Retail Investors and ESG News

Qianqian Li[a], Edward M. Watts[b], and Christina Zhu[c]

[a]Graduate School of Business, Stanford University
[b]Yale School of Management
[c]The Wharton School, University of Pennsylvania

Current Draft: June 30, 2023

Abstract

An important debate exists around the extent to which retail investors make sustainable investments and why they do. We provide evidence relevant to this debate by investigating the aggregate trading patterns of retail investors around a comprehensive sample of key Environmental, Social, and Governance (ESG) news events for U.S. firms. Our focus on news-relevant events allows us to bypass measurement issues related to investors' frictions in becoming aware of and understanding ESG-related information. We show that ESG news events appear to be an important component of retail investors' portfolio allocation decisions. Yet, inconsistent with non-pecuniary preferences, our evidence shows that retail investors mainly trade on this information when they deem it financially material to a company's stock performance. Moreover, their net trading demand predicts future abnormal returns, consistent with some ability to profit from transacting on ESG news events. Overall, we conclude that retail investors care about firms' ESG-related activities, but primarily to the extent they are financially material for company performance.

JEL classification: G12, G14, G20, M14, G24, J32

Keywords: Retail investors; Individual investors; Environmental, social and governance (ESG); Socially responsible investing (SRI)

Corresponding authors: Qianqian Li (qqli@stanford.edu); Edward Watts (edward.watts@yale.edu); Christina Zhu (chrzhu@wharton.upenn.edu). We thank Mary Barth, Thomas Bourveau (discussant), Ed deHaan, Dave Larcker, Christian Leuz, Charlie McClure, Jeremy Michels, Olivia Mitchell, Austin Moss (discussant), Trung Nguyen (discussant), Kevin Smith, Eric So, Frank Zhou, and seminar participants at the University of Chicago, Singapore Management University, Stanford, Temple, Wharton, the 2023 Recent Developments in Corporate Governance Research Conference, the 2023 Four-School Accounting Research Conference, and the 2023 Colorado Summer Accounting Research Conference for helpful comments and suggestions. We also thank Allan Ngo and Cong Xiao for research assistance and Greg Bala, Jim Hawley, and Dinah Koehler at TruValue Labs (a Factset company) for helping us understand the data and providing helpful feedback. We gratefully acknowledge support from the Jacobs Levy Equity Management Center at Wharton, the Stanford Graduate School of Business, the Yale School of Management, and the Wharton School.

1. Introduction

Despite the substantial growth of assets tracking Environmental, Social, and Governance-focused (ESG-focused) strategies in recent years, the extent to which the average investor values ESG-related factors and the reasons they do remain the subject of ongoing debate. Recently, attention to these questions has expanded beyond academic research to the forefront of many political and regulatory debates in the United States. For example, such questions are critical to the debates in the U.S. around considering ESG factors in retirement accounts and the SEC's new proposed climate disclosure rules. We provide novel evidence informing these debates by studying how retail investors transact in their personal portfolios around one of their primary sources of information about companies' ESG-related activities—the news.

We begin by exploring the dynamics of retail investor trading activity, identified following Boehmer, Jones, Zhang, and Zhang (2021), around 54,199 distinct ESG-related news events from December 2015 through August 2022.[1] We find that relative to non-ESG news days, retail investor trading activity increases by approximately 5.7% on ESG news days in the full sample and by 8.1% in the most recent period. This finding demonstrates that retail investors in the United States collectively incorporate ESG-related news as an important determinant of their investment decisions. In comparison to the retail investor reactions to different types of traditional financial news events, the reactions to ESG news events appear to be greater in magnitude than those to analyst forecasts and dividend announcements, yet smaller than those to earnings announcements and management guidance.

In the cross-section, we show that all categories of such news events generate significant trade by retail investors, with news related to "Leadership and Governance" impacting trade the most. This finding is consistent with survey evidence highlighting governance—among all

[1]Our dataset comes from Factset TruValue Labs' Spotlight data solutions, which sources news from various sources outside the organization, such as media outlets and government regulators. An inherent advantage of using the dataset is that it clearly defines what is considered ESG-related news. Specifically, to be included in the dataset, news events must map into at least one topic in the ESG framework defined by the Sustainability Accounting Standards Board (SASB).

ESG factors—as the most important in investors' decision-making (CFA Institute, 2020). We also find substantial heterogeneity in the time-series of investors' reactions, with significant growth in their reactions over time. This finding highlights the increased importance of ESG-related factors in retail investors' portfolio decisions over time, as attention to these issues by shareholders and other stakeholders has increased.

As investor attention can affect perceptions and incorporation of information (e.g., Hirshleifer and Teoh, 2003; Blankespoor, deHaan, and Marinovic, 2020), we further explore the role of investor attention in retail investor trading behavior around ESG-related news events. Consistent with investors' heightened attention to companies during ESG news events, we find significant increases in direct measures of investor attention (Google search and Bloomberg terminal activity) during ESG event periods. Moreover, we find that retail investors' reactions to ESG news events are particularly pronounced for high-attention events. Specifically, we show that events with more extensive media coverage and more pronounced increases in investor attention generate significantly more retail trade. These findings mirror those of prior studies in related settings and highlight the critical role of investors' attention constraints in incorporating ESG-related information into their portfolio decision-making process (e.g., Hartzmark and Sussman, 2019; Choi, Gao, and Jiang, 2020; Painter, 2020).

The significant increase in trading activity by retail investors around high-attention ESG events allows us to reject the hypothesis that they are indifferent to ESG-related information. Nevertheless, it does not allow us to conclude why retail investors care about these issues. That is, a question remains as to whether retail investors value ESG-related factors for pecuniary (e.g., Lys, Naughton, and Wang, 2015; Christensen, Floyd, Liu, and Maffett, 2017) versus non-pecuniary reasons (e.g., Martin and Moser, 2016; Friedman and Heinle, 2016). Such non-pecuniary preferences are possible because, unlike most institutional investors, retail investors are not constrained by fiduciary duty, so their response may differ from the overall market response. To shed light on whether retail investors have non-pecuniary pref-

erences, we leverage the fact that investors' perceptions of a news event's ESG performance implications (i.e., positive or negative changes in a firm's ESG performance) can be uncorrelated or even negatively correlated with investors' beliefs about its implications for firm value (e.g., Krüger, 2015; Manchiraju and Rajgopal, 2017; Chen, Hung, and Wang, 2018).

Our evidence indicates that the average retail investor does not have non-pecuniary preferences. Instead, the pecuniary implications of ESG news (i.e., impacts on returns) lead retail investors to transact. We find that retail investors' trading activity around ESG news events appears to directly correspond to the impact on realized returns and are largely independent of the changes in expectations about a company's ESG performance. Specifically, when focusing on retail investors' aggregate net demand of securities around ESG news events, our evidence shows that investors purchase (sell) securities when the implications for portfolio performance are positive (negative), *regardless* of the ESG performance implications. Using a matched-pair analysis, we also find that changes in retail investor net demand at ESG events are statistically indistinguishable from those for earnings announcements with similar return reactions. We continue to find a lack of support for non-pecuniary preferences in events for firms headquartered in blue states and states with higher state-level ESG scores, and we find some evidence that retail investors' responses to the financial performance implications are even stronger in states with higher ESG scores.

Further highlighting the pecuniary motives for retail investor trading, we find that they profit by transacting on ESG-related news. Specifically, aggregate retail investor net demand at each ESG event predicts future abnormal returns in the post-news event period. Moreover, we show that this return predictability is only present in the subsample of financially material events. Collectively, these findings imply that retail investors appear to profit from their processing of the implications of these ESG news events for portfolio performance.

We perform several additional analyses to assess the robustness of our primary inferences and to provide a more complete picture of retail investors' trading around ESG news events. First, we continue to find similar results when using an alternative assignment of trades as

buys or sells based on the Lee-Ready algorithm (Lee and Ready, 1991), as suggested by Barber, Huang, Jorion, Odean, and Schwarz (2023). Second, we show our inferences hold in an examination of the trading behavior of investors potentially most likely to have non-pecuniary preferences, those using the Robinhood trading platform. The younger traders that favor this platform (e.g., Welch, 2022) represent a class of retail investors traditionally thought to be more likely than the overall investor population to invest in companies targeting social or environmental goals (e.g., Morgan Stanley, 2017; Haber, Kepler, Larcker, Seru, and Tayan, 2022). Third, we address concerns that our returns-based measures of pecuniary motivations are confounded by non-pecuniary incentives in other segments of the market. We use additional, non-returns-based measures to bolster inferences about whether pecuniary incentives are the main explanation for retail investors' responses. Specifically, we show that retail investor reactions are significantly greater when events are identified as financially material, per the SASB and equity analysts. Along with our primary findings, these results reinforce our conclusion that retail investors value ESG-related information for pecuniary reasons.

We contribute to a growing literature that explores whether and why retail investors value ESG-related factors in their investment decisions. As we discuss in Section 2, the evidence to date is largely mixed regarding these questions. Our approach complements prior research in this area by focusing on how investors transact around nearly all noteworthy ESG-related events—the primary channel through which most retail investors learn about firms' ESG-related activities.

Our study also provides new policy-relevant insights into ongoing debates in the U.S. around ESG investments and disclosure rules. There is considerable pushback regarding the consideration of ESG factors in retail investors' retirement accounts (e.g., Department of Labor, 2020, 2022; Ackerman and Wise, 2023). Similar debates are ongoing regarding the new proposed SEC climate disclosure rules, which—in accordance with the SEC's mandate to "level the playing field" between retail and institutional investors—are being considered, in

part, to increase transparency for unsophisticated investors (e.g., Fisch, 2022; SEC, 2022). Much of this debate centers around the premise of whether ESG factors are financially material to retail investors' investment portfolios and whether considering non-financially material factors should be permitted.[2] Our broad, generalizable empirical evidence should inform the underlying premises of the debate. Specifically, consistent with the view that ESG information is "very important but nothing special" (Edmans, 2023), we show that retail investors view ESG-related factors as important for their investment decisions, but primarily when this type of information is financially material.

The remainder of the paper is organized as follows. The next section provides a review of the prior literature and institutional details on regulatory debates related to our study. Section 3 describes the data used in the study and presents descriptive statistics. We discuss the paper's empirical strategy and main results in Section 4. Section 5 presents additional analyses and robustness tests. Finally, Section 6 provides concluding remarks.

2. Background and Related Literature

2.1. Related Literature

Significant disagreement exists in the academic literature regarding the extent to which retail investors value ESG-related factors and why they do. Many of the mixed findings are potentially explained by differences in research method (e.g., surveys and experiments versus empirical methods) or setting (e.g., examining securities with a specific ESG mandate versus a broader examination).

A growing number of published experimental and survey studies find that retail investors

[2]Although U.S. regulation is largely predicated on financial materiality, the E.U. regulation has taken a different approach by focusing on double materiality. This latter concept considers ESG factors to be material if they affect the world at large. The E.U. has incorporated this double materiality concept into their regulation of ESG disclosures (e.g., Norton Rose Fulbright, 2023) as well as their pension regulation, which includes sustainability considerations as part of their fiduciary obligations (e.g., Azizuddin, 2023). Various advocacy groups and market constituents have called for similar rules in the U.S., which would allow the consideration of ESG factors that are potentially unrelated to financial objectives (e.g., Engler, 2022).

value ESG-related factors and do so at the expense of their wealth (e.g., Martin and Moser, 2016; Riedl and Smeets, 2017; Bauer, Ruof, and Smeets, 2021; Heeb, Kolbel, Paetzold, and Zeisberger, 2023). Collectively, these studies suggest that investors view ESG-related factors as important factors for portfolio decision-making. Experimental participants' willingness to sacrifice wealth also supports a growing literature that models the asset pricing implications of assuming some investors have prosocial preferences (e.g., Friedman and Heinle, 2016; Pedersen, Fitzgibbons, and Pomorski, 2021; Pastor, Stambaugh, and Taylor, 2022).

In contrast, the empirical evidence is significantly less clear-cut. There is mixed evidence on whether retail investors view ESG-related information as an important investment signal. For instance, Hartzmark and Sussman (2019) provides evidence that non-institutional investment funds gain assets after a salience shock to their sustainability ratings, but Moss, Naughton, and Wang (2023) find that Robinhood investors do not appear to trade on ESG-related disclosures. While some of the disagreement in results may be attributable to differences in the form of ESG-related information studied, prior studies find conflicting evidence about how retail investors react to ESG information even in similar settings. Choi and Robertson (2020) find that retail investors respond to abnormally warm temperatures by selling stocks of high emissions firms, yet Pastor, Stambaugh, and Taylor (2023) find retail investors' portfolio holdings are tilted toward polluting firms.

Furthermore, while survey evidence suggests a significant willingness by retail investors to sacrifice financial wealth for prosocial investing, analysis in an experimental or survey setting may only reflect investor preferences when their wealth is largely not at stake. Extant empirical evidence questions whether retail investors or those serving retail clients are actually willing to sacrifice wealth (e.g., Larcker and Watts, 2020; Barber, Morse, and Ya-

suda, 2021).[3] The empirical evidence of investors' willingness of forgo returns is also mixed. Prior studies typically consider how socially responsible investment (SRI) fund returns (e.g., Geczy, Stambaugh, and Levin, 2005; Barber et al., 2021; Baker, Egan, and Sarkar, 2022b) or sustainable issuer returns (e.g., Hong and Kacperczyk, 2009; Pastor et al., 2022) behave ex-post relative to others. Yet, such inferences are subject to selection concerns because asset risk and reward profiles often differ across these securities (e.g., Larcker and Watts, 2020; Pedersen et al., 2021).

Our study complements and helps to reconcile some of these mixed findings by focusing on how investors transact around nearly all noteworthy ESG-related events in the news—the primary channel through which most retail investors learn about firms' ESG-related activities. News provides an ideal setting to study retail investors' preferences toward firms' ESG-related activities for several reasons. First, this setting allows us to overcome the measurement challenge inherent to studying these issues. Specifically, investors face significant frictions in becoming aware of and subsequently understanding companies' underlying ESG performance based on ESG ratings or corporate social responsibility (CSR) reports.[4] These challenges are particularly relevant when studying retail investors, a group with limited sophistication. At the extreme, retail investors are reportedly not even entirely sure what ESG investments are. For instance, a recent FINRA survey finds that only a quarter of individuals can define an ESG investment, while a fifth incorrectly believes ESG stands for "earnings,

[3] Giglio, Maggiori, Stroebel, Tan, Utkus, and Xu (2023) provide new evidence which potentially explains the disconnect between survey and empirical evidence. Using retail investors' holdings and surveys of their beliefs, they show that many investors report investing in ESG for non-pecuniary reasons. However, only those that expect ESG investments to outperform the market have significant holdings in ESG investments. In effect, survey evidence may significantly overstate reality. Heeb et al. (2023) also question how methodical most retail investors are when allocating their funds to ESG-related investments by showing that how much wealth investors are willing to forgo in the experiment is largely insensitive to the actual impact it may ultimately have for society or the environment.

[4] A growing body of evidence highlights the significant uncertainty around firms' true ESG performance. Not only is there considerable disagreement across ESG rating providers (e.g., Berg, Koelbel, Pavlova, and Rigobon, 2021; Berg, Kölbel, and Rigobon, 2022; Larcker, Pomorski, Tayan, and Watts, 2022), but there are also concerns about "greenwashing" and "social washing" (e.g., Baker, Larcker, McClure, Saraph, and Watts, 2022a; Raghunandan and Rajgopal, 2022; Bailey, Glaeser, Omartian, and Raghunandan, 2022; Kim and Yoon, 2023). The severity of these issues has prompted the SEC and other regulatory bodies worldwide to bring increased enforcement actions against firms and investment advisors (Norton Rose Fulbright, 2022).

stock, growth" (Mottola, Valdes, Ganem, Fontes, and Lush, 2022).

Focusing our analysis on high-attention, publicly observable news events allows us to circumvent many of these measurement issues. For instance, some of the mixed empirical evidence regarding whether retail investors consider ESG-related factors to be important could be attributable to differences in their attention to different forms of ESG information. The news is likely to be the main channel through which most individuals consume ESG-related information about firms, which helps us bypass retail investors' attention and information processing constraints inherent to other settings. For instance, while retail investors may not understand an ESG rating or what an SRI fund does, they are more likely to understand when Home Depot experiences public backlash for its Black Lives Matter labor controversies or when Occidental Petroleum signs clean energy contracts (see Appendix A).

