303)       | -0.002<br>(-1.0409)     |
| Book-Market $_{t-1}$                               | -0.003***<br>(-12.5389) | -0.003***<br>(-12.6564) | -0.003***<br>(-13.4505)       | -0.003***<br>(-13.6152) | 0.001***<br>(2.5789)      | 0.001***<br>(2.7959)    |
| Leverage $_{t-1}$                                  | -0.001***<br>(-7.1537)  | -0.001***<br>(-7.1563)  | -0.001***<br>(-7.5751)        | -0.001***<br>(-7.5680)  | 0.000<br>(0.8562)         | 0.000<br>(0.8265)       |
| ROA $_{t-1}$                                       | -0.004***<br>(-13.8862) | -0.004***<br>(-13.8576) | -0.004***<br>(-14.3116)       | -0.004***<br>(-14.2733) | -0.000<br>(-0.5849)       | -0.000<br>(-0.6231)     |
| Sales Growth $_{t-1}$                              | 0.003***<br>(12.1419)   | 0.003***<br>(12.1476)   | 0.003***<br>(11.8533)         | 0.003***<br>(11.8560)   | 0.000**<br>(2.3758)       | 0.000**<br>(2.3990)     |
| Quarterly Stock Return $_{t-1}$                    | 0.004***<br>(4.7259)    | 0.004***<br>(4.7303)    | 0.004***<br>(4.8786)          | 0.004***<br>(4.8846)    | -0.000*<br>(-1.8135)      | -0.000*<br>(-1.8326)    |
| Fund-Year-Quarter FE                               | YES                     | YES                     | YES                           | YES                     | YES                       | YES                     |
| Observations                                       | 23,054,428              | 23,054,428              | 23,054,428                    | 23,054,428              | 23,054,428                | 23,054,428              |
| R-squared                                          | 0.072                   | 0.072                   | 0.056                         | 0.056                   | 0.626                     | 0.626                   |
| Within R-squared                                   | 0.000                   | 0.000                   | 0.000                         | 0.000                   | 0.000                     | 0.000                   |
| F-statistic                                        | 49.59***                | 49.69***                | 53.60***                      | 54.09***                | 18.17***                  | 18.36***                |

Notes: OLS regressions on mutual fund trades. Position Changes is the change in the position of fund  $i$  in stock  $j$  in quarter  $t$  estimated as  $\frac{Price_{j,t-1}(NumberShares_{i,j,t} - NumberShares_{i,j,t-1})}{AUM_{i,t-1}}$  (Gantchev et al., 2023; Giannetti and Jotikasthira, 2024). Expected Position Changes are estimated as the dollar flow-induced trades, keeping previous quarters' holding weights constant:  $\frac{Weight_{i,j,t-1} \times (flow_{i,t} \times AUM_{i,t-1})}{AUM_{i,t-1}}$  where  $flow_{i,t}$  is the relative flow, with  $flow_{i,t} \times AUM_{i,t-1}$  denoting the dollar flow to fund  $i$  between  $t - 1$  and  $t$ . Alternatively, this can be written as  $\frac{Position_{i,j,t-1} \times Price_{j,t-1} \times flow_{i,t}}{AUM_{i,t-1}}$ . Discretionary Position Changes are estimated as  $Position\ Changes_{i,j,t} - Expected\ Position\ Changes_{i,j,t}$ . Position Changes, Expected Position Changes, and Discretionary Position Changes are trimmed at the 0.5 and 99.5 percentiles. The sample only considers fund holdings that the fund held in the previous quarter. ES incidents denote the number of environmental and social RepRisk incidents of firm  $j$  in quarter  $t$ . ESG Fund takes on value 1 if the fund  $i$  is denoted as an ESG fund following Morningstar's "General ESG Fund" indicator. We control for the previous quarter's industry-adjusted MSCI ESG score, the natural logarithm of firm market capitalization, book over market, leverage ratio, return on assets, 12-month sales growth, and quarterly stock return. All lagged continuous control variables are winsorized at the 1 and 99 percentiles. Regressions include fund  $\times$  year-quarter fixed effects. Standard errors are clustered at the fund level. Coefficients are standardized, and t-statistics are reported in parentheses. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

**Table 19:** Standardized OLS Regression Results: Types of Mutual Fund Trading and Stocks' (past) ES Incidents, Pre-Existing Holdings Only

|                                         | Changes in ownership   |                        |                            |                        |                            |                        |
|-----------------------------------------|------------------------|------------------------|----------------------------|------------------------|----------------------------|------------------------|
|                                         | (1)                    |                        | (2)                        |                        | (3)                        |                        |
|                                         | All ownership changes  |                        | Discret. ownership changes |                        | Expected ownership changes |                        |
|                                         | (a)                    | (b)                    | (c)                        | (d)                    | (e)                        | (f)                    |
|                                         | $t$                    | $t - 1$                | $t$                        | $t - 1$                | $t$                        | $t - 1$                |
| # ES Incidents $_{t-s}$                 | -0.004***<br>(-8.9937) | -0.004***<br>(-9.0125) | -0.003***<br>(-7.4012)     | -0.003***<br>(-7.4598) | -0.005***<br>(-7.2611)     | -0.004***<br>(-7.0729) |
| # ES Incidents $_{t-s} \times$ ESG Fund | -0.000<br>(-1.1617)    | -0.000<br>(-0.9465)    | 0.000<br>(0.6526)          | 0.000<br>(0.9090)      | -0.003***<br>(-5.8598)     | -0.003***<br>(-5.9443) |
| MSCI ESG $_{t-1}$                       | -0.001*<br>(-1.8597)   | -0.001*<br>(-1.8638)   | -0.001***<br>(-2.7285)     | -0.001***<br>(-2.7319) | 0.002**<br>(2.5720)        | 0.002**<br>(2.5738)    |
| MSCI ESG $_{t-1} \times$ ESG Fund       | 0.006***<br>(6.2487)   | 0.006***<br>(6.2462)   | 0.007***<br>(7.4745)       | 0.007***<br>(7.4742)   | -0.004***<br>(-3.4566)     | -0.004***<br>(-3.4669) |
| In Market Capitalization $_{t-1}$       | 0.062***<br>(28.1761)  | 0.062***<br>(28.1943)  | 0.051***<br>(26.0808)      | 0.051***<br>(26.0971)  | 0.049***<br>(18.7682)      | 0.049***<br>(18.7713)  |
| Book-Market $_{t-1}$                    | 0.000<br>(0.3273)      | 0.000<br>(0.3328)      | -0.000<br>(-0.4182)        | -0.000<br>(-0.4136)    | 0.003***<br>(4.5618)       | 0.003***<br>(4.5690)   |
| Leverage $_{t-1}$                       | -0.002***<br>(-5.2732) | -0.002***<br>(-5.2660) | -0.002***<br>(-5.8032)     | -0.002***<br>(-5.7982) | 0.000<br>(1.0117)          | 0.000<br>(1.0195)      |
| ROA $_{t-1}$                            | -0.007***<br>(-7.0740) | -0.007***<br>(-7.0707) | -0.006***<br>(-6.5695)     | -0.006***<br>(-6.5672) | -0.001**<br>(-2.2583)      | -0.001**<br>(-2.2487)  |
| Sales Growth $_{t-1}$                   | 0.002***<br>(3.1288)   | 0.002***<br>(3.1290)   | 0.002***<br>(3.4722)       | 0.002***<br>(3.4721)   | -0.001***<br>(-3.0293)     | -0.001***<br>(-3.0275) |
| Quarterly Stock Return $_{t-1}$         | -0.003***<br>(-3.3533) | -0.003***<br>(-3.3358) | -0.003***<br>(-2.9227)     | -0.003***<br>(-2.9111) | -0.002***<br>(-5.7535)     | -0.002***<br>(-5.6929) |
| Fund-Year-Quarter FE                    | YES                    | YES                    | YES                        | YES                    | YES                        | YES                    |
| Observations                            | 21,698,177             | 21,698,177             | 21,698,177                 | 21,698,177             | 21,698,177                 | 21,698,177             |
| R-squared                               | 0.098                  | 0.098                  | 0.073                      | 0.073                  | 0.626                      | 0.626                  |
| Within R-squared                        | 0.002                  | 0.002                  | 0.001                      | 0.001                  | 0.003                      | 0.003                  |
| F-statistic                             | 136.71***              | 136.77***              | 128.85***                  | 129.18***              | 40.87***                   | 40.86***               |