Second, unlike some prior studies, our study speaks to the preferences of a representative retail investor in the market, and thus it adds generalizable evidence to complement studies focused on those investing in securities specifically with a sustainability mandate. Studies commonly explore these issues in the context of green bonds (e.g., Larcker and Watts, 2020; Flammer, 2021; Baker, Bergstresser, Serafeim, and Wurgler, 2022c) and socially responsible funds (e.g., Geczy et al., 2005; Barber et al., 2021; Baker et al., 2022b). However, several studies note that sustainable assets make up a small percentage—in the low single-digits—of U.S. assets under management (e.g., Hartzmark and Sussman, 2019; Pastor, Stambaugh, and Taylor, 2021; Pastor et al., 2023). Our focus bypasses these issues as we explore the most newsworthy ESG events for a comprehensive sample of U.S. firms.

Finally, the comprehensive nature of the ESG event sample and the heterogeneity across events allows us to provide useful context regarding the extent to which retail investors consider ESG information to be useful. For instance, our analysis provides new evidence of time-series and cross-sectional variation in the consideration of ESG factors. We compare the reaction to ESG news events to the reaction to traditional financial news events. In addition, we are able to leverage the heterogeneity across events to provide new insights

into the debate about whether investors value ESG-related activities beyond a security's expected risk and return attributes. The rich heterogeneity of our data and our focus on small windows around ESG news events, precisely when investors are updating their beliefs about companies' ESG performance (e.g., Krüger, 2015), provides a powerful setting in which to explore these issues.

Overall, by focusing on how and why retail investors react to ESG-related information, our paper adds to a large literature on retail investor decision-making in various settings (e.g., see Barber and Odean, 2013 for a review). Prior literature on retail investors provides mixed evidence about how sophisticated they are in their reaction to financial signals, such as earnings news (e.g., Lee, 1992; Hirshleifer, Myers, Myers, and Teoh, 2008; Kaniel, Liu, Saar, and Titman, 2012). Our evidence indicates that retail investors incorporate ESG-related information into their trading decisions by paying attention to the news. Specifically, they focus on news events' implications for stock performance while also exhibiting information awareness and acquisition costs (e.g., Lawrence, Ryans, Sun, and Laptev, 2018; Blankespoor, deHaan, and Zhu, 2018; Blankespoor, deHaan, Wertz, and Zhu, 2019). Despite their attention constraints, they do not appear to be net buyers during all ESG news events, in contrast to their reaction to earnings news (e.g., Lee, 1992; Hirshleifer et al., 2008). Similar to why they react to earnings news, they react to ESG news to the extent such news impacts their financial welfare (e.g., Kaniel et al., 2012; Kelley and Tetlock, 2013).

2.2. Regulatory Debates

Our research questions are also relevant to ongoing regulatory debates around ESG investments and disclosures. Significant disagreement exists regarding the consideration of ESG factors in investments in retail investors' retirement accounts at the federal level (e.g., Department of Labor, 2020, 2022; Ackerman and Wise, 2023), and several states have already adopted or are proposing regulations that ban ESG-related investment considerations in pension portfolio decisions. These regulations range from bans on asset management

strategies that "discriminate" against specific industries, such as fossil fuels, to restricting how ESG factors are used in portfolio investment (e.g., Goldberg, Dial, and Mann, 2022). A related debate exists around the SEC climate disclosure proposal, including whether some of these new disclosure requirements are necessary or within the scope of the SEC's mandate to enhance the functioning of capital markets (e.g., Karpoff, Litan, Schrand, and Weil, 2022; Posner, 2022; Vallette and Gray, 2022).

Understanding how retail investors use ESG-related information is critical in informing the premise of these debates, as they pertain to retail investor (i.e., pension plan participant) wealth or to additional transparency on ESG-related information to help retail investors. Those against considering ESG-related information in investing or mandatory disclosures question whether ESG factors are financially material.[5] Some go further and contend that considering such factors may be detrimental to investors' wealth.[6] Advocates of considering ESG-related information in investing or mandatory disclosures suggest that this information is financially material and ignoring ESG information, critical to a firm's risks and performance, would hurt portfolio performance.

We highlight that retail investors consider ESG-related factors to be important in their investment decision-making process and that such considerations are not detrimental to their wealth. Therefore, banning ESG considerations in retirement portfolios may be misguided, and doing so may violate fiduciary obligations, as argued by some.[7] In addition, mandating some form of climate disclosures is within the SEC's rule-making authority.

Our findings also suggest that retail investors value ESG-related information primarily

[5]For instance, in the context of the SEC climate disclosure rule, several state attorney generals question whether the proposed non-financial measures are financially material. Specifically, they suggest the proposed disclosures may be "merely helpful for investors interested in companies with corporate practices consistent with federally encouraged social views". Comment letter here: `https://www.sec.gov/comments/climate-disclosure/cll12-8915606-244835.pdf`.

[6]For example, several New York City pension funds are currently being sued for their actions to address climate change and accused of advancing "environmental goals unrelated to the financial health of the plans" (Wayne Wong v. NYCERS and BERS, 2023). The plaintiffs contend that the recently adopted divestment policies have breached fiduciary obligations and are seeking monetary damages.

[7]Some estimates suggest that the costs associated with the recent anti-ESG bills in Texas, Indiana, and Kansas are $6.0, $6.7, and $3.6 billion, respectively (Gibson and Sawyer, 2023).

for pecuniary reasons. Therefore, citing retail investors' non-pecuniary objectives when advocating for investment strategies that sacrifice financial performance may be inadvisable. Consistent with the guidance outlined in Karpoff et al. (2022), our results support the idea that disclosures about financially relevant ESG factors can help investors, but those to achieve environmental or social goals are inconsistent with why the average retail investor considers ESG information to be important.

3. Data

3.1. Sample

We obtain a comprehensive sample of ESG news events for publicly traded firms from Factset TruValue Labs' Spotlight Data solutions. Using artificial intelligence and machine learning on unstructured data across a broad range of independent sources outside the organization, TruValue Labs identifies firm-specific articles mapping into one or more of the 26 categories defined by the SASB materiality framework—even if the topic is not financially material for the firm's industry but for a different industry. Thus, each ESG news article need not be financially material (per the SASB's definition).

TruValue Labs then identifies peaks in the volume of related ESG articles for a given firm. These peaks are the ESG news events, or "spotlight" events, that are in the data provided to us. Thus, their event selection is based only on media article volume on ESG topics and not on the sentiment of the articles. Critical to our study, the TruValue Labs dataset contains the precise date the news first became public, the ESG category of the event, and the volume of media attention.

TruValue Labs tracks ESG news events for hundreds of thousands of companies worldwide. From these data, we focus on all publicly traded firms in the United States covered by TruValue Labs from December 2015 to August 2022. Companies in our sample have an average of 16.5 ESG events during the sample period (i.e., $\approx$ 2.5 events per year).

We obtain data from several additional sources. Equity returns information comes from CRSP, and retail investor trading activity data are from WRDS Intraday Indicators, based on TAQ data. We obtain measures of attention from Google Trends and Bloomberg and analyst forecast revision data from IBES. For part of our sample, we also obtain data from Robintrack to construct an alternative measure of retail investor trade based on changes in the number of unique Robinhood users holding the stock (e.g., Barber, Huang, Odean, and Schwarz, 2022; Welch, 2022; Campbell, Drake, Thornock, and Twedt, 2023; Michels, 2022). A small percentage of the ESG news events coincide with firms' earnings announcements, so we remove events in the 3-day window around earnings announcements to avoid this confound. Our event-study design uses retail trading data in the [−20,+20] trading-day window around each ESG news event. Thus, our primary sample includes 2,220,704 Firm-EventDate-Date observations around 54,199 unique events for 3,292 unique publicly-traded firms.

3.2. ESG Performance Measure

An advantage of the TruValue Labs dataset is that it allows us to proxy for changes in the ESG performance of a firm specifically associated with an ESG event. Factset TruValue Labs uses natural language processing (NLP) to calculate the article sentiment regarding how a firm is performing along each ESG category. This sentiment ranges from 0 to 100, with 50 denoting a neutral article.

TruValue Labs then computes *Pulse*, defined as the weighted average of these firm × ESG category sentiment scores. *Pulse* is a short-term running average that weights the sentiment of more recent articles more heavily. Thus, we interpret *Pulse* as the short-term real-time performance of the firm in a specific ESG category.

The dataset contains the *Pulse* both before and after incorporating the information revealed by the event. We use this information to compute the change in ESG performance in the short window around the event, *PulseChange*, which is a powerful proxy for how the

public perceives the change in a firm's ESG performance revealed by the event.[8] For example, a positive *PulseChange* for an event related to the SASB "Environment" category suggests that the event reveals a positive change in expectations about the firm's environmental performance.[9]

Figure A-1 in Appendix A presents several examples of ESG news events in our sample. Our sample covers a broad range of positive and negative events. For instance, Panel (a) presents Hasbro's change in branding to promote gender equality and inclusivity, and Panel (b) presents Occidental Petroleum's signing of clean energy contracts. Although both are pro-ESG events, in that a positive *PulseChange* accompanies them, they differ in their implications for the firm's financial performance. We use market returns to identify the former as a positive development for the firm's financial performance (positive returns) and the latter a negative event for financial performance (negative returns). These examples illustrate the significant heterogeneity across events, which allows us to disentangle the reasons for investor trade.

3.3. Retail Trade Measures

We measure retail trading activity using TAQ data and the methodology introduced by Boehmer et al. (2021). This methodology is based on the logic that marketable retail investor orders receive small amounts of price improvement over the National Best Bid or Offer and are typically filled internally or sold to wholesalers (e.g., this approach is used in Blankespoor et al., 2018, 2019; Bushee, Cedergren, and Michels, 2020; Barber et al., 2022; Campbell et al., 2023). This retail trading volume makes up a small percent ($\approx$ 7%) of total volume during our sample period. This methodology only identifies market orders or marketable limit orders filled internally or by wholesalers. Nevertheless, despite not all

[8]Discussions with the TruValue Labs data team confirm this interpretation. Specifically, taking the difference of the pre-event and post-event *Pulse* score proxies for both the direction and magnitude of the event's ESG implications.

[9]For events spanning multiple SASB categories, *PulseChange* represents the average change in ESG performance expectations across all categories.

identifying all retail trades, trades identified as retail trades are likely correctly identified, and our inferences should generalize to all retail investors.

Useful for our tests investigating retail investors' motivations for trade, the methodology also identifies retail trades as buys or sells. We compute measures of buy-sell imbalance, after following Boehmer et al. (2021) to distinguish retail investor buys from sells. Thus, we can test how the direction of retail trade in the short window around an ESG news event, as proxied by buy-sell imbalance measures, corresponds to the event's implications for ESG performance and financial performance. In robustness tests, we use an alternative buy-sell imbalance measure based on the assignment of buys and sells using the Lee-Ready algorithm Lee and Ready (1991), as suggested by Barber et al. (2023).

We also use a specific sample of retail investors, those using the Robinhood trading platform. This sample does not rely on the approach developed in Boehmer et al. (2021).[10] Robinhood investors are more likely to be young investors, a class of retail investors traditionally thought to be more likely than the overall investor population to invest in companies targeting social or environmental goals. Therefore, an advantage of using this sample is that it provides a more powerful setting to test for non-pecuniary preferences for ESG-related activities among retail investors.

3.4. Descriptive Statistics

Table 1 Panel A presents summary statistics for the main variables used in our analysis. The first section of Panel A covers variables measured at the Firm-EventDate-Date level. For example, we measure unsigned retail trading activity using retail trading volume ($RetailVol$) and the number of retail trades ($RetailNum$). The average daily retail trading volume is 0.581 million shares and the average daily number of retail trades is 3,409. We compute two measures of buy-sell imbalance, $RetailBSIVol$ and $RetailBSINum$.

[10] A disadvantage is that the data on Robinhood investors reveal the change in the number of users holding the stock, but not the change in shares or trades that we could investigate in our main analyses using the approach introduced by Boehmer et al. (2021). Moreover, the sample ends in August 2020 due to Robinhood data availability.

The second section of Panel A covers variables measured at the Firm-EventDate level. The events in our sample garner substantial attention, as evidenced by the average media coverage of more than 7 articles. The sample of events encompasses a diverse array of news categories, including the Environment (23.4%), Social Capital (33.2%), Human Capital (18.8%), Business Model and Innovation (24.4%), and Leadership and Governance (19.8%).[11]

The summary statistics also reveal that the ESG news events exhibit a large amount of variation in the revealed ESG performance news ($PulseChange$) and the revealed financial performance news ($EventRet$).

The abnormal return in the 3-day window around the event, $EventRet$, is a concise measure of the direction and magnitude of the change in expectations regarding firm value revealed at the time of the event. The descriptive statistics for *Analyst Revision* and *SASB Materiality* indicate that around half of the events contain financially material information in that they elicit an analyst forecast revision or are financially material according to the SASB's Materiality Map.

Table 1 Panel B presents correlations between notable Firm-EventDate level signed variables. The correlation between $PulseChange$ and $EventRet$ is significantly positive, yet small in magnitude ($\approx 2\%$), which highlights the fact that financial performance can be largely orthogonal to ESG performance. This fact is consistent with prior research (e.g., Krüger, 2015; Manchiraju and Rajgopal, 2017; Chen et al., 2018).[12]

[11] These percentages sum to more than 100%, as some ESG news events span multiple categories.

[12] As an example of disagreement between signed ESG performance and financial performance, Panel (c) in Figure A-1 shows an event for Occidental Petroleum with high ESG performance but low event returns. In addition, many of our events are not considered financially material, further underscoring the low correlation between ESG and financial performance around news events.

4. Main Results

4.1. Retail Investor Trading Activity and ESG News

We begin by investigating whether retail investors consider ESG news events in their portfolio allocation decisions. Specifically, we test for changes in retail investor trading activity around ESG news events. To the extent that retail investors value ESG-related information conveyed during news events, we expect to find significant increases in trading activity by retail investors around ESG news, as retail investors sell or purchase assets based on their interpretations of the news signal.

As a first step, Figure 1 plots the average daily retail investor trading activity in event-time in the window immediately surrounding ESG news events. Panel A presents a plot of retail investor trading volume, and Panel B presents a plot of the number of retail trades. Consistent with ESG news events being an important component of retail investors' portfolio allocation decisions, we find significant spikes in daily retail investor trading activity around the news release date.

To further investigate these issues, we estimate the following regression using the sample of Firm-EventDate-Date observations in the 20 trading-day window before and after (i.e., trading days −20 through +20) each Firm-EventDate:

$$RetTrade_{i,e,t} = \beta_1 EventDay[-1,+1]_{i,e,t} + \Sigma\beta_{i,e} Firm\text{-}EventDate_{i,e} + \epsilon_{i,e,t}, \quad (1)$$

where $RetTrade_{i,e,t}$ is one of several measures of retail investor trading activity for firm i on a particular date t around EventDate e. $EventDay[-1,+1]_{i,e,t}$ is an indicator variable equal to one if the date is within trading days [−1,+1] of the Firm-EventDate. A positive β_1 suggests that retail investors react to ESG news events. Given the event-study design allows us to hold constant other factors that should not vary in the short window around the event, thus mitigating omitted variable bias and reverse causality concerns, time-varying controls are

omitted. Moreover, in our most restrictive specification, we include Firm-EventDate fixed effects, which subsumes any variation constant for each firm-event window. For completeness, we present versions of regressions with and without EventDate, Firm, and Firm-EventDate fixed effects. We use cluster-robust standard errors clustered by firm and event date.

Table 2 presents a first set of regression results for multiple variations of Equation (1). Across all specifications, we find that retail investor trading activity significantly increases around ESG news events. The results in Table 2 Panel A imply that, relative to the $[-20, -2]$ and $[+2, +20]$ windows before and after these events, retail investors increase their trading volume in the three days centered around the event. The coefficient on $EventDay[-1, +1]$ is 0.033 across all four columns of Table 2 Panel A, which indicates that average retail investor trading volume increases by approximately 5.7% in the 3-day period around the release of ESG news. The results in Table 2 Panel B indicate that retail investors increase their number of trades by approximately 3.7% on average at the release of ESG news.[13]

To provide context to interpret these magnitudes, we also compare the retail investor reaction to ESG news events to their reaction to "traditional" financial news events. As we expect retail investors to react only to financial events covered in the news, we use Ravenpack to identify news articles on financial events: earnings announcements, analyst forecast revisions, dividend announcements, guidance that is not bundled with earnings announcements, and M&A announcements.

We estimate Equation (1) using the 20 trading-day window before and after (i.e., trading days −20 through +20) each Firm-EventDate in the sample of financial news events. Table 3 presents results. For this analysis, we exclude analyst forecasts, dividend announcements, guidance, and M&A announcements in the [-1,+1] trading-day window around earnings announcements. Panel A presents results for the dependent variable $RetailVol$ and Panel B presents results for the dependent variable $RetailNum$.

[13]The 5.7% increase for Panel A is calculated based on the average retail investor trading volume of 0.581 (0.033/0.581=0.057). The 3.7% increase for Panel B is calculated based on the average number of retail trades of 3.409 (0.125/3.409=0.037).

For ease of comparison, column 1 of each panel presents the retail investor reaction to news events from the previous table. Column 2 of each panel presents the retail investor reaction to all financial news articles. In panel A, the column 2 coefficient on $EventDay[-1,+1]$ is 0.041, and an Z-test across columns 1 and 2 finds that the retail investor reaction to ESG news events is marginally significantly lower than the reaction to all financial news events. Thus, it appears that retail investors react to ESG news events to a slightly smaller degree than the average financial news event. Columns 3 to 7 present the results for the subsamples of financial events (comprising column 2), based on the type of financial event. The column 3 coefficient on $EventDay[-1,+1]$ is 0.089 and significantly different from the column 1 coefficient, implying that the retail investor reaction to ESG news events is significantly lower than the reaction to their reaction to earnings announcements. The column 6 and column 7 coefficients are also significantly larger than the ESG news reaction coefficient, implying that the retail investor reaction to ESG news is significantly lower than the reactions to guidance and M&A announcements. However, the reaction to ESG news events is significantly larger than the reaction to analyst forecasts and dividend announcements.

4.2. Cross-sectional Variation

We also explore cross-sectional variation in the extent to which retail investors react to events on different ESG topics. To this end, we estimate Equation (1) in the subsamples of events tagged to each of the SASB categories: Environment, Social Capital, Human Capital, Business Model and Innovation, and Leadership and Governance. Table 4, Panel A presents results using the dependent variable $RetailVol$ and Table 4, Panel B presents results using the dependent variable $RetailNum$. We find a positive and significant coefficient on $EventDay[-1,+1]$ across all columns in each panel, which implies that events in all categories elicit retail investor trading volume. There is substantial variation in the magnitude of the coefficient across the columns. Our results suggest that Leadership and Governance events, followed by Business Model and Innovation and Social Capital events, elicit the great-

est increases in event-related retail investor trading activity. Events in the Environment and Human Capital categories elicit smaller increases in event-related retail investor trading activity. This relative ranking is consistent with survey evidence highlighting governance as the most important factor, among all ESG factors, in investors' decision-making (CFA Institute, 2020).[14]

4.3. Time-series Variation

Figure 2 presents the evolution of ESG event-related changes in retail investor trading volume and the number of retail trades over time, respectively. The event-related increase in retail investor trading volume has grown since the beginning of our sample period in December 2015. While events in the earliest part of our sample period (December 2015 to March 2018) garner a 3.7% increase in retail investor trading volume, this statistic more than doubles (e.g., rises to 8.1%) for the period from May 2020 to August 2022.

The collective evidence in Sections 4.1, 4.2, and 4.3 highlights that retail investors view ESG news as an important component in their portfolio decision-making. Trading activity by retail investors increases substantially around ESG news events. Retail investors appear to react to ESG news events to a greater extent than some types of financial news events (e.g., analyst forecasts and dividend announcements), but to a lesser extent than the financial news events garnering large retail investor reactions (e.g., earnings announcements, management guidance, and M&A announcements). Their reactions are greatest for Leadership and Governance and Social Capital events, and their response has increased in magnitude over our sample period.

[14] As differences in media attention to different categories of events could explain these findings, in untabulated analyses we find that controlling for media coverage does not change the relative ranking of the importance of each ESG category. We explore attention in more detail in Section 4.4. Furthermore, untabulated analyses find that news events revealing positive ESG performance and those revealing negative ESG performance both elicit significant increases in retail trading activity.

4.4. Retail Investor Attention

A key feature of our setting is that it focuses on high-attention ESG news events, of which retail investors are likely to be aware. Next, we validate that measures of investor attention change around ESG news events. We focus on two commonly used measures of investor attention from prior studies: (1) abnormal Google search volume used in Da, Engelberg, and Gao (2011) and Drake, Roulstone, and Thornock (2012) (*GoogleSearch_Daily*) and abnormal Bloomberg institutional investor attention used in Ben-Rephael, Da, and Israelsen (2017) (*BloombergAIA_Daily*).[15]

We begin by plotting average daily attention directly in event-time for the window immediately around ESG news events for each measure in Figure 3. Panel A presents results for Google search volume, and Panel B presents results for Bloomberg terminal activity. Consistent with increases in investor attention around these events, we find large spikes in investors' Google searches and Bloomberg terminal activity around each event. These findings highlight substantial increases in investor attention to companies around ESG news events in our sample, mirroring those related to retail investors' trading activity shown in Figure 1.

We next estimate a version of Equation (1) that replaces the dependent variable with one of the two attention proxies. Table 5 Panel A shows that Google search volume increases around the event. The coefficient on $EventDay[-1,+1]$ is significantly positive and around 0.309 across all four columns of Panel A, indicating that abnormal Google search volume increases by approximately 1.5% on average in the three-day period centered around the release of ESG news. Panel B shows that Bloomberg terminal attention significantly increases by approximately 14% around the event.[16] Taken together, these results imply that ESG

[15] Although the attention to news on Bloomberg terminals reflects institutional investor attention, many institutional clients are an important source of news dissemination to retail investors. For instance, prior studies highlight the important role that analysts play in retail investor portfolio decision-making (e.g., Malmendier and Shanthikumar, 2007; Lawrence, Ryans, and Sun, 2017). Consistent with this notion, Section 5.4 documents greater retail investor trading activity during ESG events eliciting analyst revisions.

[16] In untabulated analyses, we find qualitatively similar results in Tables 5 and 6 if we use an indicator for high Bloomberg terminal attention, defined as attention taking a value of 3 or 4 (Ben-Rephael et al., 2017).

news events garner substantial attention from investors and highlight that retail investors are likely aware of these events.

We next highlight the importance of investor attention in retail investors' reactions to ESG news events. Specifically, we explore in the cross-section how retail investors' trading activity varies with the amount of attention paid to the ESG news event. To do so, we estimate a version of Equation (1) that interacts $EventDay[-1,+1]$ with several attention proxies commonly used in prior literature: (1) the number of news articles associated with the event,[17] (2) Google search volume, and (3) Bloomberg terminal activity. To facilitate the interpretation of the coefficients, we standardize each event-level attention proxy so that it has a mean of zero and a standard deviation of one.

Table 6 Panel A (Panel B) presents results for the dependent variable retail investor volume (number of retail trades). For all specifications, our estimates indicate that retail investor trading activity is significantly higher in cases where attention is higher. For instance, in Panel A, our estimates indicate a one-standard-deviation increase in the event's media coverage, Google search, and Bloomberg activity, increases the change in retail investor trading volume by approximately two-thirds, two-thirds, and four times, respectively.[18] In Panel B, our findings related to the number of retail trades mirror these findings. Collectively, these results highlight the important role that attention has in retail investors' responses to ESG news events.

4.5. Motivations for Retail Investor Trade

Having documented that retail investors incorporate ESG news events into their trading decisions, we next explore why they trade. Around each news event, investors should update their beliefs about firm performance along both financial and ESG dimensions. We lever-

[17] Prior literature finds strong evidence in support of the media's dissemination role in mitigating investors' attention constraints and information processing frictions more broadly (e.g., Peress, 2014; Blankespoor et al., 2018).

[18] The positive and significant coefficient on $EventDay[-1,+1]$ highlights that retail trade also increases for events with an average level of attention. This finding mitigates concerns that our results can be attributed to a small subsample of events garnering extremely high attention.

age the significant heterogeneity across events to disentangle non-pecuniary vs. pecuniary reasons for retail investor transactions.

To explore these issues, we augment Equation (1) to examine the relationship between the *signed* reactions of retail investors and measures of stock performance and ESG performance. Specifically, we estimate:

$$\begin{aligned} RetailBSI_{i,e,t} = {} & \beta_1 EventDay[-1,+1]_{i,e,t} + \\ & \beta_2 EventDay[-1,+1]_{i,e,t} \times PulseChange_{i,e} + \\ & \beta_3 EventDay[-1,+1]_{i,e,t} \times EventRet_{i,e} + \\ & \Sigma\beta_{i,e} Firm\text{-}EventDate_{i,e} + \epsilon_{i,e,t}, \end{aligned} \tag{2}$$

where $RetailBSI$ is one of two measures of retail investor buy-sell imbalance for firm i on a particular date t around EventDate e and $EventDay[-1,+1]$ is as previously defined. The interaction term variables $PulseChange_{i,e}$ and $EventRet_{i,e}$ represent the the change in ESG expectations for the firm (based on event-related changes in the TruValue $Pulse$ score) and the event period return for firm i around EventDate e. In effect, these measures proxy for the changes in investors' expectations for a company's ESG and stock return performance around an event. A positive β_2 suggests that retail investors increase their net demand when the event reveals more positive implications for the firm's ESG performance, after controlling for its impact on stock performance. A positive β_3 suggests that retail investors increase their net demand when the event reveals more positive implications for the firm's stock performance, after controlling for its impact on ESG performance. For completeness, we present regressions with and without Firm-EventDate fixed effects.

Table 7 Panel A presents results of estimating several versions of Equation (2). Using the dependent variable $RetailBSIVol$, column 1 shows an insignificant coefficient on the interaction $EventDay[-1,+1] \times PulseChange$. After including an additional interaction between the event-window indicator and signed event returns, the coefficient on the inter-

action $EventDay[-1,+1] \times PulseChange$ remains insignificant in column 2. We infer that ESG performance does not affect retail investor net demand.[19] In sharp contrast to the coefficient on $EventDay[-1,+1] \times PulseChange$, the coefficient on the interaction with $EventRet$ is significantly positive. Thus, consistent with pecuniary motivations for trade, retail investors increase their net demand at the event to a greater extent when the event reveals positive information about financial performance. Columns 3 and 4 indicate similar results using the dependent variable $RetailBSINum$.

Next, we compare the retail investor buy-sell imbalance reaction to ESG news events to their reaction to a set of matched earnings announcements, which are financial events without non-pecuniary implications (i.e., they are not pro-environmental). To conduct this matched-pair analysis, we match each ESG news event to an earnings announcement within the same calendar year-quarter that has a similar abnormal event return and market capitalization. We use abnormal event returns to proxy for the firm value implications of each event, and we use total market capitalization as a proxy for other firm characteristics likely to affect retail investor trading behavior (e.g., attention, media coverage, etc.). For each ESG news event, we use a nearest-neighbor matching algorithm to find the earnings announcement that is the most similar along the matching variables, and we match without replacement. Thus, each ESG news event is similar to its matched financial news event in terms of financial implications. We then compare the abnormal retail investor buy-sell imbalances in the ESG event period and the matched earnings announcement event period. A significant difference in the buy-sell imbalance would suggest that retail investors have a differential net demand for ESG news events compared to "traditional" financial news events and could therefore have non-pecuniary motivations for trade.

Table 7 Panels B and C report the results of the matched-pair analysis for retail buy-

[19] Including $PulseChange$ and financial performance together in a single regression facilitates the interpretation of the coefficient on $EventDay[-1,+1] \times EventRet$ based the portion of $EventRet$ that is orthogonal to changes in ESG performance. Therefore, our analyses account for the possibility that non-pecuniary preferences in the market could affect returns. Section 5.4 includes further discussion and additional robustness tests.

sell imbalances based on volume and the number of trades, respectively. Column 1 reports the abnormal retail buy-sell imbalance differences for the full sample of ESG news events, column 2 uses only positive ESG news events, and column 3 uses only negative ESG news events. Across all columns of Table 7 Panel B and C, we find insignificant differences in the abnormal retail buy-sell imbalance between ESG news events and their matched earnings announcements. Importantly, the matched-pair analysis holds constant the financial implications of and the attention to each of the two types of events when making the comparison. Our inference is that retail investors respond to ESG news events in the same way they do to earnings announcements, after accounting for the events' financial implications.[20]

Collectively, our evidence presented in Table 7 highlights that there exists little relation between retail investor trading activity and companies' ESG performance, after accounting for the event's impact on stock return performance. We further illustrate this insight by plotting aggregate net demand (measured by buy-sell imbalances) around extreme events. Figure 4 illustrates that event-period retail investor buy-sell volume imbalance is more positive for events revealing extremely positive changes in financial performance (e.g., based on day-0 returns), regardless of whether the event reveals extremely positive or negative ESG performance information. In contrast, the event-period retail investor buy-sell volume imbalance is negative for events revealing extremely negative changes in financial performance, regardless of whether the event reveals extremely positive or negative ESG performance information. In line with our main analyses, this figure highlights that retail investor aggregate net demand at extreme ESG news events reflects pecuniary, rather than non-pecuniary, motives for trade. Overall, the results in this section are consistent with retail investors transacting around ESG news events for pecuniary rather than non-pecuniary reasons.

[20]In untabulated analyses, we perform the matched-pair analysis for subsamples of ESG events, by category, and continue to find statistically insignificant differences in abnormal retail buy-sell imbalance for these subsamples.

5. Additional Analyses

5.1. Cross-sectional Variation in Motivations for Retail Investor Trade

Our main results show that retail investors react to ESG news events, but primarily due to pecuniary motivations. To provide further insight into cross-sectional variation in these motivations for trade, we investigate how our results vary with retail investors' views on ESG investing. We use proxies for the prosocial nature and the political leanings of local investors, as prior studies highlight that they affect market participants' attitudes towards sustainable investments (e.g., Di Giuli and Kostovetsky, 2014; Larcker and Watts, 2020). Given our retail investor data is aggregate-level data, we follow prior studies' findings of a local tilt in investors' portfolios (e.g., Ivkovic and Weisbenner, 2005; Chi and Shanthikumar, 2017; Branikas, Hong, and Xu, 2020) and use variation in the location of the firm's headquarters.

Our proxy for investors' prosocial nature is the state-level average HIP Investor ESG rating for local governments (by census-designated places).[21] We divide states into high and low prosocial attitudes based on splits around the sample median of the constructed measure. Our proxy for political leanings is an indicator variable for whether the state predominantly voted Democratic in the 2020 presidential election. We estimate Equation (2) in the subsamples of events for firms headquartered in each of these subsamples. These regressions test whether our results hold in subsamples of investors potentially more likely to have non-pecuniary preferences. In addition, we explore whether pecuniary motivations for trade are stronger or weaker in states with investors that viewing sustainable investments in a more positive light (e.g., related to believing in climate change risk in Baldauf, Garlappi, and Yannelis, 2020).

Table 8 presents results. Panel A presents results from estimates using the dependent variable $RetailBSIVol$ and Panel B presents results using the dependent variable

[21] The rationale for this measure is that local governments likely reflect the beliefs of their constituents, so it serves as a proxy for investors' attitudes towards prosocial investment in these states. Consistent with this rationale, Larcker and Watts (2020) provides evidence that environmental indices correlate with state-level green securities issuance.

RetailBSINum. In each panel, columns 1 and 3 find that our results continue to hold in high ESG rating states and blue states, respectively. Even in these states, retail investors' non-pecuniary preferences toward social or environmental factors appears limited. Columns 2 and 4 also find no evidence that retail investor net demand varies with changes in ESG performance expectations at the event in low ESG rating and red states, respectively. Interestingly, the variation with event returns is also insignificant in the low ESG and red state subsamples, and a test of the difference in coefficients between columns 1 and 2 finds that the association between event-related changes in retail investor net demand and event returns is marginally significantly higher in high ESG rating states.[22] Thus, we find some evidence that retail investors react even more strongly to ESG events' implications for stock return performance in states with higher ESG scores.

5.2. Return Predictability

To provide further insight into the extent to which retail investors profit or suffer losses from trading, we assess whether net demand predicts future stock prices (e.g., Chordia and Subrahmanyam, 2004; Bushee and Goodman, 2007; Kelley and Tetlock, 2013).