Notes: OLS regressions on mutual fund trades. Discretionary Trades are defined as the difference in the flow-driven and actual trades made by a fund between quarter  $t - 1$  and  $t$ , denominated by the stock's previous quarter's shares outstanding (Huang et al., 2023; Coval and Stafford, 2007). All (discretionary) trades are trimmed at the 0.5 and 99.5 percentiles. The sample only considers fund holdings that the fund held in the previous quarter. ES incidents denote the number of environmental and social RepRisk incidents of firm  $j$  in quarter  $t$ . ESG Fund takes on value 1 if the fund  $i$  is denoted as an ESG fund following Morningstar's "General ESG Fund" indicator. We control for the previous quarter's industry-adjusted MSCI ESG score, the natural logarithm of firm market capitalization, book over market, leverage ratio, return on assets, 12-month sales growth, and quarterly stock return. All lagged continuous control variables are winsorized at the 1 and 99 percentiles. Regressions include fund  $\times$  year-quarter fixed effects. Standard errors are clustered at the fund level. Coefficients are standardized, and t-statistics are reported in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table 20:** Standardized OLS Regression Results: Mutual Fund Trading on Future Cumulative ES Incidents by ESG and Conventional Funds, Pre-Existing Holdings Only

|                                                    | Changes in ownership   |                        |                            |                        |                            |                        |
|----------------------------------------------------|------------------------|------------------------|----------------------------|------------------------|----------------------------|------------------------|
|                                                    | (1)                    |                        | (2)                        |                        | (3)                        |                        |
|                                                    | All ownership changes  |                        | Discret. ownership changes |                        | Expected ownership changes |                        |
|                                                    | (a)<br>$t + 2$         | (b)<br>$t + 4$         | (c)<br>$t + 2$             | (d)<br>$t + 4$         | (e)<br>$t + 2$             | (f)<br>$t + 4$         |
| Cumulative # ES Incidents $_{t+s}$                 | -0.004***<br>(-9.0773) | -0.004***<br>(-9.0138) | -0.003***<br>(-7.4661)     | -0.003***<br>(-7.3737) | -0.005***<br>(-7.2477)     | -0.005***<br>(-7.2722) |
| Cumulative # ES Incidents $_{t+s} \times$ ESG Fund | -0.001<br>(-1.1395)    | -0.000<br>(-1.0535)    | 0.000<br>(0.6582)          | 0.000<br>(0.7090)      | -0.003***<br>(-5.8338)     | -0.003***<br>(-5.6851) |
| MSCI ESG $_{t-1}$                                  | -0.001*<br>(-1.8653)   | -0.001*<br>(-1.8633)   | -0.001***<br>(-2.7273)     | -0.001***<br>(-2.7247) | 0.002**<br>(2.5563)        | 0.002**<br>(2.5530)    |
| MSCI ESG $_{t-1} \times$ ESG Fund                  | 0.006***<br>(6.2500)   | 0.006***<br>(6.2551)   | 0.007***<br>(7.4732)       | 0.007***<br>(7.4765)   | -0.004***<br>(-3.4504)     | -0.004***<br>(-3.4428) |
| In Market Cap $_{t-1}$                             | 0.062***<br>(28.1199)  | 0.062***<br>(28.0403)  | 0.051***<br>(26.0316)      | 0.051***<br>(25.9532)  | 0.049***<br>(18.7279)      | 0.049***<br>(18.7079)  |
| Book-Market $_{t-1}$                               | 0.000<br>(0.3670)      | 0.000<br>(0.3867)      | -0.000<br>(-0.3950)        | -0.000<br>(-0.3844)    | 0.003***<br>(4.6432)       | 0.003***<br>(4.6875)   |
| Leverage $_{t-1}$                                  | -0.002***<br>(-5.2757) | -0.002***<br>(-5.2857) | -0.002***<br>(-5.8054)     | -0.002***<br>(-5.8128) | 0.000<br>(1.0094)          | 0.000<br>(0.9997)      |
| ROA $_{t-1}$                                       | -0.007***<br>(-7.0694) | -0.007***<br>(-7.0750) | -0.006***<br>(-6.5655)     | -0.006***<br>(-6.5686) | -0.001**<br>(-2.2530)      | -0.001**<br>(-2.2710)  |
| Sales Growth $_{t-1}$                              | 0.002***<br>(3.1675)   | 0.002***<br>(3.1810)   | 0.002***<br>(3.4984)       | 0.002***<br>(3.5075)   | -0.001***<br>(-2.9397)     | -0.001***<br>(-2.9083) |
| Stock Return $_{t-1}$                              | -0.003***<br>(-3.3438) | -0.003***<br>(-3.3439) | -0.003***<br>(-2.9159)     | -0.003***<br>(-2.9156) | -0.002***<br>(-5.7228)     | -0.002***<br>(-5.7257) |
| Fund-Year-Quarter FE                               | YES                    | YES                    | YES                        | YES                    | YES                        | YES                    |
| Observations                                       | 21,698,177             | 21,698,177             | 21,698,177                 | 21,698,177             | 21,698,177                 | 21,698,177             |
| R-squared                                          | 0.098                  | 0.098                  | 0.073                      | 0.073                  | 0.626                      | 0.626                  |
| Within R-squared                                   | 0.002                  | 0.002                  | 0.001                      | 0.001                  | 0.003                      | 0.003                  |
| F-statistic                                        | 135.56***              | 135.77***              | 128.23***                  | 128.33***              | 40.83***                   | 40.79***               |

Notes: OLS regressions on mutual fund trades. Discretionary Trades are defined as the difference in the flow-driven and actual trades made by a fund between quarter  $t - 1$  and  $t$ , denominated by the stock's previous quarter's shares outstanding (Huang et al., 2023; Coval and Stafford, 2007). All (discretionary) trades are trimmed at the 0.5 and 99.5 percentiles. The sample only considers fund holdings that the fund held in the previous quarter. ES incidents denote the cumulative number of environmental and social RepRisk incidents of firm  $j$  in the following two ( $t + 1 - t + 2$ ) or four quarters ( $t + 1 - t + 4$ ). ESG Fund takes on value 1 if the fund  $i$  is denoted as an ESG fund following Morningstar's "General ESG Fund" indicator. We control for the previous quarter's industry-adjusted MSCI ESG score, the natural logarithm of firm market capitalization, book over market, leverage ratio, return on assets, 12-month sales growth, and quarterly stock return. All lagged continuous control variables are winsorized at the 1 and 99 percentiles. Regressions include fund  $\times$  year-quarter fixed effects. Standard errors are clustered at the fund level. Coefficients are standardized, and t-statistics are reported in parentheses. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