Specifically, we test whether the future buy-and-hold returns over the window [+2,+60] trading days after the event are associated with aggregate retail investor net demand in the [-1,+1] trading-day window around each event. That is, we estimate the following regression using the sample of unique Firm-EventDate observations:

$$BHAR[+2,+60]_{i,e} = \beta_1 SignedRetailTrade[-1,+1]_{i,e} + \Sigma\beta_i Firm_i + \Sigma\beta_q YearQtr_q + \epsilon_{i,e}, \quad (3)$$

where $SignedRetailTrade[-1,+1]_{i,e}$ is the retail investor buy-sell imbalance for firm i in the [-1,+1] trading-day window around EventDate e. A positive β_1 indicates that retail investor

[22]The difference in coefficients across blue and red states is insignificant.

net demand predicts future abnormal returns; retail investor net selling predicts negative returns, and retail net buying predicts positive returns. Therefore, a positive β_1 suggests that retail investors make profitable trades around ESG news events.

Table 9 Panel A reports results of estimating Equation (3). Column 1 includes all events in our sample with available data used to compute $BHAR[+2, +60]$. The coefficient on $RetailBSIVol[-1, +1]$ is positive and significant, indicating that retail investors appear to profit when interpreting the information revealed by these events. As not all ESG events reveal information relevant for financial performance, we isolate the events with substantial financial performance information, defined based on SASB materiality mappings or extreme event returns.

Column 2 of Table 9 Panel A reveals a positive and significant coefficient in the sample of events containing financially material information based on the SASB Materiality Map. Column 3 shows a positive and significant coefficient in the sample of events with extreme event returns, defined as abnormal event returns in the top or bottom quintiles of the sample. Panel B repeats the same analyses with $RetailBSINum[-1, +1]$ as the independent variable, and it indicates similar results overall. As a falsification test, we also investigate whether retail investor aggregate net demand predicts returns in the remaining events not presented in columns 2 and 3 of each panel, those that are not financially material, and we find insignificant results (untabulated).

Collectively, these findings imply that retail investors' net demand related to ESG events predicts future returns, but only in the subsample of events revealing financially material information about firms. Our inference is that retail investors profit from processing the financial performance implications of ESG events, and our results are suggestive of retail investors using event returns as a proxy for the implications (e.g., Blankespoor et al., 2019). In contrast, the insignificant return predictability for non-financially material events mitigates alternative explanations for these results (e.g., measurement error in the identification of retail investor buys and sells).

5.3. Alternative Measures of Retail Trade

We assess the robustness of our inferences to alternative measures of retail buy-sell imbalance. First, we use an alternative buy-sell imbalance measure based on the assignment of buys and sells using the Lee-Ready algorithm (Lee and Ready, 1991), as suggested by Barber et al., 2023. Table 10 Panel A presents results using this alternative buy-sell imbalance measure for the tests described in Section and 4.5. We present results of estimating Equation (2). Consistent with our main results, aggregate net retail demand does not vary with ESG performance, but instead, it varies with information about stock return performance.

Second, we use an alternative, specific sample of retail investors, namely those using the Robinhood trading platform. These analyses provide the support that our inferences are robust to alternative samples of retail investor trading data which do not rely on the approach developed in Boehmer et al. (2021). Moreover, the Robinhood sample provides a potentially more powerful setting to test for non-pecuniary preferences for ESG-related activities among retail investors, as Robinhood investors tend to be younger.

Table 10 Panel B presents results using Robinhood data for the tests described in Section and 4.5.[23] We present results of estimating Equation (2). Aggregate net Robinhood demand does not vary with ESG performance, but instead, it varies with information about stock return performance.[24]

Overall, our findings across our main measure and alternative measures of retail trade provide consistent evidence that retail investors care about ESG-related factors, but only to the extent they have implications for their portfolios' financial performance. The consistency of results across different retail buy-sell classifications and different samples of retail investors (e.g., Robinhood) mitigates concerns about potential measurement error in the identification of retail investor trade.

[23] In untabulated analyses, we also re-estimate the other analyses reported in the paper with Robinhood data and find that our inferences are qualitatively unchanged.

[24] As the Robinhood data measure the change in the number of users holding the stock, this result suggests that new Robinhood users become owners of the stock.

5.4. Non-Market-Based Measures of Financial Materiality

Our main analyses described in Section 4.5 use equity returns and option prices to infer changes in the level and variance of future cash flows associated with the event. Nevertheless, we acknowledge that market-based measures could be affected by non-pecuniary motivations for trade from any segment of the market. For example, socially responsible institutional investors could apply upward pressure to prices around events revealing positive ESG performance.[25] In this case, these market-based measures might partially proxy for ESG performance rather than solely reflect risk-adjusted financial performance.

We provide further evidence on investors' trading activities using additional, non-market-based measures of financial materiality. To this end, we estimate unsigned versions of Equation (2) that interact $EventDay[-1,+1]$ with indicators suggesting that the event reveals more financially material information about the firm. Here, one alternative financial materiality proxy we use is whether the category of ESG news is material for the firm's industry, based on the SASB's Materiality Map.[26] The advantage of this proxy is that it is based on the ex-ante map between the category of the event and the company's industry, rather than on ex-post returns, but it still relates to stock performance. For instance, prior studies find return reactions are greatest for financially material events (e.g., Serafeim and Yoon, 2022a,b). A second alternative financial materiality proxy is whether any equity analysts revise their quarterly EPS forecasts on the day of or shortly after the event. These measures do not incorporate contemporaneous market prices and should only vary by the amount of financially material information revealed about the firm around the ESG news.

Table 11 Panel A reports results for regressions using the dependent variable $RetailVol$.

[25] We expect that the impact of such incentives should be small, as the number of assets strictly tracking ESG, outside of its impact on performance, remains small despite its growth in recent years. For instance, survey evidence suggests that despite its recent growth, only 18% of North American funds consider ESG a primary motivation in their investment approach, and among these, most use "ESG integration" approaches which seek to maximize portfolio performance (Capital Group, 2022). In the U.S., most fund managers are under strict fiduciary obligations to adhere to these principles.

[26] The SASB Materiality Map is based on feedback from practitioners about which ESG issues are financially material for each industry.

Columns 1 and 2 reveal that the retail investor response to ESG events is significantly more pronounced when the event's category is a material category for the industry, as defined by the SASB. An indicator that the event is financially material according to the SASB increases the change in retail investor trading volume by approximately one-half. Columns 3 and 4 show that the response is significantly more pronounced when an equity analyst revises their EPS forecast for the firm. The presence of an analyst revision roughly doubles the change in retail investor trading volume.

Panel B uses the dependent variable $RetailNum$. Columns 1 and 2 show a positive but insignificant coefficient on the interaction between $EventDay[-1,+1]$ and SASB Materiality, which suggests that larger retail investor trades may react more to financially material events, while smaller trades do not. Columns 3 and 4 show qualitatively similar results to those presented in Panel A; the retail investor response is more pronounced for events revealing financially material information, as proxied by changes in analysts' expectations. The presence of an analyst revision roughly triples the change in the number of retail investor trades. Overall, the results in this section corroborate our inference that retail investors react to ESG news to the extent it reveals financially material information about the firm.[27]

6. Conclusion

This paper explores how retail investors transact around ESG news events, their primary source of information about firms' ESG-related activities. We provide novel evidence that retail investors treat ESG-related news as a critical component of their portfolio allocation decisions. But, in contrast to the assumptions and findings of extant theoretical and exper-

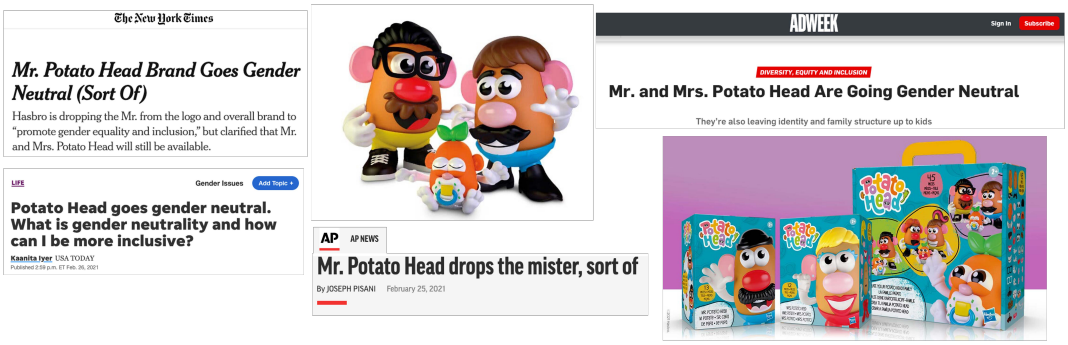
[27]We also conduct additional robustness tests to address potential measurement error in $PulseChange$ as a proxy for retail investors' perception of changes in ESG performance. First, while there could be measurement error in the magnitude of $PulseChange$, measurement error is less likely to impact our inferences when an event reveals extreme changes in ESG performance. Therefore, we assess event-related changes in retail investors' aggregate net demand around a set of events revealing extreme changes in ESG performance. In untabulated analyses, we estimate signed versions of Equation (2) in the subsample of events with $PulseChange$ in the top or bottom quintile, and we continue to find that retail investor net demand does not vary with ESG performance but does vary with financial performance (also see Figure 4).

imental studies, the extent to which a representative retail investor exhibits non-pecuniary preferences toward social or environmental factors appears limited. Our evidence is consistent with ESG information being "very important but nothing special" to retail investors (Edmans, 2023). Specifically, our findings indicate that retail investors view ESG news as important for their investment-decision making, but in the same light that they do any financial news signal.

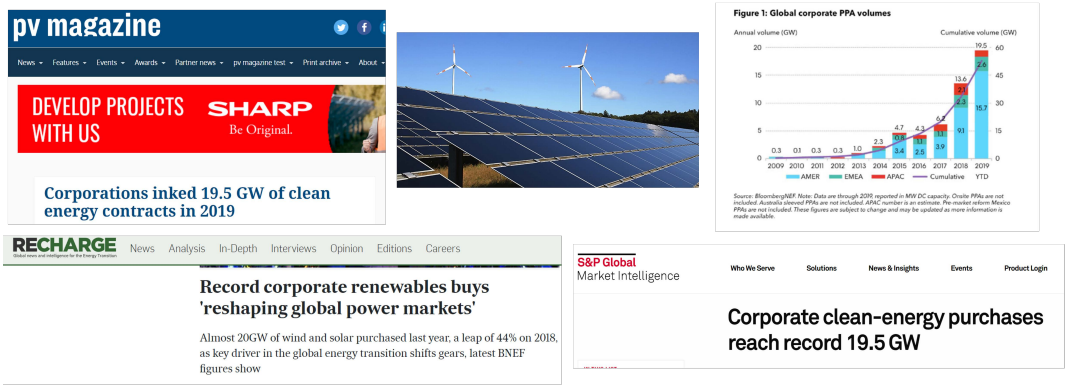
Our study should inform ongoing debates regarding considering ESG factors in retirement plans and mandated disclosures along several dimensions. We leave open how financially relevant ESG factors should be incorporated into retirement portfolio investments and how regulators should require ESG-related information to be disclosed.[28] Our findings highlight that these questions may be meaningful avenues for future research, given the importance of ESG-related information to retail investor decision-making.

[28]Relevant to future studies on how ESG-related information should be disclosed to help retail investors process them, our results are suggestive of event returns as one way in which retail investors infer the financial implications of ESG news, consistent with the findings in Blankespoor et al. (2019), but not necessarily the exclusive way.

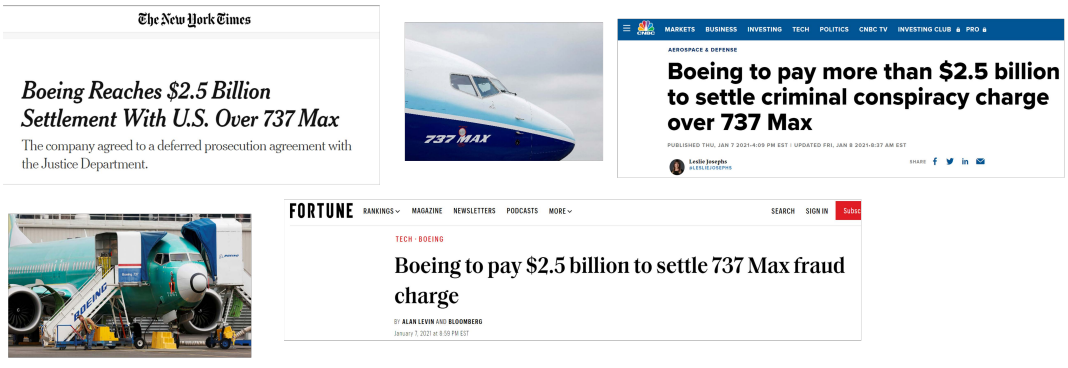
Appendix A. ESG News Event Examples



(a) Hasbro – Gender Neutral Potato Head Branding

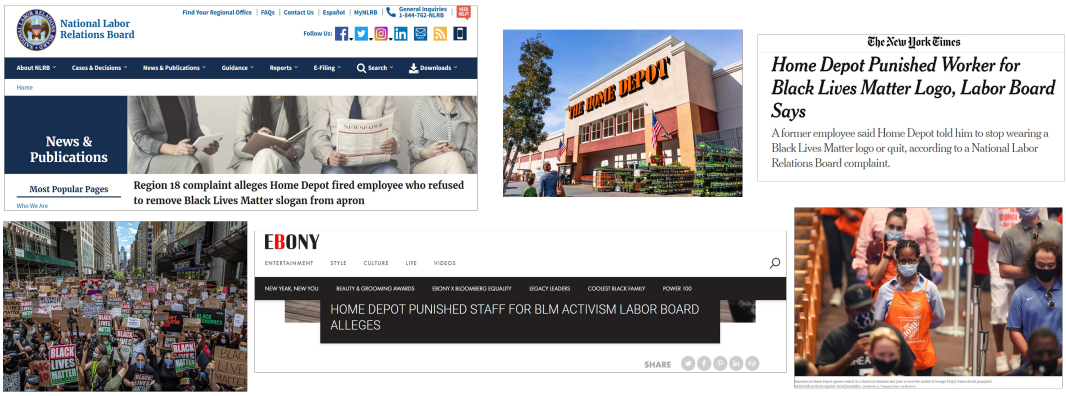


(b) Occidental Petroleum – Clean Energy Investment

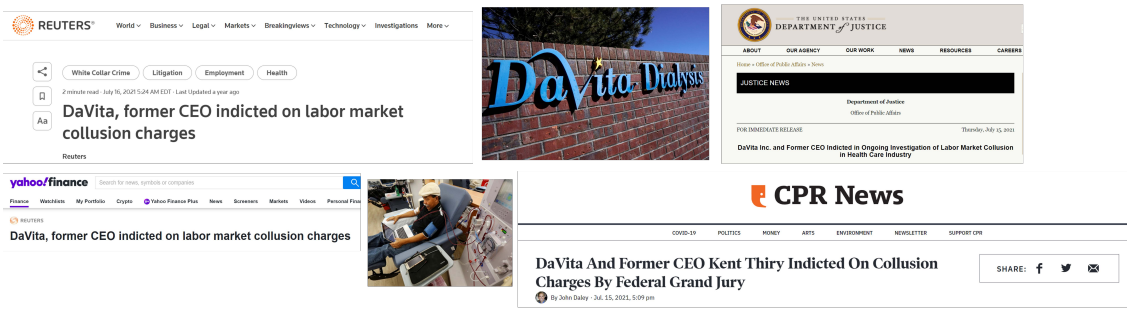


(c) Boeing – 737 MAX Conspiracy

Fig. A-1 Select ESG Events in the Sample.



(d) Home Depot – Black Lives Matter Controversies



(e) DaVita – Labor Market Collusion

Fig. A-1 Select ESG Events in the Sample (continued). This figure presents news clippings from several ESG events in our sample. Panel (a) presents an example of a high-ESG/high-financial performance event for Hasbro on 2/25/21, the adoption of more gender-inclusive branding. Panel (b) presents an example of a high-ESG/low-financial performance event for Occidental Petroleum on 1/28/20, the announcement of broader investment into clean energy. Panel (c) presents an example of a low-ESG/low-financial performance event for Boeing on 1/27/21, a large settlement with the Justice Department over the Boeing 737 MAX fraud. Panel (d) presents an example of a low-ESG/low-financial performance event for Home Depot on 8/16/21, an accusation of penalizing employees for their support of Black Lives Matter. Panel (e) presents an example of a low-ESG/low-financial performance event for DaVita on 7/15/21, an indictment by the Justice Department of labor market collusion charges.