**Table 21:** Standardized OLS Regression Results: Types of Mutual Fund Trading and Stocks' (past) ES Incidents, All Holdings

|                                         | Changes in ownership   |                        |                            |                         |                            |                        |
|-----------------------------------------|------------------------|------------------------|----------------------------|-------------------------|----------------------------|------------------------|
|                                         | (1)                    |                        | (2)                        |                         | (3)                        |                        |
|                                         | All ownership changes  |                        | Discret. ownership changes |                         | Expected ownership changes |                        |
|                                         | (a)                    | (b)                    | (c)                        | (d)                     | (e)                        | (f)                    |
|                                         | $t$                    | $t-1$                  | $t$                        | $t-1$                   | $t$                        | $t-1$                  |
| # ES Incidents $_{t-s}$                 | 0.002***<br>(8.2181)   | 0.002***<br>(7.7843)   | 0.003***<br>(11.3360)      | 0.003***<br>(10.6315)   | -0.005***<br>(-7.4864)     | -0.004***<br>(-7.2692) |
| # ES Incidents $_{t-s} \times$ ESG Fund | -0.000*<br>(-1.7215)   | -0.000<br>(-1.4794)    | 0.000<br>(1.6283)          | 0.000*<br>(1.8396)      | -0.003***<br>(-5.6056)     | -0.003***<br>(-5.6844) |
| MSCI ESG $_{t-1}$                       | -0.001***<br>(-4.1565) | -0.001***<br>(-4.1527) | -0.002***<br>(-5.5518)     | -0.002***<br>(-5.5460)  | 0.002**<br>(2.5435)        | 0.002**<br>(2.5462)    |
| MSCI ESG $_{t-1} \times$ ESG Fund       | 0.003***<br>(4.9782)   | 0.003***<br>(4.9779)   | 0.004***<br>(6.2523)       | 0.004***<br>(6.2546)    | -0.004***<br>(-3.3124)     | -0.004***<br>(-3.3222) |
| In Market Cap. $_{t-1}$                 | -0.005***<br>(-6.4453) | -0.005***<br>(-6.4251) | -0.014***<br>(-16.1048)    | -0.014***<br>(-16.0761) | 0.047***<br>(19.2467)      | 0.047***<br>(19.2504)  |
| Book-Market $_{t-1}$                    | -0.005***<br>(-6.8169) | -0.005***<br>(-6.8157) | -0.006***<br>(-7.2561)     | -0.006***<br>(-7.2564)  | 0.003***<br>(4.0266)       | 0.003***<br>(4.0320)   |
| Leverage $_{t-1}$                       | -0.002***<br>(-6.0842) | -0.002***<br>(-6.0875) | -0.002***<br>(-6.5247)     | -0.002***<br>(-6.5305)  | 0.001<br>(1.0959)          | 0.001<br>(1.1043)      |
| ROA $_{t-1}$                            | -0.006***<br>(-6.6696) | -0.006***<br>(-6.6715) | -0.006***<br>(-6.2474)     | -0.006***<br>(-6.2501)  | -0.001**<br>(-2.4732)      | -0.001**<br>(-2.4616)  |
| Sales Growth $_{t-1}$                   | 0.005***<br>(8.6413)   | 0.005***<br>(8.6416)   | 0.005***<br>(8.7378)       | 0.005***<br>(8.7380)    | -0.001**<br>(-2.4466)      | -0.001**<br>(-2.4451)  |
| Stock Return $_{t-1}$                   | 0.008***<br>(5.9877)   | 0.007***<br>(5.9837)   | 0.008***<br>(6.2433)       | 0.008***<br>(6.2356)    | -0.001***<br>(-3.4175)     | -0.001***<br>(-3.3524) |
| Fund-Year-Quarter FE                    | YES                    | YES                    | YES                        | YES                     | YES                        | YES                    |
| Observations                            | 23,237,385             | 23,237,385             | 23,237,385                 | 23,237,385              | 23,237,385                 | 23,237,385             |
| R-squared                               | 0.049                  | 0.049                  | 0.038                      | 0.038                   | 0.597                      | 0.597                  |
| Within R-squared                        | 0.000                  | 0.000                  | 0.000                      | 0.000                   | 0.003                      | 0.003                  |
| F-statistic                             | 15.74***               | 15.61***               | 34.73***                   | 34.62***                | 43.23***                   | 43.22***               |

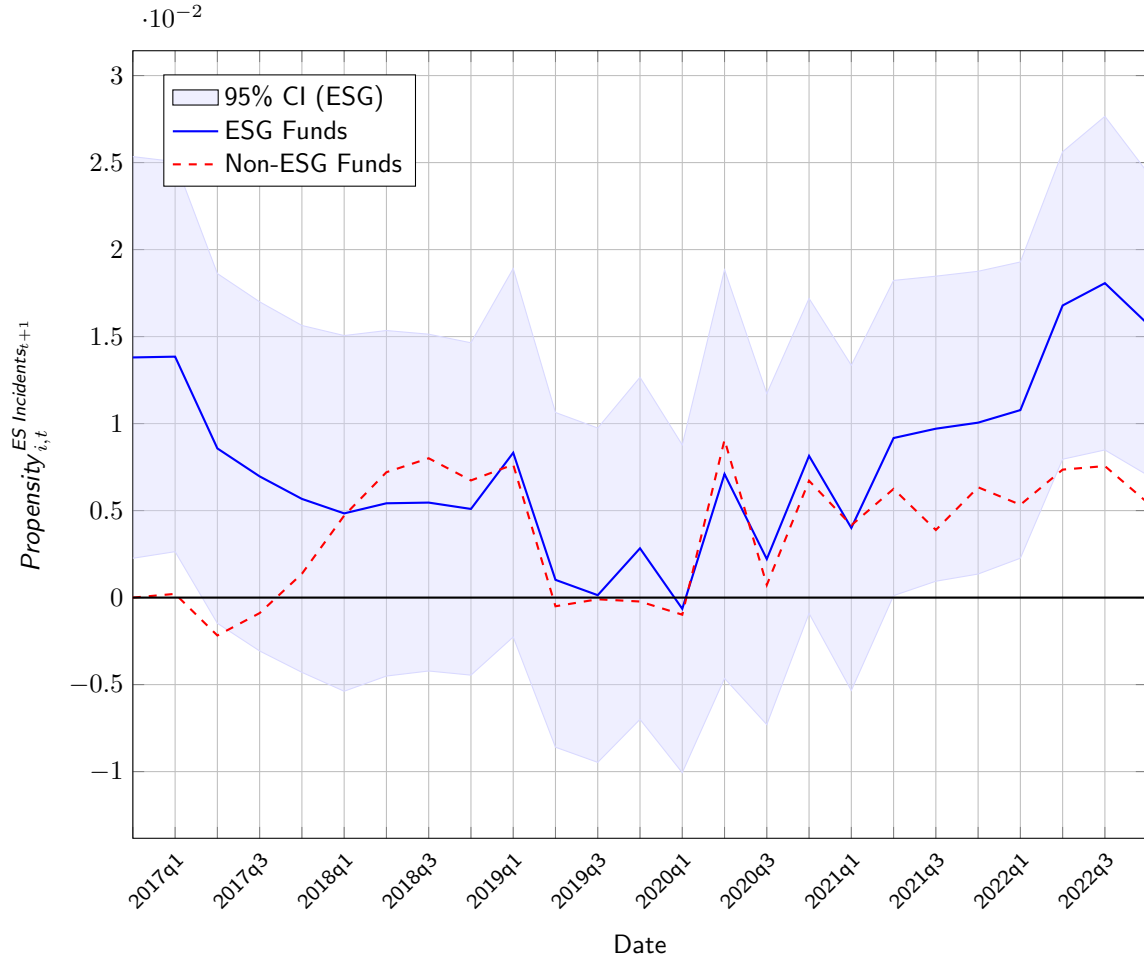
Notes: OLS regressions on mutual fund trades. Discretionary Trades are defined as the difference in the flow-driven and actual trades made by a fund between quarter  $t-1$  and  $t$ , denominated by the stock's previous quarter's shares outstanding (Huang et al., 2023; Coval and Stafford, 2007). All (discretionary) trades are trimmed at the 0.5 and 99.5 percentiles. ES incidents denote the number of environmental and social RepRisk incidents of firm  $j$  in quarter  $t$ . ESG Fund takes on value 1 if the fund  $i$  is denoted as an ESG fund following Morningstar's "General ESG Fund" indicator. We control for the previous quarter's industry-adjusted MSCI ESG score, the natural logarithm of firm market capitalization, book over market, leverage ratio, return on assets, 12-month sales growth, and quarterly stock return. All lagged continuous control variables are winsorized at the 1 and 99 percentiles. Regressions include fund  $\times$  year-quarter fixed effects. Standard errors are clustered at the fund level. Coefficients are standardized, and t-statistics are reported in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table 22:** Standardized OLS Regression Results: Mutual Fund Trading on Future Cumulative ES Incidents by ESG and Conventional Funds, All Holdings

|                                                    | Changes in ownership   |                        |                            |                         |                            |                        |
|----------------------------------------------------|------------------------|------------------------|----------------------------|-------------------------|----------------------------|------------------------|
|                                                    | (1)                    |                        | (2)                        |                         | (3)                        |                        |
|                                                    | All ownership changes  |                        | Discret. ownership changes |                         | Expected ownership changes |                        |
|                                                    | (a)                    | (b)                    | (c)                        | (d)                     | (e)                        | (f)                    |
|                                                    | $t + 2$                | $t + 4$                | $t + 2$                    | $t + 4$                 | $t + 2$                    | $t + 4$                |
| Cumulative # ES Incidents $_{t+s}$                 | 0.002***<br>(8.2631)   | 0.002***<br>(8.1114)   | 0.003***<br>(11.4106)      | 0.003***<br>(11.3411)   | -0.005***<br>(-7.3952)     | -0.005***<br>(-7.4360) |
| Cumulative # ES Incidents $_{t+s} \times$ ESG Fund | -0.000**<br>(-1.9820)  | -0.000*<br>(-1.6523)   | 0.000<br>(1.4422)          | 0.000*<br>(1.6834)      | -0.003***<br>(-5.5811)     | -0.003***<br>(-5.4384) |
| MSCI ESG $_{t-1}$                                  | -0.001***<br>(-4.1475) | -0.001***<br>(-4.1505) | -0.002***<br>(-5.5375)     | -0.002***<br>(-5.5386)  | 0.002**<br>(2.5310)        | 0.002**<br>(2.5270)    |
| MSCI ESG $_{t-1} \times$ ESG Fund                  | 0.003***<br>(4.9752)   | 0.003***<br>(4.9807)   | 0.004***<br>(6.2470)       | 0.004***<br>(6.2496)    | -0.004***<br>(-3.3064)     | -0.004***<br>(-3.2984) |
| In Market Cap $_{t-1}$                             | -0.005***<br>(-6.4758) | -0.005***<br>(-6.5043) | -0.015***<br>(-16.0877)    | -0.015***<br>(-16.1187) | 0.047***<br>(19.2027)      | 0.048***<br>(19.1871)  |
| Book-Market $_{t-1}$                               | -0.005***<br>(-6.8352) | -0.006***<br>(-6.8453) | -0.006***<br>(-7.2881)     | -0.006***<br>(-7.3076)  | 0.003***<br>(4.1051)       | 0.003***<br>(4.1551)   |
| Leverage $_{t-1}$                                  | -0.002***<br>(-6.0834) | -0.002***<br>(-6.0806) | -0.002***<br>(-6.5236)     | -0.002***<br>(-6.5183)  | 0.001<br>(1.0942)          | 0.001<br>(1.0854)      |
| ROA $_{t-1}$                                       | -0.006***<br>(-6.6702) | -0.006***<br>(-6.6674) | -0.006***<br>(-6.2486)     | -0.006***<br>(-6.2439)  | -0.001**<br>(-2.4661)      | -0.001**<br>(-2.4843)  |
| Sales Growth $_{t-1}$                              | 0.005***<br>(8.6308)   | 0.005***<br>(8.6274)   | 0.005***<br>(8.7185)       | 0.005***<br>(8.7120)    | -0.001**<br>(-2.3546)      | -0.001**<br>(-2.3232)  |
| Stock Return $_{t-1}$                              | 0.007***<br>(5.9856)   | 0.007***<br>(5.9860)   | 0.008***<br>(6.2392)       | 0.008***<br>(6.2398)    | -0.001***<br>(-3.3809)     | -0.001***<br>(-3.3844) |
| Fund-Year-Quarter FE                               | YES                    | YES                    | YES                        | YES                     | YES                        | YES                    |
| Observations                                       | 23,237,385             | 23,237,385             | 23,237,385                 | 23,237,385              | 23,237,385                 | 23,237,385             |
| R-squared                                          | 0.049                  | 0.049                  | 0.038                      | 0.038                   | 0.597                      | 0.597                  |
| Within R-squared                                   | 0.000                  | 0.000                  | 0.000                      | 0.000                   | 0.003                      | 0.003                  |
| F-statistic                                        | 15.82***               | 15.69***               | 34.83***                   | 34.71***                | 43.21***                   | 43.16***               |

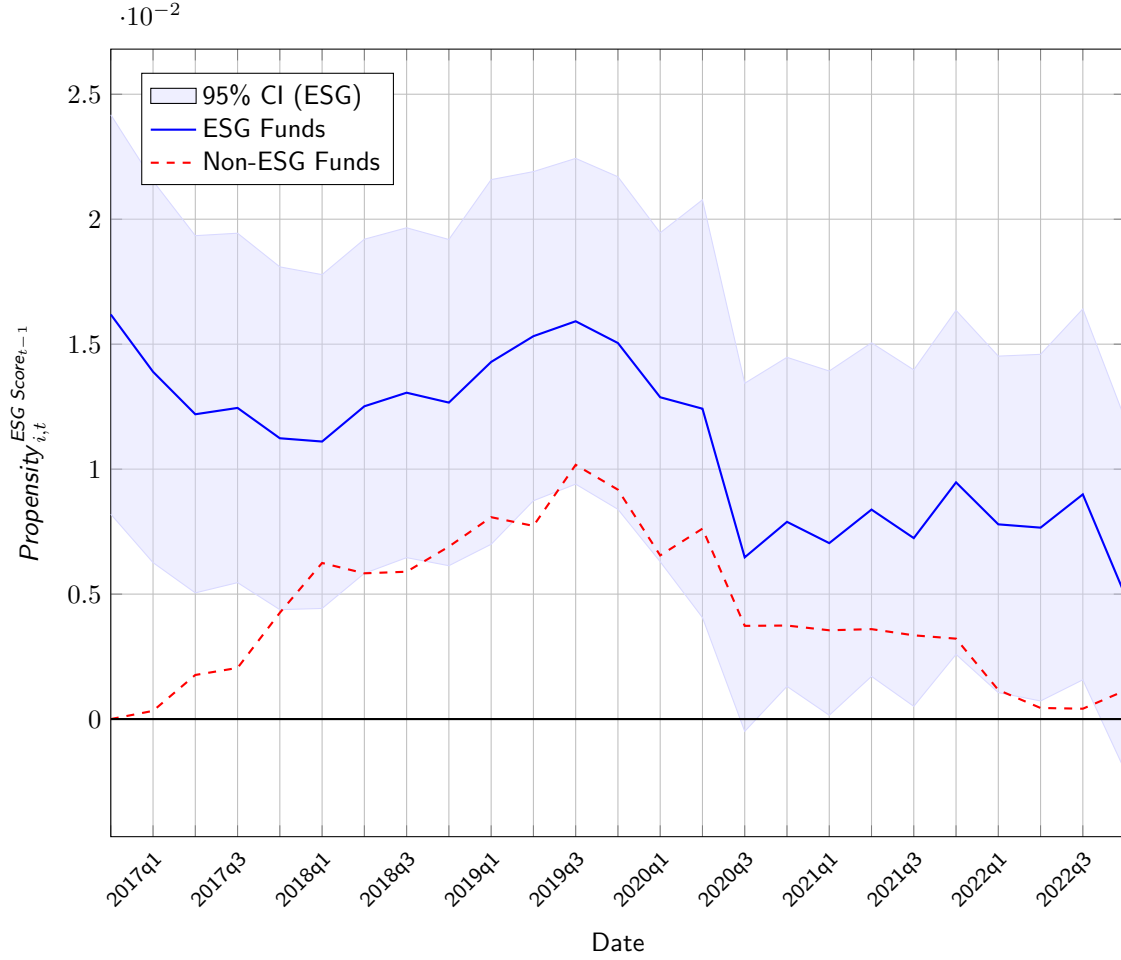
Notes: OLS regressions on mutual fund trades. Discretionary Trades are defined as the difference in the flow-driven and actual trades made by a fund between quarter  $t - 1$  and  $t$ , denominated by the stock's previous quarter's shares outstanding (Huang et al., 2023; Coval and Stafford, 2007). All (discretionary) trades are trimmed at the 0.5 and 99.5 percentiles. ES incidents denote the cumulative number of environmental and social RepRisk incidents of firm  $j$  in the following two ( $t + 1 - t + 2$ ) or four quarters ( $t + 1 - t + 4$ ). ESG Fund takes on value 1 if the fund  $i$  is denoted as an ESG fund following Morningstar's "General ESG Fund" indicator. We control for the previous quarter's industry-adjusted MSCI ESG score, the natural logarithm of firm market capitalization, book over market, leverage ratio, return on assets, 12-month sales growth, and quarterly stock return. All lagged continuous control variables are winsorized at the 1 and 99 percentiles. Regressions include fund  $\times$  year-quarter fixed effects. Standard errors are clustered at the fund level. Coefficients are standardized, and t-statistics are reported in parentheses. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