Appendix B. Variable Definitions and Sources

This table contains definitions of the primary variables used throughout the paper. Variables include measures of individual investor trading activity, ESG performance, attention, financial performance, and headquarters variables. Sources include: Bloomberg terminal activity data (Bloomberg), the Center for Research in Security Prices (CRSP), Factset TruValue Labs Spotlight data (Factset), Google search volume data (Google), HIP Investor, MIT Election Lab, Thompson Reuters I/B/E/S (IBES), OptionMetrics historical option data (OptionMetrics), Robinhood investor information (Robintrack), and Intraday Indicators by WRDS (WRDS). All continuous variables, except return data, are winsorized at 1% and 99%.

Variable	**Definition**
	Event window variables
EventDate	The first trading date on or after the date of the ESG news event. (Factset)
EventDay[−1,+1]	Indicator variable equal to one if the firm-day is in the [−1,+1] trading-day window of the ESG news event. (Factset)
YearQtr	The calendar year-quarter of the EventDate. (Factset)
	Trading activity variables
Abn. RetailBSINum	Abnormal buy-sell imbalance in the number of retail trades, calculated as the average daily RetailBSINum across trading days [−1,+1] of the news event less the average across trading days [−20,−2] of the news event. (WRDS)
Abn. RetailBSIVol	Abnormal buy-sell retail investor trading volume imbalance, calculated as the average daily RetailBSIVol across trading days [−1,+1] of the news event less the average across trading days [−20,−2] of the news event. (WRDS)
RetailBSINum	Daily buy-sell imbalance in the number of retail trades, calculated as the difference between retail buys and retail sells, scaled by the sum of retail buys and retail sells. Retail buys and sells are based on TAQ data using the approach in Boehmer et al. (2021). (WRDS)
RetailBSINum_LR	Daily buy-sell imbalance in the number of retail trades, calculated as the difference between retail buys and retail sells, scaled by the sum of retail buys and retail sells. Retail buys and sells are based on TAQ data using the approach in Boehmer et al. (2021) to identify retail trades and the approach suggested by Barber et al. (2023) to classify buys and sells based on the Lee-Ready algorithm (Lee and Ready, 1991). (WRDS)
RetailBSINum[−1,+1]	Firm-event level sum of daily RetailBSINum across trading days [−1,+1] of the ESG news event. (WRDS)
RetailBSIVol	Daily buy-sell retail investor trading volume imbalance, calculated as the difference between retail buy volume and retail sell volume, scaled by the sum of retail buy volume and retail sell volume. Retail buy and sell volume are based on TAQ data using the approach in Boehmer et al. (2021). (WRDS)
RetailBSIVol_LR	Daily buy-sell retail investor trading volume imbalance, calculated as the difference between retail buy volume and retail sell volume, scaled by the sum of retail buy volume and retail sell volume. Retail buy and sell volume are based on TAQ data using the approach in Boehmer et al. (2021) to identify retail trades and the approach suggested by Barber et al. (2023) to classify buys and sells based on the Lee-Ready algorithm (Lee and Ready, 1991). (WRDS)
RetailBSIVol[−1,+1]	Firm-event level sum of daily RetailBSIVol across trading days [−1,+1] of the ESG news event. (WRDS)

RetailNum	Daily number of retail trades, based on TAQ data using the approach in Boehmer et al. (2021) and measured in thousands of trades. (WRDS)
RetailVol	Daily retail investor trading volume, based on TAQ data using the approach in Boehmer et al. (2021) and measured in millions of shares. (WRDS)
RHUsers_Change	Daily change in the number of Robinhood users holding the stock, based on Robinhood users in the last hour available on days t and $t-1$ and measured in thousands. (Robintrack)
	Attention variables
Bloomberg AIA	Firm-event level average of BloombergAIA_Daily across trading days [−1,+1] of the ESG news event. (Bloomberg)
BloombergAIA_Daily	Daily Abnormal Institutional Investor Attention based on Bloomberg terminal activity, normalized for each firm and ranging from 0 to 4. (Bloomberg)
Google Search	Firm-event level average of GoogleSearch_Daily across trading days [−1,+1] of the ESG news event. (Google)
GoogleSearch_Daily	Daily Abnormal Google search volume index based on Google searches for the firm's ticker, normalized for each firm and ranging from 0 to 100. (Google)
Media Coverage	Firm-event level total number of media articles in the spotlight. (Factset)
	ESG variables
Bus.Mod.	ESG news event category Business Model and Innovation, which covers Product Design & Lifecycle Management, Business Model Resilience, Supply Chain Management, Materials Sourcing & Efficiency, and Physical Impacts of Climate Change. (Factset)
Env.	ESG news event category Environment, which covers GHG Emissions, Air Quality, Energy Management, Water & Wastewater Management, Waste & Hazardous Materials Management, and Ecological Impacts. (Factset)
Hum.Cap.	ESG news event category Human Capital, which covers Labor Practices, Employee Health & Safety, and Employee Engagement, Diversity & Inclusion. (Factset)
Ldr.Gov.	ESG news event category Leadership and Governance, which covers Business Ethics, Competitive Behavior, Management of the Legal & Regulatory Environment, Critical Incident Risk Management, and Systemic Risk Management. (Factset)
PulseChange	Change in the firm's Pulse score associated with the ESG news event, measured as the mean Pulse during the event period less the Pulse at end-of-day on the day before the first article date. Pulse measures the firm's real-time performance in the ESG category and ranges from 0 to 100. (Factset)
Soc.Cap.	ESG news event category Social Capital, which covers Human Rights & Community Relations, Customer Privacy, Data Security, Access & Affordability, Product Quality & Safety, Customer Welfare, and Selling Practices & Product Labeling. (Factset)
	Financial variables
Analyst Revision	Indicator variable equal to one if a securities analyst makes a quarterly EPS forecast revision in the 5-trading-day period beginning on the ESG news event date. (IBES)

BHAR[+2,+60]	Buy-and-hold abnormal returns after the ESG news event, measured as firm's buy-and-hold return in the [+2,+60] trading-day window less the buy-and-hold value-weighted market return over the same window. (CRSP)
EventRet	Cumulative abnormal returns around the ESG news event, measured as the sum across the [−1,+1] trading-day window of the daily return less the daily value-weighted market return. (CRSP)
SASB Materiality	Indicator variable equal to one if the ESG news event category is financially material for the firm, based on the SASB's Materiality Map. (Factset)
	Headquarters state variables
Blue State	Indicator variable equal to one if the firm's headquarters are in a state that voted predominantly Democratic in the 2020 presidential election. (MIT Election Lab)
High ESG State	Indicator variable equal to one if the ESG rating for the local government agencies in the firm's headquarters state is above the sample median. This rating aggregates the government's performance in health, wealth, equality, earth, and trust. (HIP Investor)
Low ESG State	Indicator variable equal to one if the ESG rating for the local government agencies in the firm's headquarters state is below the sample median. This rating aggregates the government's performance in health, wealth, equality, earth, and trust. (HIP Investor)
Red State	Indicator variable equal to one if the firm's headquarters are in a state that voted predominantly Republican in the 2020 presidential election. (MIT Election Lab)

References

Ackerman, A., Wise, L., 2023. Senate Votes 50-46 to Reverse ESG Rule for Retirement Funds. Wall Street Journal.

Azizuddin, K., 2023. EU regulator adds double materiality to pension fund rules. Responsible Investor.

Bailey, M., Glaeser, S., Omartian, J. D., Raghunandan, A., 2022. Misreporting of Mandatory ESG Disclosures: Evidence from Gender Pay Gap Information. University of Michigan, University of North Carolina at Chapel Hill, and London School of Economics.

Baker, A. C., Larcker, D. F., McClure, C., Saraph, D., Watts, E. M., 2022a. Diversity Washing. Unpublished working paper. Berkeley Law School, Stanford University, University of Chicago, Jump Trading, and Yale School of Management.

Baker, M., Egan, M., Sarkar, S. K., 2022b. How Do Investors Value ESG? Unpublished working paper. Harvard University.

Baker, M. P., Bergstresser, D. B., Serafeim, G., Wurgler, J. A., 2022c. The Pricing and Ownership of U.S. Green Bonds. Annual Review of Financial Economics 14, 415–437.

Baldauf, M., Garlappi, L., Yannelis, C., 2020. Does climate change affect real estate prices? only if you believe in it. Review of Financial Studies 33, 1256–1295.

Barber, B. M., Huang, X., Jorion, P., Odean, T., Schwarz, C., 2023. A (Sub)penny For Your Thoughts: Tracking Retail Investor Activity in TAQ. Unpublished working paper. UC Irvine, UC Davis,Washington University in St. Louis, and UC Berkeley.

Barber, B. M., Huang, X., Odean, T., Schwarz, C., 2022. Attention-Induced Trading and Returns: Evidence from Robinhood Users. The Journal of Finance 77, 3141–3190.

Barber, B. M., Morse, A., Yasuda, A., 2021. Impact Investing. Journal of Financial Economics 139, 162–185.

Barber, B. M., Odean, T., 2013. The Behavior of Individual Investors. Handbook of the Economics of Finance 2, 1533–1570.

Bauer, R., Ruof, T., Smeets, P., 2021. Get Real! Individuals Prefer More Sustainable Investments. Review of Financial Studies 34, 3976–4043.

Ben-Rephael, A., Da, Z., Israelsen, R. D., 2017. It Depends on Where You Search: Institutional Investor Attention and Underreaction to News. The Review of Financial Studies 30, 3009–3047.

Berg, F., Koelbel, J. F., Pavlova, A., Rigobon, R., 2021. ESG Confusion and Stock Returns: Tackling the Problem of Noise. Unpublished working paper. MIT Sloan School of Management, University of Zurich, and London Business School.

Berg, F., Kölbel, J. F., Rigobon, R., 2022. Aggregate Confusion: The Divergence of ESG Ratings. Review of Finance 26, 1315–1344.

Blankespoor, E., deHaan, E., Marinovic, I., 2020. Disclosure processing costs, investors' information choice, and equity market outcomes: A review. Journal of Accounting and Economics 70.

Blankespoor, E., deHaan, E., Wertz, J., Zhu, C., 2019. Why Do Individual Investors Disregard Accounting Information? The Roles of Information Awareness and Acquisition Costs. Journal of Accounting Research 57, 53–84.

Blankespoor, E., deHaan, E., Zhu, C., 2018. Capital Market Effects of Media Synthesis and Dissemination: Evidence from Robo-journalism. Review of Accounting Studies 23, 1–36.

Boehmer, E., Jones, C. M., Zhang, X., Zhang, X., 2021. Tracking Retail Investor Activity. Journal of Finance 76, 2249–2305.

Branikas, I., Hong, H., Xu, J., 2020. Location choice, portfolio choice. Journal of Financial Economics 138, 74–94.

Bushee, B., Cedergren, M., Michels, J., 2020. Does the media help or hurt retail investors during the IPO quiet period? Journal of Accounting and Economics 69, 101261.

Bushee, B. J., Goodman, T. H., 2007. Which institutional investors trade based on private information about earnings and returns? Journal of Accounting Research 45, 289–321.

Campbell, B., Drake, M., Thornock, J., Twedt, B., 2023. Earnings Virality. Journal of Accounting and Economics 75.

Capital Group, 2022. ESG Global Study 2022.

CFA Institute, 2020. Future of Sustainability in Investment Management. CFA Institute pp. 1–60.

Chen, Y. C., Hung, M., Wang, Y., 2018. The effect of mandatory CSR disclosure on firm profitability and social externalities: Evidence from China. Journal of Accounting and Economics 65, 169–190.

Chi, S. S., Shanthikumar, D. M., 2017. Local bias in google search and the market response around earnings announcements. Accounting Review 92, 115–143.

Choi, D., Gao, Z., Jiang, W., 2020. Attention to Global Warming. Review of Financial Studies 33, 1112–1145.

Choi, J. J., Robertson, A. Z., 2020. What Matters to Individual Investors? Evidence from the Horse's Mouth. Journal of Finance. In Press.

Chordia, T., Subrahmanyam, A., 2004. Order Imbalance and Individual Stock Returns: Theory and Evidence. Journal of Financial Economics 72, 485–518.

Christensen, H. B., Floyd, E., Liu, L. Y., Maffett, M., 2017. The real effects of mandated information on social responsibility in financial reports: Evidence from mine-safety records. Journal of Accounting and Economics 64, 284–304.

Da, Z., Engelberg, J., Gao, P., 2011. In Search of Attention. Journal of Finance 66, 1461–1499.

Department of Labor, 2020. Financial Factors in Selecting Plan Investments. Federal Register 85.

Department of Labor, 2022. Prudence and Loyalty in Selecting Plan Investments and Exercising Shareholder Rights. Federal Register 87.

Di Giuli, A., Kostovetsky, L., 2014. Are red or blue companies more likely to go green? Politics and corporate social responsibility. Journal of Financial Economics 111, 158–180.

Drake, M. S., Roulstone, D. T., Thornock, J. R., 2012. Investor Information Demand: Evidence from Google Searches Around Earnings Announcements. Journal of Accounting Research 50, 1001–1040.

Edmans, A., 2023. The end of ESG. Financial Management 52, 3–17.

Engler, H., 2022. "Double materiality": New legal concept likely to play in debate over SEC's climate plan. Thomas Reuters.

Fisch, J., 2022. The SEC's Authority to Pursue Climate-Related Disclosure. Harvard Law School Forum on Corporate Governance.

Flammer, C., 2021. Corporate Green Bonds. Journal of Financial Economics 142, 499–516.

Friedman, H. L., Heinle, M. S., 2016. Taste, information, and asset prices: implications for the valuation of CSR. Review of Accounting Studies 21, 740–767.

Geczy, C., Stambaugh, R. F., Levin, D., 2005. Investing in Socially Responsible Mutual Funds. Unpublished working paper. University of Pennsylvania.

Gibson, C., Sawyer, F., 2023. 2023 Statehouse Report: Right-Wing Attacks on the Freedom to Invest Responsibly Falter in Legislatures. Pleiades Strategy.

Giglio, S., Maggiori, M., Stroebel, J., Tan, Z., Utkus, S., Xu, X., 2023. Four Facts About ESG Beliefs and Investor Portfolios. Unpublished working paper. Yale School of Management, Stanford Graduate School of Business, New York University, University of Pennsylvania, and Vanguard.

Goldberg, E. S., Dial, L. C., Mann, R., 2022. The State of Anti-ESG State Legislation. Morgan Lewis.

Haber, S. H., Kepler, J. D., Larcker, D. F., Seru, A., Tayan, B., 2022. ESG Investing: What Shareholders do Fund Managers Represent? Stanford Closer Look Series pp. 1–14.

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

Heeb, F., Kolbel, J., Paetzold, F., Zeisberger, S., 2023. Do Investors Care About Impact? Review of Financial Studies 36, 1737–1787.

Hirshleifer, D., Teoh, S. H., 2003. Limited attention, information disclosure, and financial reporting. Journal of Accounting and Economics 36, 337–386.

Hirshleifer, D. A., Myers, J. N., Myers, L. A., Teoh, S. H., 2008. Do Individual Investors Cause Post-earnings Announcement Drift? Direct Evidence from Personal Trades. The Accounting Review 83, 1521–1550.

Hong, H., Kacperczyk, M., 2009. The Price of Sin: The Effects of Social Norms on Markets. Journal of Financial Economics 93, 15–36.

Ivkovic, Z., Weisbenner, S., 2005. Local does as local is: Information content of the geography of individual investors' common stock investments. Journal of Finance 60, 267–306.

Kaniel, R., Liu, S., Saar, G., Titman, S., 2012. Individual Investor Trading and Return Patterns around Earnings Announcements. Journal of Finance 67, 639–680.

Karpoff, J. M., Litan, R., Schrand, C., Weil, R. L., 2022. What ESG-Related Disclosures Should the SEC Mandate? Financial Analysts Journal 78, 9–18.

Kelley, E. K., Tetlock, P. C., 2013. How Wise Are Crowds? Insights from Retail Orders and Stock Returns. Journal of Finance 68, 1229–1265.

Kim, S., Yoon, A., 2023. Analyzing Active Managers' Commitment to ESG: Evidence from United Nations Principles for Responsible Investment. Management Science 69, 741–758.

Krüger, P., 2015. Corporate Goodness and Shareholder Wealth. Journal of Financial Economics 115, 304–329.

Larcker, D. F., Pomorski, L., Tayan, B., Watts, E. M., 2022. ESG Ratings: A Compass without Direction (Stanford Business) pp. 1–16.

Larcker, D. F., Watts, E. M., 2020. Where's the Greenium? Journal of Accounting and Economics 69.

Lawrence, A., Ryans, J., Sun, E., Laptev, N., 2018. Earnings announcement promotions: A Yahoo Finance field experiment. Journal of Accounting and Economics 66, 399–414.