**Figure 4:** Propensity to Trade on Fewer Future ES Incidents for ESG and Non-ESG Funds, All Holdings



**Notes:** This figure plots the estimated coefficients on  $Propensity_{i,t}^{ES\ Incidents_{t+1}}$  for ESG,  $\beta_1 + \beta_2$  (blue solid line), and conventional fund,  $\beta_2$  (red dashed line), from Equation (10) over 2016-Q4 to 2022-Q4. The difference between the lines denotes the difference in funds' propensity to invest using future (next quarter's)  $-1 \times (\ln 1 + \# \text{ ES incidents})$  between ESG and conventional funds in standard deviations position changes per standard deviation in fewer log incidents. ESG Fund takes on the value 1 if the fund is denoted by Morningstar to be a "General ESG Investment", 0 otherwise. We control for lagged *In TNA*, *Returns*, *quarterly flow*, *In Age*, *Fund turnover*, and *Expense Ratio*. Fund portfolio turnover and the fund expense ratio are trimmed at the 0.5 and 99.5 percentiles. We control for fund category fixed effects. Standard errors are clustered at the fund level. Shaded areas represent the 95% confidence intervals for the ESG fund estimates ( $\beta_1$ ).

**Figure 5:** Propensity to Trade on Higher Past ESG Scores for ESG and Non-ESG Funds, All Holdings



**Notes:** This figure plots the estimated coefficients on  $\text{Propensity}_{i,t}^{\text{ESG Score}_{i,t}-1}$  for ESG,  $\beta_1 + \beta_2$  (blue solid line), and conventional fund,  $\beta_2$  (red dashed line), from Equation (11) over 2016-Q4 to 2022-Q4. The difference between the lines denotes the difference in funds' propensity to invest using historic (previous quarter's) ESG scores between ESG and conventional funds in standard deviations position changes per standard deviation in higher ESG scores. ESG Fund takes on the value 1 if the fund is denoted by Morningstar to be a "General ESG Investment", 0 otherwise. We control for lagged *In TNA*, *Returns*, *quarterly flow*, *In Age*, *Fund turnover*, and *Expense Ratio*. Fund portfolio turnover and the fund expense ratio are trimmed at the 0.5 and 99.5 percentiles. We control for fund category fixed effects. Standard errors are clustered at the fund level. Shaded areas represent the 95% confidence intervals for the ESG fund estimates ( $\beta_1$ ).

**Table 23:** Impact of integrating future ES risks and past ESG scores on Returns (Fund Fixed Effects), all holdings

| Trading measure                                                                                      | Risk-adjusted Returns                 |                                   |                                       |                                   |
|------------------------------------------------------------------------------------------------------|---------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------|
|                                                                                                      | Changes in ownership                  |                                   | Changes in positions                  |                                   |
|                                                                                                      | (1)<br>Fama-French 3-Factors $\alpha$ | (2)<br>Carhart 4-Factors $\alpha$ | (3)<br>Fama-French 3-Factors $\alpha$ | (4)<br>Carhart 4-Factors $\alpha$ |
| Propensity <sub><math>t-1</math></sub> <sup>ES Incidents<sub><math>t+1</math></sub></sup>            | -0.000<br>(0.020)                     | 0.007<br>(0.020)                  | -0.030*<br>(0.017)                    | -0.014<br>(0.017)                 |
| Propensity <sub><math>t-1</math></sub> <sup>ES Incidents<sub><math>t+1</math></sub></sup> × ESG Fund | 0.033<br>(0.044)                      | 0.045<br>(0.044)                  | 0.043<br>(0.030)                      | 0.032<br>(0.030)                  |
| Propensity <sub><math>t-1</math></sub> <sup>ESG Score<sub><math>t-1</math></sub></sup>               | 0.077***<br>(0.028)                   | 0.068**<br>(0.028)                | 0.091***<br>(0.021)                   | 0.073***<br>(0.021)               |
| Propensity <sub><math>t-1</math></sub> <sup>ESG Score<sub><math>t-1</math></sub></sup> × ESG Fund    | -0.113**<br>(0.049)                   | -0.107**<br>(0.051)               | -0.029<br>(0.036)                     | -0.020<br>(0.036)                 |
| ln TNA <sub><math>t-1</math></sub>                                                                   | 0.058***<br>(0.005)                   | 0.070***<br>(0.005)               | 0.057***<br>(0.005)                   | 0.070***<br>(0.005)               |
| ln Age <sub><math>t-1</math></sub>                                                                   | -0.028<br>(0.018)                     | -0.044**<br>(0.018)               | -0.023<br>(0.018)                     | -0.037**<br>(0.018)               |
| Turnover <sub><math>t-1</math></sub>                                                                 | -0.017***<br>(0.004)                  | -0.019***<br>(0.004)              | -0.019***<br>(0.004)                  | -0.020***<br>(0.004)              |
| Flow <sub><math>t-1</math></sub>                                                                     | 0.129***<br>(0.008)                   | 0.126***<br>(0.008)               | 0.141***<br>(0.008)                   | 0.139***<br>(0.009)               |
| Expense Ratio <sub><math>t-1</math></sub>                                                            | -0.004<br>(0.011)                     | 0.003<br>(0.012)                  | -0.005<br>(0.011)                     | 0.002<br>(0.012)                  |
| Constant                                                                                             | -1.174***<br>(0.095)                  | -1.384***<br>(0.098)              | -1.185***<br>(0.095)                  | -1.404***<br>(0.097)              |
| Fund FE                                                                                              | Yes                                   | Yes                               | Yes                                   | Yes                               |
| Category FE                                                                                          | No                                    | No                                | No                                    | No                                |
| Year-quarter FE                                                                                      | Yes                                   | Yes                               | Yes                                   | Yes                               |
| Observations                                                                                         | 147,378                               | 147,378                           | 147,040                               | 147,040                           |
| R-squared                                                                                            | 0.611                                 | 0.594                             | 0.612                                 | 0.594                             |
| Within R-squared                                                                                     | 0.018                                 | 0.021                             | 0.019                                 | 0.022                             |
| F-statistic                                                                                          | 55.19***                              | 60.26***                          | 60.48***                              | 64.72***                          |