Lawrence, A., Ryans, J. P., Sun, E. Y., 2017. Investor demand for sell-side research. The Accounting Review 92, 123–149.

Lee, C. M., 1992. Earnings News and Small Traders. An Intraday Analysis. Journal of Accounting and Economics 15, 265–302.

Lee, C. M. C., Ready, M. J., 1991. Inferring Trade Direction from Intraday Data. The Journal of Finance 46, 733–746.

Lys, T., Naughton, J. P., Wang, C., 2015. Signaling through corporate accountability reporting. Journal of Accounting and Economics 60, 56–72.

Malmendier, U., Shanthikumar, D., 2007. Are Small Investors Naive about Incentives? Journal of Financial Economics 85, 457–489.

Manchiraju, H., Rajgopal, S., 2017. Does Corporate Social Responsibility (CSR) Create Shareholder Value? Evidence from the Indian Companies Act 2013. Journal of Accounting Research 55, 1257–1300.

Martin, P. R., Moser, D. V., 2016. Managers' Green Investment Disclosures and Investors' Reaction. Journal of Accounting and Economics 61, 239–254.

Michels, J., 2022. Retail Investor Trade and the Pricing of Earnings. University of Pennsylvania.

Morgan Stanley, 2017. Sustainable Signals. Morgan Stanley Institute for Sustainable Investing.

Moss, A., Naughton, J. P., Wang, C., 2023. The Irrelevance of ESG Disclosure to Retail Investors: Evidence from Robinhood. Management Science In Press.

Mottola, G., Valdes, O., Ganem, R., Fontes, A., Lush, M., 2022. Investors Say They Can Change the World, If They Only Knew How: Six Things to Know about ESG and Retail Investors. FINRA Investor Education Foundation pp. 1–13.

Norton Rose Fulbright, 2022. Greenwashing Disputes on the Rise.

Norton Rose Fulbright, 2023. "Double materiality": What does it mean for non-financial reporting?

Painter, M., 2020. An Inconvenient Cost: The Effects of Climate Change on Municipal Bonds. Journal of Financial Economics 135, 468–482.

Pastor, L., Stambaugh, R. F., Taylor, L. A., 2021. Sustainable investing in equilibrium. Journal of Financial Economics 142, 550–571.

Pastor, L., Stambaugh, R. F., Taylor, L. A., 2022. Dissecting Green Returns. Journal of Financial Economics 146, 403–424.

Pastor, L., Stambaugh, R. F., Taylor, L. A., 2023. Green Tilts. Unpublished working paper. University of Chicago and University of Pennsylvania.

Pedersen, L. H., Fitzgibbons, S., Pomorski, L., 2021. Responsible Investing: The ESG-efficient Frontier. Journal of Financial Economics 142, 572–597.

Peress, J., 2014. The Media and the Diffusion of Information in Financial Markets: Evidence from Newspaper Strikes. Journal of Finance 69, 2007–2043.

Posner, C., 2022. The Ongoing Debate at the SEC on Climate Disclosure Rules. Harvard Law School Forum on Corporate Governance.

Raghunandan, A., Rajgopal, S., 2022. Do ESG Funds Make Stakeholder-friendly Investments? Review of Accounting Studies 27, 822–863.

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

SEC, 2022. The Enhancement and Standardization of Climate-Related Disclosures for Investors.

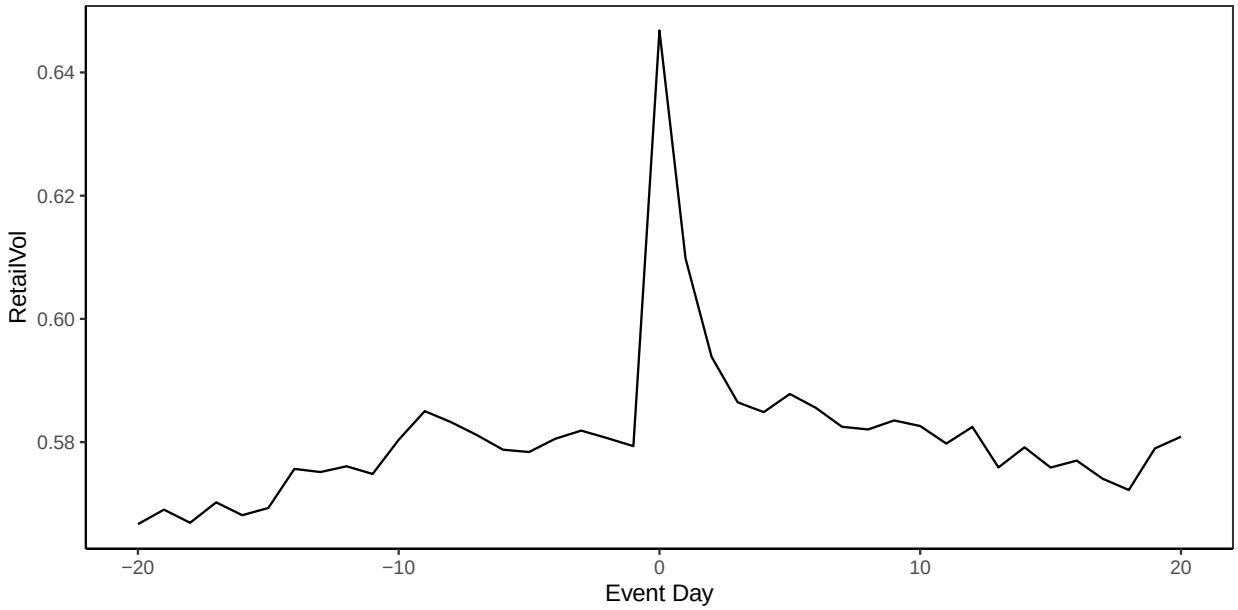
Serafeim, G., Yoon, A., 2022a. Stock price reactions to ESG news: the role of ESG ratings and disagreement. Review of Accounting Studies. In Press.

Serafeim, G., Yoon, A., 2022b. Which Corporate ESG News Does the Market React To? Financial Analysts Journal 78, 59–78.

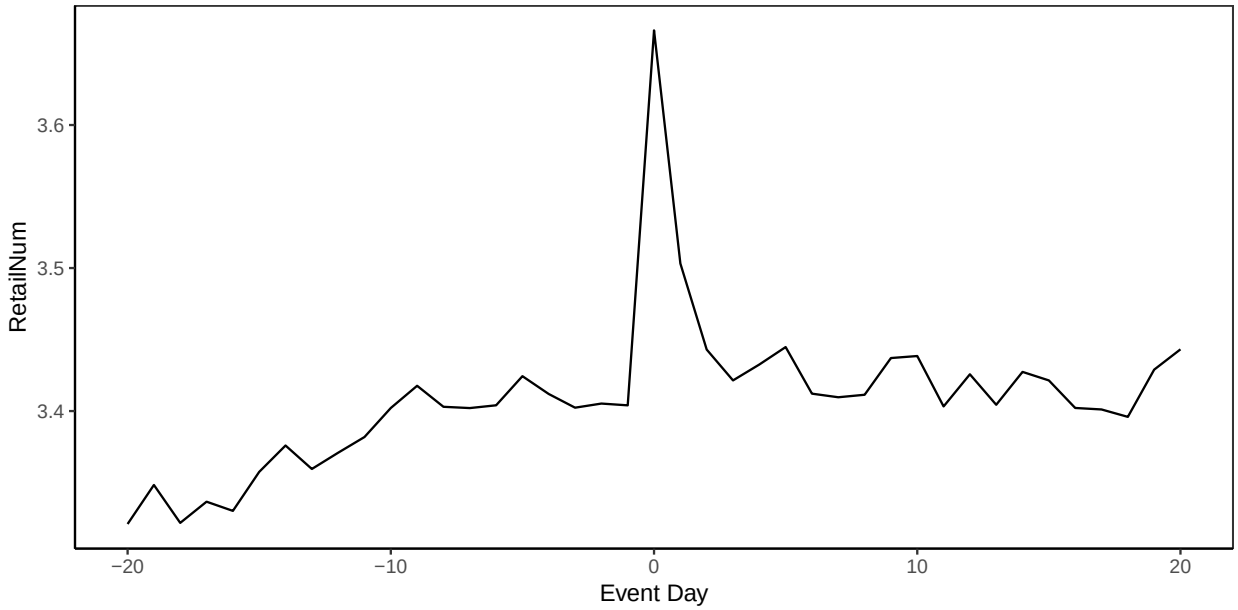
Vallette, J. M., Gray, K. M., 2022. SEC's Climate Risk Disclosure Proposal Likely to Face Legal Challenges. Harvard Law School Forum on Corporate Governance.

Wayne Wong v. NYCERS, T., BERS, 2023. Wayne Wong v. NYCERS, TRS and BERS. New York Supreme Court 652297/202.

Welch, I., 2022. The Wisdom of the Robinhood Crowd. Journal of Finance 77, 1489–1527.

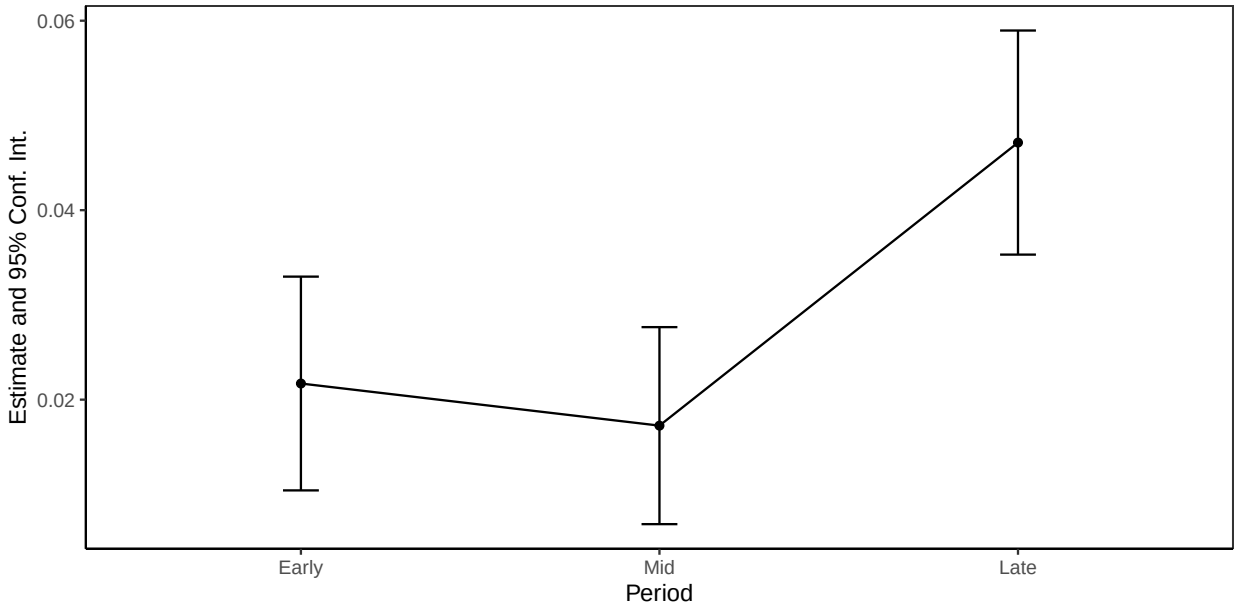


(a) RetailVol

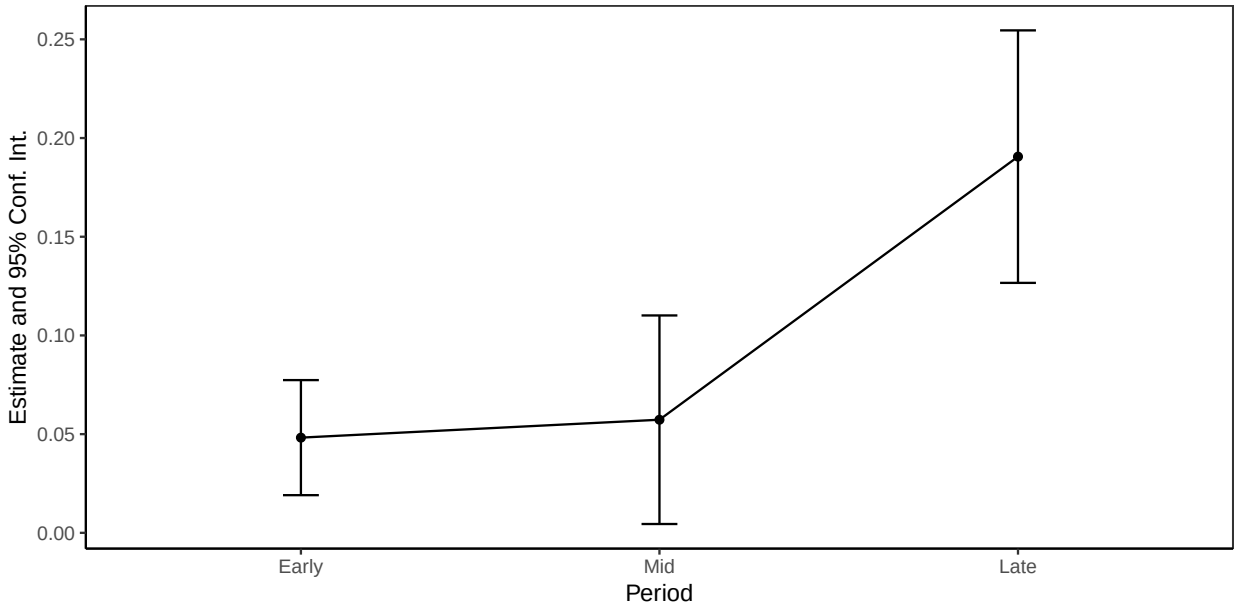


(b) RetailNum

Fig. 1 Retail Trading Activity in Event-Time. This figure presents daily average retail investor trading activity in the [−20,+20] window around our sample of ESG news events. Panel (a) presents results for $RetailVol$. Panel (b) presents results for $RetailNum$.