Notes: The table reports the relation between the lagged propensity to invest based on future firm ES risks (Propensity <sub>$t-1$</sub> <sup>ES Incidents <sub>$t+1$</sub></sup> ) or historical firm ESG score (Propensity <sub>$t-1$</sub> <sup>ESG Score <sub>$t-1$</sub></sup> ) using discretionary ownership and discretionary position changes, and fund risk-adjusted return. The two propensity measures are defined as per Fang et al. (2014) and Chen et al. (2024) on discretionary ownership (columns 1 and 2) and discretionary position changes (columns 3 and 4) and are standardized. Standardized propensity scores are trimmed on the 0.5 and 99.5 percentiles. For each fund in each quarter, Fama-French three-factor returns (columns (1) and (3)) are calculated using fund returns of the past 36 months. Quarterly Carhart's 4-factor returns (columns (2) and (4)) are calculated using fund returns of the past 36 months. We denominate quarterly risk-adjusted returns in basis points per month (coefficients are scaled by 100). ESG Fund takes on the value 1 if the fund is denoted by Morningstar to be a "General ESG Investment", 0 otherwise. Fund portfolio turnover and the fund expense ratio are trimmed at the 0.5 and 99.5 percentiles. All other continuous control variables are lagged by one quarter and winsorized at the 1 and 99 percentiles. We control for fund and year-quarter fixed effects. Standard errors are clustered at the fund level and are reported in parentheses. Note: ESG Fund indicator is absorbed by fund fixed effects and therefore not included in the regression. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

**Table 24:** Impact of integrating future ES risks and past ESG scores on Returns (Category Fixed Effects), all holdings

| Trading measure                                                                                      | Risk-adjusted Returns                 |                                   |                                       |                                   |
|------------------------------------------------------------------------------------------------------|---------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------|
|                                                                                                      | Changes in ownership                  |                                   | Changes in positions                  |                                   |
|                                                                                                      | (1)<br>Fama-French 3-Factors $\alpha$ | (2)<br>Carhart 4-Factors $\alpha$ | (3)<br>Fama-French 3-Factors $\alpha$ | (4)<br>Carhart 4-Factors $\alpha$ |
| ESG Fund                                                                                             | 0.036***<br>(0.005)                   | 0.036***<br>(0.004)               | 0.036***<br>(0.005)                   | 0.036***<br>(0.004)               |
| Propensity <sub><math>t-1</math></sub> <sup>ES Incidents<sub><math>t+1</math></sub></sup>            | 0.017<br>(0.021)                      | 0.022<br>(0.021)                  | -0.030*<br>(0.016)                    | -0.015<br>(0.017)                 |
| Propensity <sub><math>t-1</math></sub> <sup>ES Incidents<sub><math>t+1</math></sub></sup> × ESG Fund | -0.064<br>(0.042)                     | -0.058<br>(0.042)                 | 0.032<br>(0.028)                      | 0.023<br>(0.028)                  |
| Propensity <sub><math>t-1</math></sub> <sup>ESG Score<sub><math>t-1</math></sub></sup>               | 0.068**<br>(0.028)                    | 0.057**<br>(0.028)                | 0.065***<br>(0.021)                   | 0.040*<br>(0.021)                 |
| Propensity <sub><math>t-1</math></sub> <sup>ESG Score<sub><math>t-1</math></sub></sup> × ESG Fund    | 0.004<br>(0.049)                      | -0.003<br>(0.049)                 | 0.020<br>(0.034)                      | 0.027<br>(0.034)                  |
| ln TNA <sub><math>t-1</math></sub>                                                                   | 0.021***<br>(0.001)                   | 0.021***<br>(0.001)               | 0.021***<br>(0.001)                   | 0.021***<br>(0.001)               |
| ln Age <sub><math>t-1</math></sub>                                                                   | -0.022***<br>(0.003)                  | -0.022***<br>(0.003)              | -0.021***<br>(0.003)                  | -0.021***<br>(0.003)              |
| Turnover <sub><math>t-1</math></sub>                                                                 | 0.000<br>(0.005)                      | -0.002<br>(0.005)                 | -0.000<br>(0.005)                     | -0.003<br>(0.005)                 |
| Flow <sub><math>t-1</math></sub>                                                                     | 0.253***<br>(0.010)                   | 0.255***<br>(0.011)               | 0.269***<br>(0.011)                   | 0.271***<br>(0.011)               |
| Expense Ratio <sub><math>t-1</math></sub>                                                            | -0.074***<br>(0.004)                  | -0.073***<br>(0.004)              | -0.074***<br>(0.004)                  | -0.073***<br>(0.004)              |
| Constant                                                                                             | -0.417***<br>(0.024)                  | -0.416***<br>(0.024)              | -0.415***<br>(0.024)                  | -0.416***<br>(0.024)              |
| Fund FE                                                                                              | No                                    | No                                | No                                    | No                                |
| Category FE                                                                                          | Yes                                   | Yes                               | Yes                                   | Yes                               |
| Year-quarter FE                                                                                      | Yes                                   | Yes                               | Yes                                   | Yes                               |
| Observations                                                                                         | 147,621                               | 147,621                           | 147,284                               | 147,284                           |
| R-squared                                                                                            | 0.341                                 | 0.330                             | 0.344                                 | 0.332                             |
| Within R-squared                                                                                     | 0.073                                 | 0.071                             | 0.074                                 | 0.071                             |
| F-statistic                                                                                          | 191.22***                             | 189.53***                         | 195.19***                             | 192.40***                         |

Notes: The table reports the relation between the lagged propensity to invest based on future firm ES risks (Propensity <sub>$t-1$</sub> <sup>ES Incidents <sub>$t+1$</sub></sup> ) or historical firm ESG score (Propensity <sub>$t-1$</sub> <sup>ESG Score <sub>$t-1$</sub></sup> ) using discretionary ownership and discretionary position changes, and fund risk-adjusted return. The two propensity measures are defined as per Fang et al. (2014) and Chen et al. (2024) on discretionary ownership (columns 1 and 2) and discretionary position changes (columns 3 and 4) and are standardized. Standardized propensity scores are trimmed on the 0.5 and 99.5 percentiles. For each fund in each quarter, Fama-French three-factor returns (columns (1) and (3)) are calculated using fund returns of the past 36 months. Quarterly Carhart's 4-factor returns (columns (2) and (4)) are calculated using fund returns of the past 36 months. We denominate quarterly risk-adjusted returns in basis points per month (coefficients are scaled by 100). ESG Fund takes on the value 1 if the fund is denoted by Morningstar to be a "General ESG Investment", 0 otherwise. Fund portfolio turnover and the fund expense ratio are trimmed at the 0.5 and 99.5 percentiles. All other continuous control variables are lagged by one quarter and winsorized at the 1 and 99 percentiles. We control for fund category and year-quarter fixed effects. Standard errors are clustered at the fund level and are reported in parentheses. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

**Table 25:** Impact of integrating future ES risks and past ESG scores on Flows, all holdings

| Trading measure                                           | Quarterly Fund Flows |                      |                      |                      |
|-----------------------------------------------------------|----------------------|----------------------|----------------------|----------------------|
|                                                           | Changes in ownership |                      | Changes in positions |                      |
|                                                           | (1)                  | (2)                  | (3)                  | (4)                  |
| ESG Fund                                                  | 0.017***<br>(0.001)  |                      | 0.016***<br>(0.001)  |                      |
| Propensity $_{t-1}^{ES\ Incidents_{t+1}}$                 | -0.001<br>(0.004)    | -0.008*<br>(0.004)   | 0.000<br>(0.004)     | -0.001<br>(0.005)    |
| Propensity $_{t-1}^{ES\ Incidents_{t+1}} \times$ ESG Fund | 0.010<br>(0.007)     | 0.010<br>(0.009)     | 0.020***<br>(0.007)  | 0.015*<br>(0.008)    |
| Propensity $_{t-1}^{ESG\ Score_{t-1}}$                    | 0.009<br>(0.006)     | 0.014**<br>(0.006)   | 0.004<br>(0.005)     | 0.000<br>(0.006)     |
| Propensity $_{t-1}^{ESG\ Score_{t-1}} \times$ ESG Fund    | -0.004<br>(0.010)    | -0.009<br>(0.011)    | -0.008<br>(0.010)    | -0.011<br>(0.011)    |
| ln TNA $_{t-1}$                                           | -0.002***<br>(0.000) | -0.046***<br>(0.002) | -0.002***<br>(0.000) | -0.046***<br>(0.002) |
| ln Age $_{t-1}$                                           | -0.018***<br>(0.001) | -0.040***<br>(0.005) | -0.017***<br>(0.001) | -0.037***<br>(0.005) |
| Turnover $_{t-1}$                                         | 0.001<br>(0.002)     | 0.002<br>(0.002)     | 0.001<br>(0.001)     | 0.002<br>(0.002)     |
| Expense Ratio $_{t-1}$                                    | -0.000<br>(0.001)    | 0.007*<br>(0.004)    | -0.001<br>(0.001)    | 0.005<br>(0.004)     |
| Returns $_{t-1}$                                          | 0.003***<br>(0.000)  | 0.003***<br>(0.000)  | 0.003***<br>(0.000)  | 0.003***<br>(0.000)  |
| Constant                                                  | 0.065***<br>(0.006)  | 0.985***<br>(0.036)  | 0.064***<br>(0.006)  | 0.972***<br>(0.036)  |
| Fund FE                                                   | No                   | Yes                  | Yes                  | No                   |
| Category FE                                               | Yes                  | No                   | No                   | Yes                  |
| Year-quarter FE                                           | Yes                  | Yes                  | Yes                  | Yes                  |
| Observations                                              | 155,514              | 155,297              | 154,546              | 154,332              |
| R-squared                                                 | 0.034                | 0.193                | 0.033                | 0.189                |
| Within R-squared                                          | 0.026                | 0.036                | 0.025                | 0.034                |
| F-statistic                                               | 143.69***            | 170.04***            | 142.77***            | 166.53***            |

Notes: The table reports the relation between the lagged propensity to invest based on future firm ES risks (Propensity $_{t-1}^{ES\ Incidents_{t+1}}$ ) or historical firm ESG score (Propensity $_{t-1}^{ESG\ Score_{t-1}}$ ) using discretionary ownership and position changes, and quarterly fund flows. The two propensity measures are defined as per Fang et al. (2014) and Chen et al. (2024) on discretionary ownership (columns 1 and 2) and discretionary position changes (columns 3 and 4) and are standardized. Standardized propensity scores are trimmed on the 0.5 and 99.5 percentiles. ESG Fund takes on the value 1 if the fund is denoted by Morningstar to be a "General ESG Investment", 0 otherwise. Fund portfolio turnover and the fund expense ratio are trimmed at the 0.5 and 99.5 percentiles. We control for fund, and year-quarter fixed effects. Standard errors are clustered at the fund level and are reported in parentheses. Note: ESG Fund indicator is absorbed by fund fixed effects and therefore not included in the regression. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

**Table 26:** Standardized OLS Regression Results: Types of Mutual Fund Position Changes and Stocks' (past) ES Incidents, Filtered, Pre-Existing Positions Only

|                                         | (1)<br>Position Changes |                         | (2)<br>Discret. Position Changes |                         | (3)<br>Expected Position Changes |                         |
|-----------------------------------------|-------------------------|-------------------------|----------------------------------|-------------------------|----------------------------------|-------------------------|
|                                         | (a)<br>$t$              | (b)<br>$t-1$            | (c)<br>$t$                       | (d)<br>$t-1$            | (e)<br>$t$                       | (f)<br>$t-1$            |
| # ES Incidents $_{t-s}$                 | -0.000<br>(-0.4871)     | 0.000<br>(0.0660)       | 0.005***<br>(9.6406)             | 0.005***<br>(10.1932)   | -0.010***<br>(-12.9981)          | -0.010***<br>(-13.3554) |
| # ES Incidents $_{t-s} \times$ ESG Fund | 0.000<br>(0.2995)       | 0.000<br>(0.3538)       | -0.004***<br>(-7.0538)           | -0.004***<br>(-7.1466)  | 0.009***<br>(8.6133)             | 0.009***<br>(8.8594)    |
| MSCI ESG $_{t-1}$                       | -0.002***<br>(-4.9453)  | -0.002***<br>(-4.9038)  | -0.001**<br>(-2.4433)            | -0.001**<br>(-2.3616)   | -0.002***<br>(-5.7475)           | -0.002***<br>(-5.8203)  |
| MSCI ESG $_{t-1} \times$ ESG Fund       | 0.010***<br>(9.4924)    | 0.010***<br>(9.4840)    | 0.007***<br>(7.0934)             | 0.007***<br>(7.0574)    | 0.006***<br>(5.7564)             | 0.006***<br>(5.8064)    |
| In Market Capitalization $_{t-1}$       | -0.003**<br>(-2.5446)   | -0.003***<br>(-2.7075)  | 0.000<br>(0.3743)                | 0.000<br>(0.1843)       | -0.005***<br>(-3.3259)           | -0.005***<br>(-3.3428)  |
| Book-Market $_{t-1}$                    | -0.001***<br>(-3.4136)  | -0.001***<br>(-3.6001)  | -0.001***<br>(-4.2089)           | -0.001***<br>(-4.4220)  | 0.000*<br>(1.9087)               | 0.000*<br>(1.9392)      |
| Leverage $_{t-1}$                       | -0.002***<br>(-9.4653)  | -0.002***<br>(-9.4627)  | -0.002***<br>(-9.9065)           | -0.002***<br>(-9.9198)  | 0.000<br>(0.8706)                | 0.000<br>(0.9151)       |
| ROA $_{t-1}$                            | -0.003***<br>(-8.3673)  | -0.003***<br>(-8.3448)  | -0.003***<br>(-9.0692)           | -0.003***<br>(-9.0604)  | 0.000<br>(1.0851)                | 0.000<br>(1.1224)       |
| Sales Growth $_{t-1}$                   | 0.001***<br>(3.1817)    | 0.001***<br>(3.2018)    | 0.001**<br>(2.3462)              | 0.001**<br>(2.3573)     | 0.000***<br>(3.0318)             | 0.000***<br>(3.0611)    |
| Quarterly Stock Return $_{t-1}$         | -0.012***<br>(-14.0907) | -0.012***<br>(-14.0783) | -0.012***<br>(-13.9549)          | -0.012***<br>(-13.9546) | -0.000<br>(-0.1442)              | -0.000<br>(-0.0591)     |
| Fund-Year-Quarter FE                    | YES                     | YES                     | YES                              | YES                     | YES                              | YES                     |
| Observations                            | 17,795,044              | 17,795,044              | 17,795,044                       | 17,795,044              | 17,795,044                       | 17,795,044              |
| R-squared                               | 0.199                   | 0.199                   | 0.204                            | 0.204                   | 0.752                            | 0.752                   |
| Within R-squared                        | 0.000                   | 0.000                   | 0.000                            | 0.000                   | 0.000                            | 0.000                   |
| F-statistic                             | 37.61***                | 37.63***                | 44.95***                         | 46.38***                | 19.84***                         | 20.79***                |