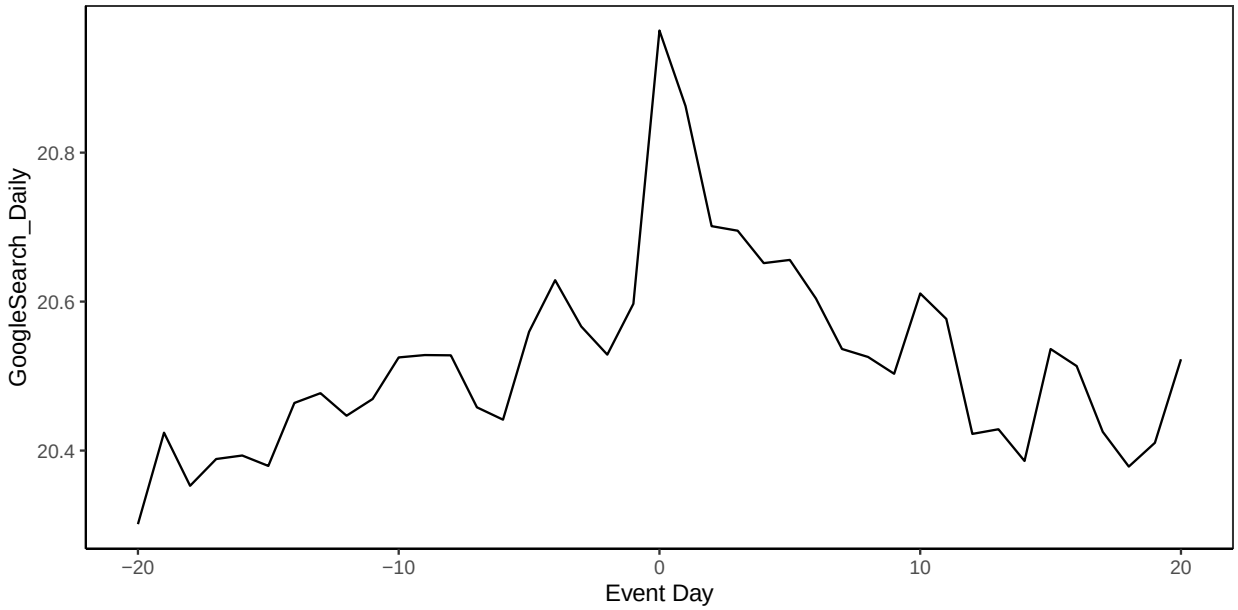


(a) RetailVol

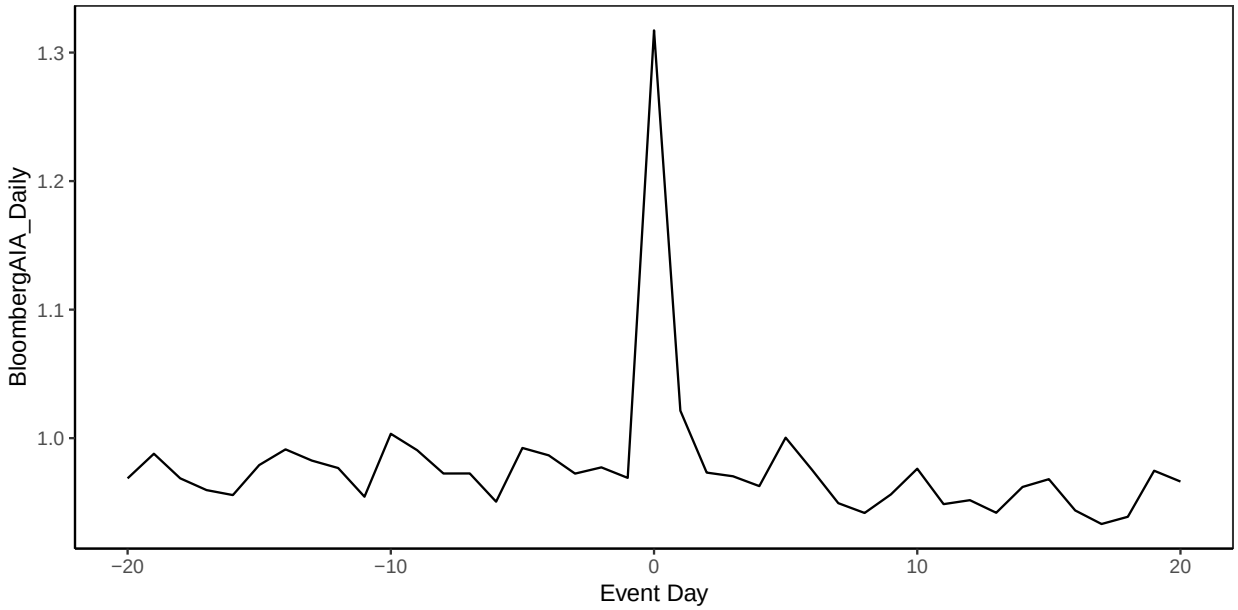


(b) RetailNum

Fig. 2 Coefficient Plots for Events in the Early, Mid, and Late Periods of the Sample. This figure presents the coefficient on $EventDay[-1,+1]$ in estimations of Equation (1) over different sample periods. The sample is divided into three equal time periods. The Early period includes events occurring between 12/16/15 and 03/02/18, the Mid period includes events occurring between 03/03/18 and 05/18/20, and the Late period includes events occurring between 05/19/20 and 08/05/2022. Panel (a) presents the coefficients for regressions using the dependent variable $RetailVol$. Panel (b) presents the coefficients for regressions using the dependent variable $RetailNum$. The vertical error bars around the coefficients reflect the 95% confidence intervals.



(a) Google Search



(b) Bloomberg AIA

Fig. 3 Attention in Event-Time. This figure presents daily average attention in the [−20,+20] window around our sample of ESG news events. Panel (a) presents results for *GoogleSearch_Daily*. Panel (b) presents results for *BloombergAIA_Daily*.

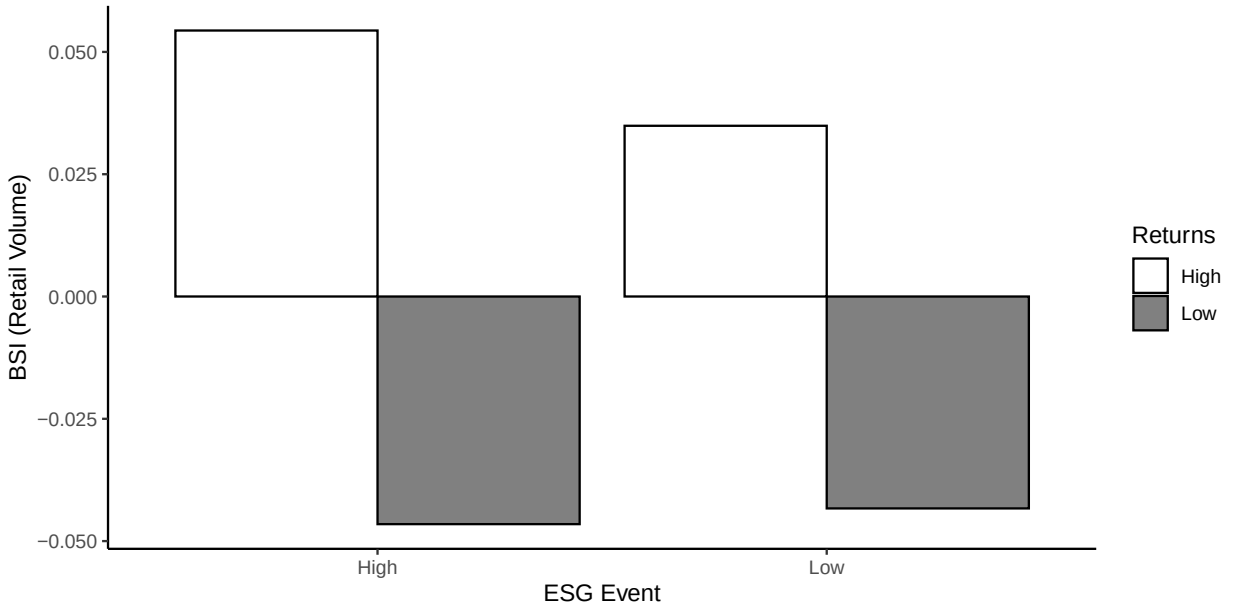


Fig. 4 Retail Buy-Sell Imbalance for Events Revealing Extreme ESG and Financial Performance. This figure presents the average of daily $RetailBSIVol$ over the [-1,+1] window in four subsamples of events, with each subsample containing events reflecting both extreme changes in ESG performance and extreme changes in financial performance. From left to right: High ESG and High Returns, High ESG and Low Returns, Low ESG and High Returns, and Low ESG and Low Returns. High (Low) ESG events are defined as events with extremely high (low) $PulseChange$, defined as $PulseChange$ and in the top (bottom) quintile across events with positive (negative) $PulseChange$. High (Low) Returns events are defined as events with extremely high (low) returns, defined as day-0 returns in the top (bottom) quintile across events with positive (negative) day-0 returns.

Table 1
Descriptive Statistics

Panel A: Summary Statistics

	Mean	StDev	$p^{25\%}$	$p^{50\%}$	$p^{75\%}$	Obs.
Firm-EventDate-Date variables						
BloombergAIA_Daily	0.978	1.455	0.000	0.000	2.000	1,543,422
GoogleSearch_Daily	20.521	25.141	0.000	7.310	39.330	1,866,309
RetailBSINum	0.021	0.152	-0.053	0.023	0.099	2,220,704
RetailBSINum_LR	0.040	0.185	-0.061	0.048	0.152	2,194,418
RetailBSIVol	-0.011	0.208	-0.106	-0.005	0.087	2,220,704
RetailBSIVol_LR	-0.016	0.241	-0.129	-0.004	0.102	2,194,418
RetailNum	3.409	9.259	0.204	0.640	2.127	2,220,704
RetailVol	0.581	1.602	0.022	0.077	0.324	2,220,704
RHUsers_Change	0.092	0.497	-0.005	0.000	0.013	796,730
Firm-EventDate variables						
Analyst Revision	0.432	0.495	0.000	0.000	1.000	54,199
BHAR[+2,+60]	0.006	0.280	-0.112	-0.011	0.091	54,132
Bloomberg AIA	1.105	1.180	0.000	0.667	2.000	39,443
Bus.Mod.	0.244	0.430	0.000	0.000	0.000	54,199
EventRet	0.004	0.095	-0.020	-0.000	0.020	54,199
Env.	0.234	0.423	0.000	0.000	0.000	54,199
Google Search	20.838	24.375	0.000	9.800	39.010	45,558
Hum.Cap.	0.188	0.391	0.000	0.000	0.000	54,199
Ldr.Gov.	0.198	0.399	0.000	0.000	0.000	54,199
Media Coverage	7.407	12.193	2.000	3.000	7.000	54,199
PulseChange	1.222	16.531	-5.390	0.180	7.137	54,199
RetailBSINum[-1,+1]	0.068	0.321	-0.100	0.067	0.237	54,199
RetailBSIVol[-1,+1]	-0.032	0.363	-0.211	-0.017	0.156	54,199
Soc.Cap.	0.332	0.471	0.000	0.000	1.000	54,199
SASB Materiality	0.629	0.483	0.000	1.000	1.000	54,199

Panel B: Correlation Table for ESG and Financial Performance Measures

	[1]	[2]
[1] EventRet		0.021***
[2] PulseChange	0.015***	

This table presents descriptive statistics for our sample. Panel A presents summary statistics of variables measured at the Firm-EventDate-Date level and variables measured at the Firm-EventDate level. Panel B presents Pearson (Spearman) correlations for signed ESG performance and financial performance measures below (above) the diagonal. All variables are defined in Appendix B. All continuous variables, except returns, are winsorized at the 1% and 99% levels to limit the influence of outliers. In Panel B, levels of significance are presented as follows: *p<0.1; **p<0.05; ***p<0.01.

Table 2
Retail Investor Response to ESG News

Panel A: Volume

	RetailVol			
	(1)	(2)	(3)	(4)
EventDay[-1,+1]	0.033***	0.033***	0.033***	0.033***
	(8.248)	(8.250)	(8.259)	(8.259)
EventDate fixed effects	No	Yes	No	No
Firm fixed effects	No	No	Yes	No
Firm-EventDate fixed effects	No	No	No	Yes
R^2	0.000	0.033	0.612	0.838
Observations	2,220,704	2,220,704	2,220,704	2,220,704

Panel B: Number of Trades

	RetailNum			
	(1)	(2)	(3)	(4)
EventDay[-1,+1]	0.125***	0.125***	0.125***	0.125***
	(5.932)	(5.929)	(5.943)	(5.943)
EventDate fixed effects	No	Yes	No	No
Firm fixed effects	No	No	Yes	No
Firm-EventDate fixed effects	No	No	No	Yes
R^2	0.000	0.044	0.667	0.888
Observations	2,220,704	2,220,704	2,220,704	2,220,704

This table presents an analysis of retail investors' trading response to ESG news events. We estimate multiple versions of Equation (1) using unique Firm-EventDate-Date observations on days −20 to +20 around each Firm-EventDate. Panel A uses the dependent variable *RetailVol* and Panel B uses the dependent variable *RetailNum*. All variables are defined in Appendix B. All continuous variables, except returns, are winsorized at the 1% and 99% levels to limit the influence of outliers. *t*-statistics based on standard errors clustered by Firm and EventDate are in parentheses. Levels of significance are presented as follows: *p<0.1; **p<0.05; ***p<0.01.

Table 3
Retail Investor Reactions to ESG News and Financial News

Panel A: Volume

	RetailVol						
	ESG	All	Earnings	Analyst	Dividends	Guidance	M&A
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
EventDay[-1,+1]	0.033***	0.041***	0.089***	0.008***	0.006***	0.088***	0.210***
	(8.259)	(22.990)	(25.105)	(6.541)	(4.023)	(12.963)	(10.002)
Coef. Diff. (ESG - Financial)		-0.008*	-0.055***	0.026***	0.027***	-0.055***	-0.177***
Firm-EventDate fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.838	0.859	0.793	0.859	0.913	0.876	0.798
Observations	2,220,704	7,995,762	2,657,435	3,629,598	939,624	992,252	104,617

Panel B: Number of Trades

	RetailNum						
	ESG	All	Earnings	Analyst	Dividends	Guidance	M&A
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
EventDay[-1,+1]	0.125***	0.148***	0.317***	0.033***	0.032***	0.343***	0.588***
	(5.943)	(23.386)	(26.096)	(6.889)	(3.303)	(12.162)	(9.949)
Coef. Diff. (ESG - Financial)		-0.023	-0.192***	0.092***	0.093***	-0.218***	-0.463***
Firm-EventDate fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.888	0.896	0.842	0.893	0.923	0.900	0.848
Observations	2,220,704	7,995,762	2,657,435	3,629,598	939,624	992,252	104,617

This table presents an analysis of retail investors' trading response to ESG news events and several types of financial news events, earnings announcements, analyst forecasts, dividend announcements, management guidance, and M&A announcements. For all types of events except earnings announcements, we remove the events in the [−1,+1] window around earnings announcements. We estimate multiple versions of Equation (1) using unique Firm-EventDate-Date observations on days −20 to +20 around each Firm-EventDate for ESG news events and financial news events. The table also presents the differences in coefficients between ESG news events and financial news events (i.e., compares column 1 to each of the other columns) and indicates the significance of the difference using Z-tests. Panel A uses the dependent variable $RetailVol$ and Panel B uses the dependent variable $RetailNum$. All variables are defined in Appendix B. All continuous variables, except returns, are winsorized at the 1% and 99% levels to limit the influence of outliers. t-statistics based on standard errors clustered by Firm and EventDate are in parentheses. Levels of significance are presented as follows: *p<0.1; **p<0.05; ***p<0.01.

Table 4
Retail Investor Response to ESG News (by Category)

Panel A: Volume

	RetailVol				
	Env.	Soc.Cap.	Hum.Cap.	Bus.Mod.	Ldr.Gov.
	(1)	(2)	(3)	(4)	(5)
EventDay[-1,+1]	0.018***	0.048***	0.013**	0.031***	0.055***
	(3.514)	(6.202)	(2.461)	(5.120)	(8.475)
Firm-EventDate fixed effects	Yes	Yes	Yes	Yes	Yes
R^2	0.843	0.808	0.864	0.882	0.853
Observations	519,337	737,383	418,582	542,417	440,461

Panel B: Number of Trades

	RetailNum				
	Env.	Soc.Cap.	Hum.Cap.	Bus.Mod.	Ldr.Gov.
	(1)	(2)	(3)	(4)	(5)
EventDay[-1,+1]	0.071***	0.176***	0.065**	0.125***	0.218***
	(2.687)	(4.958)	(2.178)	(4.056)	(5.983)
Firm-EventDate fixed effects	Yes	Yes	Yes	Yes	Yes
R^2	0.905	0.870	0.895	0.918	0.913
Observations	519,337	737,383	418,582	542,417	440,461

This table presents an analysis of retail investors' response to ESG news events, by category of ESG news. Using unique Firm-EventDate-Date observations on days −20 to +20 around each Firm-EventDate, we estimate Equation (1) in subsamples of events in different SASB categories: Environment (Env.), Social Capital (Soc.Cap.), Human Capital (Hum.Cap.), Business Model and Innovation (Bus.Mod.), and Leadership and Governance (Ldr.Gov.). Panel A uses the dependent variable $RetailVol$ and Panel B uses the dependent variable $RetailNum$. All variables are defined in Appendix B. All continuous variables, except returns, are winsorized at the 1% and 99% levels to limit the influence of outliers. t-statistics based on standard errors clustered by Firm and EventDate are in parentheses. Levels of significance are presented as follows: *p<0.1; **p<0.05; ***p<0.01.

Table 5
Changes in Investor Attention around ESG News

Panel A: Google Search

	GoogleSearch_Daily			
	(1)	(2)	(3)	(4)
EventDay[-1,+1]	0.309***	0.306***	0.308***	0.307***
	(3.715)	(3.679)	(3.702)	(3.690)
EventDate fixed effects	No	Yes	No	No
Firm fixed effects	No	No	Yes	No
Firm-EventDate fixed effects	No	No	No	Yes
R^2	0.000	0.036	0.764	0.835
Observations	1,866,309	1,866,309	1,866,309	1,866,257

Panel B: Bloomberg AIA

	BloombergAIA_Daily			
	(1)	(2)	(3)	(4)
EventDay[-1,+1]	0.136***	0.137***	0.137***	0.136***
	(15.119)	(15.269)	(15.193)	(15.213)
EventDate fixed effects	No	Yes	No	No
Firm fixed effects	No	No	Yes	No
Firm-EventDate fixed effects	No	No	No	Yes
R^2	0.001	0.022	0.212	0.274
Observations	1,543,422	1,543,422	1,543,417	1,543,317

This table presents an analysis of changes in investor attention around ESG news events. Using unique Firm-EventDate-Date observations on days −20 to +20 around each Firm-EventDate, we estimate versions of Equation (1) that replace the dependent variable with a daily proxy for firm-specific investor attention. Panel A uses the dependent variable *GoogleSearch_Daily* and Panel B uses the dependent variable *BloombergAIA_Daily*. All variables are defined in Appendix B. All continuous variables, except returns, are winsorized at the 1% and 99% levels to limit the influence of outliers. *t*-statistics based on standard errors clustered by Firm and EventDate are in parentheses. Levels of significance are presented as follows: *p<0.1; **p<0.05; ***p<0.01.

Table 6
Retail Trading Activity and the Role of Attention

Panel A: Volume

	RetailVol					
	Media Coverage		Google Search		Bloomberg AIA	
	(1)	(2)	(3)	(4)	(5)	(6)
EventDay[-1,+1] × Attention	0.020***	0.020***	0.021***	0.021***	0.110***	0.110***
	(3.845)	(3.845)	(4.242)	(4.240)	(11.641)	(11.639)
EventDay[-1,+1]	0.033***	0.033***	0.035***	0.035***	0.026***	0.026***
	(7.779)	(7.786)	(7.866)	(7.872)	(3.966)	(3.961)
Attention	0.500***		0.158**		0.543***	
	(4.510)		(2.044)		(4.655)	
Firm-EventDate fixed effects	No	Yes	No	Yes	No	Yes
R^2	0.098	0.838	0.010	0.829	0.096	0.850
Observations	2,220,704	2,220,704	1,866,548	1,866,548	1,617,135	1,617,135

Panel B: Number of Trades

	RetailNum					
	Media Coverage		Google Search		Bloomberg AIA	
	(1)	(2)	(3)	(4)	(5)	(6)
EventDay[-1,+1] × Attention	0.120***	0.120***	0.114***	0.114***	0.554***	0.554***
	(3.871)	(3.870)	(4.123)	(4.120)	(11.396)	(11.394)
EventDay[-1,+1]	0.125***	0.125***	0.133***	0.133***	0.114***	0.114***
	(5.653)	(5.662)	(5.737)	(5.744)	(3.371)	(3.367)
Attention	3.782***		0.552		3.720***	
	(4.728)		(1.517)		(4.356)	
Firm-EventDate fixed effects	No	Yes	No	Yes	No	Yes
R^2	0.168	0.888	0.004	0.872	0.129	0.893
Observations	2,220,704	2,220,704	1,866,548	1,866,548	1,617,135	1,617,135

This table presents an analysis of the role of investor attention in affecting retail investors' response to ESG news events. Using unique Firm-EventDate-Date observations on days −20 to +20 around each Firm-EventDate, we estimate versions of Equation (1) that interact $EventDay[-1,+1]$ with event-level attention proxies. Panel A uses the dependent variable $RetailVol$ and Panel B uses the dependent variable $RetailNum$. In both panels, columns 1 and 2 interact $EventDay[-1,+1]$ with an event-level attention proxy based on media coverage. Columns 3 and 4 interact $EventDay[-1,+1]$ with an event-level attention proxy based on abnormal Google search volume. Columns 5 and 6 interact $EventDay[-1,+1]$ with an event-level attention proxy based on Bloomberg institutional investor attention. In columns 2, 4, and 6, the main effects on the event-level attention proxy are subsumed by Firm-EventDate fixed effects. All variables are defined in Appendix B. All continuous variables, except returns, are winsorized at the 1% and 99% levels to limit the influence of outliers. To facilitate interpretation, the event-level attention proxies are standardized to have a mean (standard deviation) of 0 (1). t-statistics based on standard errors clustered by Firm and EventDate are in parentheses. Levels of significance are presented as follows: *p<0.1; **p<0.05; ***p<0.01.

Table 7
Retail Investors' Motivations for Trade around ESG Events

Panel A: Regression Analysis

	RetailBSIVol		RetailBSINum	
	(1)	(2)	(3)	(4)
EventDay[-1,+1] × PulseChange	0.000	0.000	0.000	0.000
	(0.577)	(0.525)	(0.714)	(0.673)
EventDay[-1,+1] × EventRet		0.002***		0.001**
		(3.600)		(2.040)
EventDay[-1,+1]	0.000	0.000	0.001**	0.001**
	(0.573)	(0.574)	(2.327)	(2.330)
Firm-EventDate fixed effects	Yes	Yes	Yes	Yes
R^2	0.054	0.054	0.177	0.177
Observations	2,220,704	2,220,704	2,220,704	2,220,704

Panel B: Matched-Pair Analysis (Abn. RetailBSIVol)

	Full Sample	Pos. ESG Event	Neg. ESG Event
	Mean	Mean	Mean
ESG Event	0.013	0.070	-0.053
Non-ESG Event	-0.030	0.021	-0.050
Difference	0.043	0.048	-0.002
t-statistic	0.603	0.477	-0.022
(p-value)	(0.546)	(0.634)	(0.982)
Observations	54,196	27,978	25,822

Panel C: Matched-Pair Analysis (Abn. RetailBSINum)

	Full Sample	Pos. ESG Event	Neg. ESG Event
	Mean	Mean	Mean
ESG Event	0.172	0.215	0.119
Non-ESG Event	0.100	0.204	0.143
Difference	0.072	0.011	-0.024
t-statistic	1.246	0.143	-0.295
(p-value)	(0.213)	(0.887)	(0.768)
Observations	54,196	27,978	25,822

This table presents an analysis of retail investors' motivations for trade around ESG news events, based on ESG performance and financial performance information in the events. Panel A presents a regression analysis and uses the dependent variables $RetailBSIVol$ and $RetailBSINum$ to assess how retail investors' buy-sell imbalance varies based on directional event-level information. Using unique Firm-EventDate-Date observations on days −20 to +20 around each Firm-EventDate, we estimate versions of Equation (2) that interact $EventDay[-1,+1]$ with event-level information on ESG performance and returns. The main effects on the event-level measures are subsumed by Firm-EventDate fixed effects. Panels B and C present matched-pair analyses of abnormal retail buy-sell imbalance, using $Abn.RetailBSIVol$ and $Abn.RetailBSINum$, for ESG events compared to non-ESG events. We match each ESG event to an earnings announcement in the same calendar year-quarter with the closest abnormal event return and market capitalization. Panel B uses . All variables are defined in Appendix B. All continuous variables, except returns, are winsorized at the 1% and 99% levels to limit the influence of outliers. To facilitate interpretation, the event-level information variables are standardized to have a mean (standard deviation) of 0 (1). t-statistics based on standard errors clustered by Firm and EventDate are in parentheses. Levels of significance are presented as follows: *p<0.1; **p<0.05; ***p<0.01.

Table 8
Cross-sectional Variation in Motivations for Trade: Headquarters State

Panel A: Volume

	RetailBSIVol			
	High ESG State	Low ESG State	Blue State	Red State
	(1)	(2)	(3)	(4)
EventDay[-1,+1]	0.001	0.000	0.001	-0.000
	(0.864)	(0.027)	(0.844)	(-0.218)
EventDay[-1,+1] × PulseChange	0.000	0.001	0.000	0.000
	(0.112)	(0.650)	(0.514)	(0.252)
EventDay[-1,+1] × EventRet	0.003***	0.001	0.002***	0.002
	(3.825)	(0.800)	(3.415)	(1.396)
EventDay[-1,+1] × EventRet Coef. Diff.	0.002*		0.001	
Firm-EventDate fixed effects	Yes	Yes	Yes	Yes
R^2	0.056	0.053	0.055	0.054
Observations	1,146,232	1,067,344	1,634,325	578,759

Panel B: Number of Trades

	RetailBSINum			
	High ESG State	Low ESG State	Blue State	Red State
	(1)	(2)	(3)	(4)
EventDay[-1,+1]	0.001**	0.001	0.001**	0.001
	(2.109)	(1.599)	(2.069)	(1.499)
EventDay[-1,+1] × PulseChange	-0.000	0.001	0.000	0.001
	(-0.649)	(1.583)	(0.084)	(1.108)
EventDay[-1,+1] × EventRet	0.002***	-0.000	0.001**	0.001
	(2.882)	(-0.238)	(2.076)	(0.464)
EventDay[-1,+1] × EventRet Coef. Diff.	0.002*		0.001	
Firm-EventDate fixed effects	Yes	Yes	Yes	Yes
R^2	0.186	0.166	0.183	0.159
Observations	1,146,232	1,067,344	1,634,325	578,759

This table presents an analysis of cross-sectional variation in retail investors' motivations for trade around ESG news events, based on firms' headquarters locations. Panel uses the dependent variables $RetailBSIVol$ and Panel B uses the dependent variable $RetailBSINum$. Using unique Firm-EventDate-Date observations on days −20 to +20 around each Firm-EventDate, we estimate versions of Equation (2) that interact $EventDay[-1,+1]$ with event-level information on ESG performance and returns. Columns 1 and 2 use the subsamples of events for firms headquartered in high ESG and low ESG states, defined as those with state-level ESG scores above and below the media, respectively. Columns 3 and 4 use the subsamples of events for firms headquartered in blue and red states, defined as those predominantly voting Democratic and Republican in the 2020 presidential election, respectively. he table also presents the differences in coefficients between high ESG and low ESG states, as well as between blue and red states (i.e., compares column 1 to column 2 and column 3 to column 4) and indicates the significance of the difference using Z-tests. The main effects on the event-level measures are subsumed by Firm-EventDate fixed effects. All variables are defined in Appendix B. All continuous variables, except returns, are winsorized at the 1% and 99% levels to limit the influence of outliers. To facilitate interpretation, the event-level information variables are standardized to have a mean (standard deviation) of 0 (1). t-statistics based on standard errors clustered by Firm and EventDate are in parentheses. Levels of significance are presented as follows: *p<0.1; **p<0.05; ***p<0.01.

Table 9
Retail Net Demand and Return Predictability

Panel A: Volume

	BHAR[+2,+60]		
	All Events	SASB Material	Extreme Returns
	(1)	(2)	(3)
RetailBSIVol[-1,+1]	0.008**	0.013***	0.015*
	(2.138)	(2.610)	(1.803)
Firm fixed effects	Yes	Yes	Yes
YearQtr fixed effects	Yes	Yes	Yes
R^2	0.163	0.169	0.201
Observations	53,589	33,451	20,926

Panel B: Number of Trades

	BHAR[+2,+60]		
	All Events	SASB Material	Extreme Returns
	(1)	(2)	(3)
RetailBSINum[-1,+1]	0.016**	0.018**	0.027**
	(2.278)	(2.076)	(2.224)
Firm fixed effects	Yes	Yes	Yes
YearQtr fixed effects	Yes	Yes	Yes
R^2	0.163	0.170	0.201
Observations	53,589	33,451	20,926

This table presents an analysis of the return predictability of retail investors' aggregate net demand at ESG news events. Aggregating retail net demand over days −1 to +1 around each Firm-EventDate, we estimate Equation (3) on the sample of unique Firm-EventDate observations. The dependent variable in both panels is buy-and-hold abnormal returns over the period [+2,+60] days after each event. Panel A uses the independent variable $RetailBSIVol[-1,+1]$ for all events (column 1) or subsamples of events that reveal financially material information (columns 2 and 3). Panel B uses the dependent variable $RetailBSINum[-1,+1]$. All variables are defined in Appendix B. All continuous variables, except returns, are winsorized at the 1% and 99% levels to limit the influence of outliers. t-statistics based on standard errors clustered by Firm and EventDate are in parentheses. Levels of significance are presented as follows: *p<0.1; **p<0.05; ***p<0.01.

Table 10
Alternative Measures of Retail Net Demand

Panel A: Aggregate Net Demand Using Lee-Ready algorithm

	RetailBSIVol_LR		RetailBSINum_LR	
	(1)	(2)	(3)	(4)
EventDay[-1,+1] × PulseChange	0.001	0.001	0.001	0.001
	(1.109)	(1.044)	(1.140)	(1.130)
EventDay[-1,+1] × EventRet		0.003***		0.000
		(4.736)		(0.375)
EventDay[-1,+1]	0.000	0.000	0.001*	0.001*
	(0.426)	(0.431)	(1.954)	(1.955)
Firm-EventDate fixed effects	Yes	Yes	Yes	Yes
R^2	0.084	0.084	0.228	0.228
Observations	2,194,371	2,194,371	2,194,371	2,194,371

Panel B: Signed Change in Number of Users

	RHUsers_Change	
	(1)	(2)
EventDay[-1,+1] × PulseChange	0.001	0.000
	(1.132)	(0.386)
EventDay[-1,+1] × EventRet		0.044***
		(5.891)
EventDay[-1,+1]	0.009***	0.010***
	(3.021)	(3.042)
Firm-EventDate fixed effects	Yes	Yes
R^2	0.519	0.520
Observations	796,684	796,684

This table presents an analysis of retail investors' motivations for trade around ESG news events, using alternative measures of retail investors' buy-sell imbalance. Using unique Firm-EventDate-Date observations on days −20 to +20 around each Firm-EventDate, we estimate versions of Equation (2) that interact $EventDay[-1,+1]$ with event-level information on ESG performance and returns. Panel A uses the dependent variables $RetailBSIVol\_LR$ and $RetailBSINum\_LR$, which assign buys and sells using the Lee-Ready algorithm to retail trades identified using the methodology introduced by Boehmer et al. (2021), as suggested by Barber et al. (2023). Panel B uses the dependent variable $RHUsers\_Change$, which is the change in the number of Robinhood users holding the stock. Columns 1 and 3 of Panel A and column 1 of Panel B interact $EventDay[-1,+1]$ with an event-level proxy of ESG performance information. Columns 2 and 4 of Panel A and column 2 of Panel B interact $EventDay[-1,+1]$ with event-level proxies of ESG performance and return information. The main effects on the event-level measures are subsumed by Firm-EventDate fixed effects. All variables are defined in Appendix B. All continuous variables, except returns, are winsorized at the 1% and 99% levels to limit the influence of outliers. To facilitate interpretation, the event-level information variables are standardized to have a mean (standard deviation) of 0 (1). t-statistics based on standard errors clustered by Firm and EventDate are in parentheses. Levels of significance are presented as follows: *p<0.1; **p<0.05; ***p<0.01.

Table 11
Retail Trading Activity and Non-Market-Based Measures of Financial Materiality

Panel A: Volume

	RetailVol			
	SASB Materiality		Analyst Revision	
	(1)	(2)	(3)	(4)
EventDay[-1,+1] × FinMaterial	0.012**	0.012**	0.023***	0.023***
	(2.001)	(1.989)	(3.557)	(3.551)
EventDay[-1,+1]	0.026***	0.026***	0.024***	0.024***
	(4.935)	(4.952)	(5.187)	(5.200)
FinMaterial	0.006		0.265***	
	(0.112)		(4.756)	
Firm-EventDate fixed effects	No	Yes	No	Yes
R^2	0.000	0.838	0.007	0.838
Observations	2,220,704	2,220,704	2,220,704	2,220,704

Panel B: Number of Trades

	RetailNum			
	SASB Materiality		Analyst Revision	
	(1)	(2)	(3)	(4)
EventDay[-1,+1] × FinMaterial	0.041	0.041	0.164***	0.163***
	(1.621)	(1.598)	(4.339)	(4.333)
EventDay[-1,+1]	0.099***	0.100***	0.054**	0.055**
	(3.580)	(3.599)	(2.272)	(2.288)
FinMaterial	-0.233		1.398***	
	(-0.707)		(4.707)	
Firm-EventDate fixed effects	No	Yes	No	Yes
R^2	0.000	0.888	0.006	0.888
Observations	2,220,704	2,220,704	2,220,704	2,220,704

This table presents an analysis of the role of financial materiality in affecting retail investors' response to ESG news events. Using unique Firm-EventDate-Date observations on days −20 to +20 around each Firm-EventDate, we estimate versions of Equation (1) that interact $EventDay[-1,+1]$ with event-level indicators for the financial materiality of the event. Panel A uses the dependent variable $RetailVol$ and Panel B uses the dependent variable $RetailNum$. In both panels, columns 1 and 2 interact $EventDay[-1,+1]$ with an event-level financial materiality indicator based on the SASB's Financial Materiality Map. Columns 3 and 4 interact $EventDay[-1,+1]$ with an event-level financial materiality indicator based on whether an analyst makes an EPS forecast revision following the event. In columns 2 and 4, the main effects on the event-level financial materiality indicator are subsumed by Firm-EventDate fixed effects. All variables are defined in Appendix B. All continuous variables, except returns, are winsorized at the 1% and 99% levels to limit the influence of outliers. t-statistics based on standard errors clustered by Firm and EventDate are in parentheses. Levels of significance are presented as follows: *p<0.1; **p<0.05; ***p<0.01.