Notes: OLS regressions on mutual fund trades. Position Changes is the change in the position of fund  $i$  in stock  $j$  in quarter  $t$  estimated as  $\frac{Price_{j,t-1}(NumberShares_{i,j,t} - NumberShares_{i,j,t-1})}{AUM_{i,t-1}}$  (Gantchev et al., 2023; Giannetti and Jotikasthira, 2024). Expected Position Changes are estimated as the dollar flow-induced trades, keeping previous quarters' holding weights constant:  $\frac{Weight_{i,j,t-1} \times (flow_{i,t} \times AUM_{i,t-1})}{AUM_{i,t-1}}$  where  $flow_{i,t}$  is the relative flow, with  $flow_{i,t} \times AUM_{i,t-1}$  denoting the dollar flow to fund  $i$  between  $t-1$  and  $t$ . Alternatively, this can be written as  $\frac{Position_{i,j,t-1} \times Price_{j,t-1} \times flow_{i,t}}{AUM_{i,t-1}}$ . Discretionary Position Changes are estimated as  $Position_{i,j,t} - Expected\ Position\ Changes_{i,j,t}$ . We limit the observations of (discretionary) position changes such that the ratio of  $\frac{Weight_{i,j,t-1} \times (flow_{i,t} \times AUM_{i,t-1})}{AUM_{i,t-1}}$  and  $\frac{Position_{i,j,t-1} \times Price_{j,t-1} \times flow_{i,t}}{AUM_{i,t-1}}$  is not smaller than 0.8 and larger than 1.2. Discretionary Position Changes are trimmed at the 0.5 and 99.5 percentiles. ES incidents denote the number of environmental and social RepRisk incidents of firm  $j$  in quarter  $t$ . ESG Fund takes on value 1 if the fund  $i$  is denoted as an ESG fund following Morningstar's "General ESG Fund" indicator. We control for the previous quarter's industry-adjusted MSCI ESG score, the natural logarithm of firm market capitalization, book over market, leverage ratio, return on assets, 12-month sales growth, and quarterly stock return. All lagged continuous control variables are winsorized at the 1 and 99 percentiles. Regressions include fund  $\times$  year-quarter fixed effects. Standard errors are clustered at the fund level. Coefficients are standardized, and t-statistics are reported in parentheses. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

**Table 27:** Standardized OLS Regression Results: Types of Mutual Fund Position Changes and Future Cumulative ES Incidents by ESG and Conventional Funds, Filtered, Pre-Existing Positions Only

|                                                    | (1)<br>Position Changes |                         | (2)<br>All Discret. Position Changes |                         | (3)<br>Expected Position Changes |                         |
|----------------------------------------------------|-------------------------|-------------------------|--------------------------------------|-------------------------|----------------------------------|-------------------------|
|                                                    | (a)<br>$t+2$            | (b)<br>$t+4$            | (c)<br>$t+2$                         | (d)<br>$t+4$            | (e)<br>$t+2$                     | (f)<br>$t+4$            |
| Cumulative # ES Incidents $_{t+s}$                 | -0.000<br>(-0.5012)     | -0.000<br>(-0.1399)     | 0.005***<br>(9.9520)                 | 0.005***<br>(10.3956)   | -0.010***<br>(-13.3958)          | -0.010***<br>(-13.4829) |
| Cumulative # ES Incidents $_{t+s} \times$ ESG Fund | 0.000<br>(0.2161)       | 0.000<br>(0.3040)       | -0.004***<br>(-7.3289)               | -0.004***<br>(-7.3100)  | 0.009***<br>(8.7507)             | 0.009***<br>(8.8187)    |
| MSCI ESG $_{t-1}$                                  | -0.002***<br>(-4.9490)  | -0.002***<br>(-4.9241)  | -0.001**<br>(-2.4413)                | -0.001**<br>(-2.4346)   | -0.002***<br>(-5.7594)           | -0.002***<br>(-5.7234)  |
| MSCI ESG $_{t-1} \times$ ESG Fund                  | 0.010***<br>(9.4924)    | 0.010***<br>(9.4929)    | 0.007***<br>(7.1005)                 | 0.007***<br>(7.1161)    | 0.006***<br>(5.7488)             | 0.006***<br>(5.7257)    |
| In Market Capitalization $_{t-1}$                  | -0.002**<br>(-2.5190)   | -0.003***<br>(-2.6405)  | 0.000<br>(0.2341)                    | -0.000<br>(-0.0048)     | -0.005***<br>(-3.1791)           | -0.005***<br>(-3.1069)  |
| Book-Market $_{t-1}$                               | -0.001***<br>(-3.3974)  | -0.001***<br>(-3.5281)  | -0.001***<br>(-4.3494)               | -0.001***<br>(-4.5597)  | 0.001**<br>(2.3566)              | 0.001**<br>(2.5633)     |
| Leverage $_{t-1}$                                  | -0.002***<br>(-9.4654)  | -0.002***<br>(-9.4630)  | -0.002***<br>(-9.8944)               | -0.002***<br>(-9.8776)  | 0.000<br>(0.8357)                | 0.000<br>(0.7948)       |
| ROA $_{t-1}$                                       | -0.003***<br>(-8.3666)  | -0.003***<br>(-8.3481)  | -0.003***<br>(-9.0810)               | -0.003***<br>(-9.0538)  | 0.000<br>(1.1241)                | 0.000<br>(1.1036)       |
| Sales Growth $_{t-1}$                              | 0.001***<br>(3.1801)    | 0.001***<br>(3.1911)    | 0.001**<br>(2.3098)                  | 0.001**<br>(2.3121)     | 0.000***<br>(3.1494)             | 0.000***<br>(3.1790)    |
| Quarterly Stock Return $_{t-1}$                    | -0.012***<br>(-14.0909) | -0.012***<br>(-14.0860) | -0.012***<br>(-13.9651)              | -0.012***<br>(-13.9547) | -0.000<br>(-0.0761)              | -0.000<br>(-0.1120)     |
| Fund-Year-Quarter FE                               | YES                     | YES                     | YES                                  | YES                     | YES                              | YES                     |
| Observations                                       | 17795044                | 17795044                | 17795044                             | 17795044                | 17795044                         | 17795044                |
| R-squared                                          | 0.199                   | 0.199                   | 0.204                                | 0.204                   | 0.752                            | 0.752                   |
| Within R-squared                                   | 0.000                   | 0.000                   | 0.000                                | 0.000                   | 0.000                            | 0.000                   |
| F-statistic                                        | 37.62***                | 37.60***                | 45.60***                             | 46.26***                | 20.99***                         | 21.28***                |

Notes: OLS regressions on mutual fund trades. Position Changes is the change in the position of fund  $i$  in stock  $j$  in quarter  $t$  estimated as  $\frac{Price_{j,t-1}(NumberShares_{i,j,t} - NumberShares_{i,j,t-1})}{AUM_{i,t-1}}$  (Gantchev et al., 2023; Giannetti and Jotikasthira, 2024). Expected Position Changes are estimated as the dollar flow-induced trades, keeping previous quarters' holding weights constant:  $\frac{Weight_{i,j,t-1} \times (flow_{i,t} \times AUM_{i,t-1})}{AUM_{i,t-1}}$  where  $flow_{i,t}$  is the relative flow, with  $flow_{i,t} \times AUM_{i,t-1}$  denoting the dollar flow to fund  $i$  between  $t-1$  and  $t$ . Alternatively, this can be written as  $\frac{Position_{i,j,t-1} \times Price_{j,t-1} \times flow_{i,t}}{AUM_{i,t-1}}$ . Discretionary Position Changes are estimated as  $PositionChanges_{i,j,t} - ExpectedPositionChanges_{i,j,t}$ . We limit the observations of (discretionary) position changes such that the ratio of  $\frac{Weight_{i,j,t-1} \times (flow_{i,t} \times AUM_{i,t-1})}{AUM_{i,t-1}}$  and  $\frac{Position_{i,j,t-1} \times Price_{j,t-1} \times flow_{i,t}}{AUM_{i,t-1}}$  is not smaller than 0.8 and larger than 1.2. Discretionary Position Changes are trimmed at the 0.5 and 99.5 percentiles. ES incidents denote the number of environmental and social RepRisk incidents of firm  $j$  in quarter  $t$ . ESG Fund takes on value 1 if the fund  $i$  is denoted as an ESG fund following Morningstar's "General ESG Fund" indicator. We control for the previous quarter's industry-adjusted MSCI ESG score, the natural logarithm of firm market capitalization, book over market, leverage ratio, return on assets, 12-month sales growth, and quarterly stock return. All lagged continuous control variables are winsorized at the 1 and 99 percentiles. Regressions include fund  $\times$  year-quarter fixed effects. Standard errors are clustered at the fund level. Coefficients are standardized, and t-statistics are reported in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .