# The Irrelevance of Environmental, Social, and Governance Disclosure to Retail Investors

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**Abstract.** Using an hourly data set on retail investor individual security positions from Robinhood Markets, we find no evidence that environmental, social, and governance (ESG) disclosures inform retail investors' buy and sell decisions. The response on ESG press release days by retail investors is indistinguishable from nonevent days. In contrast, these same investors make economically meaningful changes to their portfolios in response to non-ESG press releases, especially those that pertain to earnings announcements. We use stock return tests to show that there is economic content in ESG press releases, and we conduct subsample analyses showing that retail investors do not respond to the most salient and economically transparent ESG disclosures. Collectively, these tests suggest that a lack of economic content, a lack of visibility, and difficulty with investment integration are unlikely to explain our findings.

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#### 1. Introduction

We examine how retail investors adjust their portfolio holdings in response to firms' environmental, social, and governance (ESG) disclosures. Prior studies suggest that ESG disclosures attract investors who have a "taste" for these types of activities (Friedman and Heinle 2016, Pástor et al. 2021). These investor preferences are important because they give rise to investor clientele and base effects, which ultimately influence firms' cost of capital and future operating decisions (Naughton et al. 2019, Christensen et al. 2021). Although Hartzmark and Sussman (2019) find empirical evidence supporting these conjectured effects for mutual fund flows, the evidence on retail investors trading individual company stocks is limited to experimental studies (e.g., Cheng et al. 2015, Martin and Moser 2016). In this paper, we examine this important question using an empirical archival approach.

We use data from Robinhood Markets Inc. (Robinhood) to provide direct evidence on retail investor portfolio decisions.<sup>1</sup> A unique feature of Robinhood is that it publishes the number of Robinhood investors who own each security in real time (see Figure 1 for an example). We obtained a time series of these data from Robintrack, an independent website that retrieves the Robinhood holdings data for stocks and exchange-traded funds (ETFs) on an hourly basis. The data we

use contain the number of retail investors who own a particular security each hour from June 1, 2018 through December 31, 2019. We collect firm initiated ESG press releases from CSRWire and RavenPack Analytics (RavenPack). In combination, CSRWire and RavenPack provide a comprehensive and timely source of press releases related to ESG matters. We also obtain information on non-ESG disclosures from RavenPack and IBES. We focus on newswire press releases rather than third-party surveys or ESG performance ratings because we are interested in understanding how retail investors respond to the disclosure of new ESG information, which is more typically contained in these press releases (Griffin and Sun 2013, Moss et al. 2022). The press release data are also suited to our research design, which is similar to a staggered event study that compares outcome variables across event and nonevent davs.

We use Robinhood data to produce a set of variables that capture retail investor portfolio adjustments; we measure the changes, absolute changes, and volatility in hourly changes in the number of retail investors holding a firm's stock over three-day windows centered on event days. The variables we construct inform whether more or fewer retail investors are taking positions on a given day and how the overall movement in the number of retail investors changes over time. We





*Note.* The figure provides a screenshot of https://robinhood.com/stocks/WMT as of May 18, 2020; it includes disclosure of retail investor positions for Walmart in real time.

use these variables to identify differences in retail investors' responses to ESG press releases, non-ESG press releases, and earnings announcements relative to days on which none of these three events occur (i.e., nonevent days).

Our tests do not detect a retail investor response to ESG press releases, suggesting that these disclosures do not inform retail trading decisions. In contrast, we find statistically significant portfolio adjustments to non-ESG press releases and to earnings announcements, with a substantially larger effect for earnings announcements. The lack of a significant response to ESG press releases is not because of a lack of statistical power, as the precision of the coefficient estimates for ESG press release days is similar to that for non-ESG press release days (i.e., the standard errors are comparable for the coefficients on the ESG press release days and the non-ESG press release days). Rather, the coefficients themselves are markedly smaller for ESG press release days.

Next, we conduct a series of additional tests to better understand why retail investors appear unresponsive to ESG press releases. We specifically consider three possible explanations: lack of economic content, lack of visibility, and integration difficulties.<sup>2</sup> Intuitively, we would expect retail investors to be unresponsive to ESG press releases that do not contain economically meaningful information, that are disseminated so narrowly that investors are unaware of them, or that contain information that investors are unable to process and integrate into their investment decisions. It is not possible to examine each explanation in isolation, as they are inherently intertwined. Therefore, we conduct a series of tests that, when viewed collectively, allow us to infer whether any of the three possibilities contribute to our main result.

We begin by showing that there is a stock market price and volume response to both ESG and non-ESG press releases, suggesting that both types of press releases contain meaningful economic information. Next, to examine whether retail investors have a differential response to

ESG press releases based on economic content, we separate ESG event days into quartiles (Qs) according to the magnitude of the day's stock return. The intuition is that days with the highest stock return are most likely to identify press releases that contain valuable new economic information, with positive (negative) returns reflecting positive (negative) information. These analyses do not show any retail investor response on ESG days across all groupings of stock returns. In contrast, the retail investor response to non-ESG press releases lines up with economic intuition, with portfolio adjustments occurring on those days in the top and bottom quartile of returns, and with the strongest adjustments on those days with the worst stock returns. Overall, these results indicate that there is economic content in both ESG and non-ESG press releases but that retail investors adjust their portfolios only in response to non-ESG press releases.

Second, we use data from Truvalue Labs (TVL) to identify the most broadly disseminated ESG press releases. TVL locates and analyzes ESG-relevant news and articles to produce a daily Pulse score (e.g., see Serafeim and Yoon 2022, 2023). The TVL Pulse score excludes firm-initiated press releases to measure how third-party stakeholders perceive ESG information. The TVL Pulse score captures visibility, but it is possible that more economically impactful disclosures generate more external visibility, so the TVL Pulse score is not entirely independent of economic content. However, the TVL Pulse score is especially effective at detecting visibility from a retail investor perspective because its algorithms pull information from a variety of external sources, including those favored by retail investors, such as local news and social media. We use the TVL data in two ways. First, we use the data to show that the greatest TVL Pulse score changes occur on ESG press release days, confirming that the ESG press releases in our sample are publicly visible and contain novel ESG information. Second, we use the data to separate ESG press release days into quartiles according to the magnitude of the day's change in the TVL Pulse score and find that retail investors make no detectable portfolio adjustments in response to ESG press releases across each grouping. This finding indicates that retail investors are not responding to even the most visible ESG press releases. Overall, our analyses utilizing the stock market reaction and the TVL Pulse score suggest that economic content and a lack of visibility are unlikely to explain our main result.

Finally, we provide evidence on the role of integration difficulties by focusing on a specific type of ESG press release that has known economic content and high visibility-the announcement that the company has either been added to or improved its ranking on the "100 Best Companies to Work for" list (Best100), published annually by Fortune magazine. Prior research has established that the Best100 news is positive from a stock return perspective, highly visible, and relatively easy to understand (Edmans 2011). Even though our event study tests document a positive stock price response for those firms that are receiving favorable news from *Best100*, we do not find a detectable change in any of our measures of retail investor activity. This finding suggests that retail investors do not appear to respond even when the content of the ESG press release is relatively easy to integrate, indicating that integration complexity is unlikely to be influencing retail investors' overall response to ESG press releases. Based on these three sets of analyses, we conclude that retail investors do not incorporate information from ESG press releases into their investment decisions even when the information is economically important, highly visible, and relatively easy to evaluate.

There are a few caveats and clarifications to our conclusions. First, we acknowledge that there are likely to be differences between Robinhood investors and the general population of retail investors (e.g., Michels 2023). These differences could be driven by aspects of the Robinhood interface or by differences in investing philosophy.<sup>3</sup> To check that our conclusions are not unique to Robinhood users, we conduct analyses using the method of identifying retail trades introduced by Boehmer et al. (2021) and find that our conclusions are unchanged. Second, our tests relate only to the use of ESG information by retail investors at the time the press releases are disseminated; they do not investigate whether retail investors focus on long-term, historical measures of ESG performance in making portfolio adjustments, nor whether ESG disclosures inform periodic rebalancing as opposed to day-to-day trading activities.

We make several contributions to the literature. First, we contribute to the literature that examines how ESG disclosures affect the composition of firms' shareholder base. Friedman and Heinle (2016) suggest that ESG disclosures attract investors who have a "taste" for these types of activities. Dhaliwal et al. (2011) find that firms initiating the disclosure of ESG activities tend to attract dedicated institutional investors. Naughton et al. (2019) document that time-varying demand by investors for ESG performance influences firms' commitment to ESG activities and the composition of its investor base. Hartzmark and Sussman (2019) exploit the introduction of ESG ratings by Morningstar to show that perceptions about sustainability drive mutual fund flows. Our evidence suggests that retail investors do not adjust their holdings of individual firm securities in response to firm-initiated ESG disclosures.

Second, we contribute to the literature that examines how investors respond to firms' ESG disclosures (e.g., Lys et al. 2015, Grewal et al. 2019, Hirst et al. 2021) by narrowing the unit of analysis to retail investors. Although our results indicate that these disclosures do not influence retail investors' real-world portfolio choices, even when those disclosures are economically important, highly visible, and easily processed, subjects in laboratory experiments have been found to transact based on ESG disclosures (e.g., Cheng et al. 2015, Martin and Moser 2016). This finding confirms the value of using different approaches to investigate important research questions (e.g., Bloomfield et al. 2016).

Our findings also contribute to the ongoing development of ESG disclosures by various regulatory entities, including the U.S. Securities and Exchange Commission (SEC).<sup>4</sup> The discussion of these disclosure proposals has generally assumed that investors are homogeneous. In addition, much of the feedback on disclosure proposals to date has come from institutional investors, such as BlackRock (e.g., Pawliczek et al. 2022). Our paper suggests that retail investors may have different informational needs when it comes to ESG disclosures, as they do not appear to incorporate existing disclosures in a manner that mirrors institutional investors. This finding should be important for regulators, as retail investors represent a segment of capital market participants that are fundamental to SEC rulemaking.

#### 2. Literature Review

Studies that examine the consequences of firms' ESG disclosure for investor portfolios rely on the framework introduced in Fama and French (2007), where investors disagree about fundamentals or have heterogeneous private beliefs. Friedman and Heinle (2016) extend this framework to study portfolio allocation in the ESG setting. In their model, they show that stock prices are influenced by investor preferences for socially responsible activities and that these preferences operate independently of the cash flow implications. They also predict that investors with a preference for ESG activities will respond to information about firms' ESG initiatives, generating trading volume and portfolio turnover. The preferences described by Friedman and Heinle (2016) have important capital market implications because they can give rise to investor clientele and base effects, which

can affect firms' cost of capital and feed back into firms' future ESG activities (Naughton et al. 2019, Christensen et al. 2021).

A small number of prior studies have examined how ESG information influences different classes of investors. Hartzmark and Sussman (2019) exploit the introduction of corporate social responsibility (CSR) ratings by Morningstar and show that perceptions about sustainability drive mutual fund flows; a low (high) sustainability rating results in net outflow (inflow) by mutual funds. Prior studies focusing on retail investors rely on laboratory experiments with undergraduate or masters students and generally find that these subjects are more willing to invest in companies that pursue ESG initiatives (e.g., Cheng et al. 2015, Martin and Moser 2016). The conclusions in these papers do not rely on the assumption that disclosed ESG activities generate positive future cash flows for the firm.

Our study addresses a similar question—whether retail investors adjust their portfolio holdings in response to ESG disclosures—but does so using an empirical archival rather than experimental research design. Each methodological approach has its own trade-offs. A common problem with experiments is that the decision-making environment inside the laboratory can be materially different from the environment outside the laboratory, limiting external validity. For example, in the studies cited, the participants knew they were being observed, so their answers could have been influenced by social desirability bias (Paluck and Shafir 2017).<sup>5</sup> There are almost certainly other differences in our setting across the dimensions identified by Levitt and List (2007), but these additional differences only support the notion that further research using different methods is justified.

## 3. Data and Sample 3.1. Retail Investor Data

Our retail investor data track the trading activities of retail investors who use Robinhood as their brokerage firm. Launched in 2015, Robinhood was the first brokerage with zero-commission trades, and as of December 2019, it had approximately 10 million registered users. A recent survey found that the average age of these users is 31, most are new investors, and the average Robinhood account has a balance of approximately \$4,800 (Popper 2020). Thus, the behavior of Robinhood investors should provide information about the preferences of retail investors. In later analyses, we also employ the proxy for retail investors using the method developed by Boehmer et al. (2021) and find consistent results.

Robinhood makes available the popularity of securities (i.e., the number of Robinhood investors who own each security) in real time (see Figure 1 for an example). We download the time-series Robinhood popularity data from Robintrack, an independent website that retrieves the Robinhood popularity data for stocks and ETFs on an hourly basis via a public application programming interface (API). Our sample starts on June 1, 2018, when Robintrack's time-series database first became available (see Figure 2 for an example).<sup>6</sup> For every security that is available to purchase on Robinhood, the Robintrack data provide the security ticker symbol, a time stamp of when the API was accessed, and the number of Robinhood investors who own the security.

Figure 2. (Color online) Time Series of Retail Investor Positions on Robintrack



*Note.* The figure provides a screenshot of https://robintrack.net/symbol/WMT as of May 18, 2020; it includes the time series of retail investor positions for Walmart from May 1, 2018 to May 18, 2020.





*Notes*. The figure provides a graphic illustration of the number of securities available to purchase on Robinhood (left axis) and the total number of investor positions on Robinhood (right axis). The data in this figure are for the entire Robinhood universe and are not restricted to our sample. Values are as of the last trading day of each month in our sample, June 2018 to December 2019.

Figure 3 presents the number of securities available for purchase on Robinhood (left axis) and the total number of Robinhood investor positions across all securities (right axis) during our sample period from June 1, 2018 through December 31, 2019. The growth in available securities is primarily driven by an increase in the number of ETFs. Total investor positions more than double during our sample period, increasing from 6.3 million positions in June 2018 to 14.3 million in December 2019. To ensure that our results are not affected by the aggregate growth of Robinhood investors, we present results using both the observed investor portfolio allocations as well as portfolio allocations adjusted for aggregate growth in the number of Robinhood investors. In addition, we generally use specifications that compare changes in Robinhood positions across different types of press releases within a firm (i.e., firm fixed effects) and date (i.e., date fixed effects), which allows us to better identify the abnormal change for a particular type of press release.

There are several notable caveats about the construction of our specific proxies of retail trading using Robintrack data. First, the trading decisions of Robinhood traders may not generalize to other retail traders. For example, Robinhood allows users to purchase fractional shares and does not charge a commission for equity trades, practices that some practitioners have argued create incentives for frequent and potentially speculative trading. Although trade frequency is not an issue in our research design—and is potentially beneficial—the types of trades that Robinhood investors favor could be problematic. In particular, to the extent that Robinhood investors prefer to trade with options, our measures derived from equity holdings may not fully capture their trading behavior. We investigate the nature of this concern by examining the key performance metrics disclosed in Robinhood's 2021 10-K, which indicates that Robinhood investors hold options comprising only 2% of total assets under custody. We interpret this evidence as indicating that the majority of trades are focused on equity securities and hence, that option trading is unlikely to materially change our proxies for retail trading.

In addition, Robintrack captures only the extensive margin of retail ownership and not the intensive margin, creating some measurement error in capturing retail investor trading. As a result, our measures do not capture changes in ownership for existing equity security holders unless the position is fully exited. This measurement error is problematic if ESG press releases uniquely cause investors to increase or decrease current holdings but do not cause existing investors to completely exit their positions or cause new investors to take initial positions. This specific trading pattern is unlikely, as we are able to document significant responses to non-ESG press releases, meaning the measurement error introduced by capturing the extensive but not intensive margin would need to occur differently for ESG and non-ESG press releases to influence our inferences. Although we believe that this differential pattern is unlikely, we cannot rule it out entirely.

#### 3.2. ESG Press Releases Sample

Table 1 describes the sample selection process for ESG press releases. We began this process by collecting all press releases on CSRWire, the leading global source of

Sample selection criteria	# of Press Releases	# of PR Days	# of Firms
CSRWire press releases (June 1, 2018 to December 31, 2019)	2,203		
Matched to CRSP/Compustat	477	460	89
Matched to Robinhood Markets data	469	452	87
All requisite regression variables	465	448	86
Nonoverlap with earnings announcements	460	443	86
CSRWire press releases	460	443	86
Add RavenPack ESG press releases	370	355	
ESG press releases sample	830	798	86

	Table 1.	ESG Press	Releases	Sample	Formation
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*Notes.* The table lists the sample selection criteria for ESG press releases, ESG press release days, and firms. The starting point for our sample is all 2,203 CSRWire press releases from June 1, 2018 to December 31, 2019 (source: https://www.csrwire.com/press\_releases). We then matched each CSRWire press release to the company name in CRSP/Compustat (477 remaining). Next, we merged with the Robinhood data using a firm's trading ticker symbol (469 remaining). We required that variables used in our analyses be nonmissing (465 remaining) and that the press release not be on the same day as an earnings announcement (460 remaining). For the 86 firms in our CSRWire press release sample, we searched RavenPack Analytics for additional ESG-related press releases during the same period using keywords provided to us by a RavenPack representative (see Appendix B for details). RavenPack added 370 ESG-related press releases to our sample. In total, our ESG press releases sample consists of 830 ESG-related press releases, 798 ESG-related press release days, and 86 firms.

ESG and sustainability news, for our sample period described. We use CSRWire because the press releases on its platform generally reflect new information at the time they are posted (Griffin and Sun 2013). Newly provided press releases are more suited to our research question than survey or ratings data, which can often lag events by several months and hence, do not reflect new information at the time they are released.

Next, we matched CSRWire press releases to CRSP/ Compustat company names, generating a sample of 477 public company press releases.<sup>7</sup> We used a namematching algorithm and then verified each match manually. We merged this sample with Robinhood using ticker symbols. Lastly, we required nonmissing regression variables and for press releases to not occur on the same day as a firm's earnings announcement. After applying these restrictions, the CSRWire press release sample contains 460 press releases disclosed by 86 firms.<sup>8</sup> For these 86 firms, we searched RavenPack for additional ESG-related press releases using the keywords provided to us by a RavenPack representative (see Appendix B for details). The search added 370 ESG-related press releases to our sample. In total, our ESG press release sample consists of 830 ESG-related press releases, 798 ESG-related press release days (i.e., *ESG PR Day*), and 86 firms. The two data sources are complementary, as CSRWire consists of press releases primarily related to environmental and social issues, whereas RavenPack consists of press releases primarily related to governance issues. Appendix B describes how we classified the press releases into environmental, social, or governance categories.

Tables 2 and 3 describe our sample composition by industry (Table 2) and month (Table 3). In Table 2, we present the number of firms and *ESG PR Days* by onedigit standard industrial classification code (SIC1). From a firm perspective, the two manufacturing industries (SIC1 = 2 and 3) and the finance, insurance, and real estate industry (SIC1 = 6) are the most represented, although our sample is not concentrated in any one industry. We observe similar patterns for composition by *ESG PR Days*.

 Table 2. Sample Composition by Industry (SIC1)

SIC1		F	Firms	ESG PR Days	
	Industry description	Ν	%	Ν	%
1	Mineral and construction	5	5.8	20	2.5
2	Manufacturing	21	24.4	173	21.7
3	Manufacturing	17	19.8	98	12.3
4	Transportation, communications, and utilities	10	11.6	184	23.1
5	Whole trade and retail trade	8	9.3	80	10.0
6	Finance, insurance, and real estate	14	16.3	169	21.2
7	Service industries	9	10.5	52	6.5
8	Service industries	2	2.3	22	2.8
	Total	86	100.0	798	100.0

*Notes.* The sample contains 86 unique firms that released 830 ESG press releases on 798 firm days (i.e., *ESG PR Days*) from June 2018 to December 2019. The table presents the number of firms and *ESG PR Days* for our sample by SIC1. Percentages may not add to 100 because of rounding.

Table 3.	Sample	Composition	by	Month
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Month	# of Firms	ESG PR Days	# of Investor Positions
June 2018	84	19	309,256
July 2018	84	29	316,900
August 2018	84	36	322,534
September 2018	84	34	326,261
October 2018	84	41	332,281
November 2018	85	29	331,978
December 2018	84	27	334,265
January 2019	84	36	344,075
February 2019	84	34	350,022
March 2019	84	42	359,348
April 2019	84	46	374,498
May 2019	84	39	381,647
June 2019	84	46	387,303
July 2019	84	36	398,696
August 2019	84	41	404,015
September 2019	84	77	406,437
October 2019	85	72	412,093
November 2019	85	69	416,836
December 2019	85	45	422,292
Average per month	84	42	364,791

*Notes.* The table presents the number of firms, *ESG PR Days*, and the number of Robinhood investor positions for our sample of firms by month.

In Table 3, we present the number of firms, *ESG PR Days*, and the total number of investor positions for our sample of firms by month. The number of firms in our sample is consistent through the entire period, ranging between 84 and 85. The average month has 42 *ESG PR Days*, and there is a slight upward trend in the number of *ESG PR Days* over time. Lastly, the number of investor positions in our sample of firms steadily grows over

our sample, although the rate of growth is lower than that of the entirety of Robinhood.

#### 3.3. Descriptive Statistics

Each day in our sample period is allocated to one of four categories: (1) ESG PR Day refers to days as described; (2) Non-ESG PR Day refers to days on which the firm had a press release (source: RavenPack) that was not ESG related and on which the firm did not issue an ESG press release or announce earnings; (3) EA Day refers to days on which the firm announces earnings as identified by the earlier of IBES or Compustat; and (4) Nonevent Day refers to all days in our sample period that are not designated as an ESG PR Day, Non-ESG PR Day, or EA Day. Further, if a day meets the criteria of a Nonevent Day but is the trading day directly before or after an EA Day or Non-ESG PR Day, it is excluded from the sample. We exclude these days because their three-day window contains either an EA Day or Non-ESG PR Day, and therefore, including them would contaminate our inferences.

In Table 4, we provide descriptive statistics for our five primary dependent variables (described in more detail in Section 4), two supplementary dependent variables, five control variables, and two unscaled variables from which our primary dependent variables are calculated. All firm-day observations classified as an *ESG PR Day, Non-ESG PR Day, EA Day,* or *Nonevent Day* are included in the sample for which we tabulate descriptive statistics. The average firm has 4,149 retail investors on Robinhood (*Unscaled RI*<sub>t</sub>), and the average three-day change in the number of retail investors is

**Table 4.** Descriptive Statistics for Variables Used in the Regression Analyses (N = 28,817)

Variables	Mean	Standard deviation	P1	P25	Median	P75	P99
Investor reaction variable	s						
Unscaled RI <sub>t</sub>	4,149	6,905	117	461	1,432	4,722	34,678
Unscaled $\Delta RI_{t-1,t+1}$	7	66	-185	-9	0	9	353
$\Delta RI_{t-1,t+1}$	0.655	6.104	-16.301	-0.895	0.000	0.900	32.967
Adj. $\Delta RI_{t-1,t+1}$	-1.884	6.686	-31.205	-2.845	-0.660	0.060	23.206
$\Delta RI \ Volatility_{t-1,t+1}$	0.343	0.448	0.030	0.103	0.193	0.383	2.662
Abs. $\Delta RI_{t-1,t+1}$	2.955	5.961	0.000	0.311	0.898	2.739	37.070
Abs. Adj. $\Delta RI_{t-1,t+1}$	3.758	6.685	0.014	0.397	1.213	3.935	38.957
Abs. $CAR_{t-1,t+1}$	1.764	1.684	0.023	0.578	1.280	2.379	8.763
Share $Turnover_{t-1,t+1}$	0.020	0.015	0.002	0.011	0.016	0.026	0.082
Control variables							
$Return_{t-5,t-2}$	0.180	3.321	-9.585	-1.607	0.300	2.048	9.583
$Return_{t-25,t-6}$	0.718	7.517	-20.690	-3.633	1.158	5.242	21.000
$Return_{t-251,t-26}$	5.466	21.994	-43.812	-9.895	4.179	19.913	70.611
Size	9.938	1.592	4.588	8.957	9.975	11.051	12.716
M/B	6.320	17.853	-9.609	1.246	2.508	4.898	133.541

*Notes.* The table presents distributional descriptive statistics for variables used in our analyses of retail investor reaction to ESG press releases. We first present two unscaled retail investor reaction variables for reference: (1) *Unscaled*  $RI_t$  and *Unscaled*  $\Delta RI_{t-1,t+1}$ . We then present five different dependent variables used in our regression analyses to measure the reaction of retail investors: (1)  $\Delta RI_{t-1,t+1}$ , (2) Adj.  $\Delta RI_{t-1,t+1}$ , (3)  $\Delta RI$  *Volatility*<sub>t-1,t+1</sub>, (4) *Abs*.  $\Delta RI_{t-1,t+1}$ , and (5) *Abs*. Adj.  $\Delta RI_{t-1,t+1}$ . We also use two dependent variables based on market reaction: (1) *Abs*.  $CAR_{t-1,t+1}$  and (2) *Share Turnover*<sub>t-1,t+1</sub>. We use five control variables: (1) *Return*<sub>t-25,t-2</sub>, (2) *Return*<sub>t-25,t-6</sub>, (3) *Return*<sub>t-25,t-26</sub>, (4) *Size*, and (5) *M/B*.

Means by type	Ν	(1) $\Delta RI_{t-1,t+1}$	(2) Adj. $\Delta RI_{t-1,t+1}$	(3) $\Delta RI \ Volatility_{t-1,t+1}$	(4) Abs. $\Delta RI_{t-1,t+1}$	(5) Abs. Adj. $\Delta RI_{t-1,t+1}$
Environment PR Days	161	0.325	-1.803***	0.298***	2.735***	3.349***
0		(0.78)	(-3.76)	(11.67)	(7.31)	(7.50)
Social PR Days	298	0.876**	-2.508***	0.401***	3.280***	4.421***
-		(2.49)	(-5.98)	(15.20)	(10.61)	(11.75)
Governance PR Days	350	0.051	$-2.425^{***}$	0.329***	2.690***	3.651***
		(0.21)	(-8.02)	(18.63)	(11.73)	(12.27)
All ESG PR Days	798	0.403**	-2.337***	0.349***	2.915***	3.891***
		(2.14)	(-10.33)	(25.75)	(17.11)	(18.38)
Non-ESG PR Days	2,593	1.451***	$-1.692^{***}$	0.445***	4.056***	4.930***
		(9.42)	(-10.64)	(40.39)	(27.06)	(30.80)
EA Days	498	6.564***	3.826***	0.831***	8.314***	7.746***
		(12.21)	(8.34)	(21.41)	(15.51)	(14.64)
Nonevent Days	24,928	0.463***	$-2.004^{***}$	0.322***	2.735***	3.553***
-		(12.90)	(-49.55)	(122.25)	(77.96)	(88.33)

Table 5. Means of Retail Investor Reaction Variables by Type of Event Day

*Notes.* The table presents the means and (in parentheses) *t* statistics for each measure of retail investor reaction by event type. Throughout our analyses, we identify four types of days: (1) *ESG PR Days*, (2) *Non-ESG PR Days*, (3) *EA Days*, and (4) *Nonevent Days*. The means are displayed for each type of *ESG PR Day* separately as well as combined into one event. The sum of the *Environment*, *Social*, *and Governance PR Days* exceeds the *All ESG PR Days* because of concurrence of two types of ESG press releases on the same day for seven days of our sample. These four types of days are our variables of interest, and in regression analyses, the variables take the value of one if they meet the criteria for that day and zero otherwise.

\*\*Statistical significance at the 5% p level (two tailed); \*\*\*statistical significance at the 1% p level (two tailed).

seven (*Unscaled*  $\Delta RI_{t-1,t+1}$ ). In Table 5, we present the mean of our five primary dependent variables for each type of event day. The means are displayed for each category of *ESG PR Day* separately as well as combined into one category. The sum of the observations in the *Environment, Social, and Governance PR Day* components exceeds the observations in *ESG PR Day* because of the concurrence of two types of ESG press releases on the same day for seven days in our sample. We obtained financial data from Compustat, market data from CRSP, and market risk factor data from the Fama–French & Liquidity Factors database on WRDS.

### Research Design and Results Retail Investor Reaction to ESG Press Releases

Our first analysis examines the effect of ESG press releases on retail investor portfolio holdings by comparing the investor response with the four types of event days defined using the following specification:

$$RI\_RESPONSE_{i,t} = \alpha + \beta_1 ESG \ PR \ Day_{i,t} + \beta_2 Non-ESG \ PR \ Day_{i,t} + \beta_3 EA \ Day_{i,t} + \sum \gamma_j Controls_{i,t} + Fixed \ Effects + \varepsilon_{i,t}.$$
(1)

In Equation (1), we include *ESG PR Day, Non-ESG PR Day,* and *EA Day,* which are indicator variables following the definitions provided in Section 3.3 and Appendix A. Days meeting the definition of *Nonevent Day* are included in the regression sample, but we omit its indicator variable. This omission means that the coefficients

for the included indicator variables capture the differential retail investor response on that type of day relative to nonevent days. In other words, nonevent days are the baseline comparison in Equation (1).

We measure the retail investor response ( $RI\_RE$ -SPONSE<sub>*i*,*t*</sub>) using five different outcome variables. First, we calculate the aggregate change in the number of Robinhood investors who hold stock in firm *i* over the three-day window centered on press release day *t*.<sup>9</sup> This variable is denoted by  $\Delta RI_{t-1,t+1}$ . This variable is signed, so a decrease in the number of investors who own the firm's stock produces a negative value for this variable. We also calculate *Abs*.  $\Delta RI_{t-1,t+1}$  as the absolute value of  $\Delta RI_{t-1,t+1}$  to better understand retail investor responses to ESG press releases.

Next, we adjust  $\Delta RI_{t-1,t+1}$  to reflect the fact that there is underlying growth in the number of investors on Robinhood, and we denote this variable by Adj.  $\Delta RI_{t-1,t+1}$ . We adjust for the underlying growth of Robinhood by taking the actual change in Robinhood investors minus an expected change in Robinhood investors, defined as the firm's percentage share of total Robinhood stock positions on day t - 1 multiplied by the change in total Robinhood security positions during the three-day window centered on day t. The intent of this variable is to capture the change in investors in a firm, which is different from the change that arises from the growth in the overall number of investors. If a firm has the same percentage of the aggregate number of Robinhood security positions from one period to the next, then this variable will produce a value of zero regardless of the actual change in the number of investors who own stock in the firm. This variable is also signed, so a smaller number of investors than

expected will produce a negative value. We also calculate *Abs. Adj.*  $\Delta RI_{t-1,t+1}$  as the absolute value of *Adj.*  $\Delta RI_{t-1,t+1}$ . Our final variable captures investor volatility,  $\Delta RI$  *Volatility*<sub>t-1,t+1</sub>, which we calculate as the standard deviation of hourly changes in the number of Robinhood investors who own the firm's stock over the three-day window centered on day t. All five dependent variables are scaled by the firm's natural logarithm of assets as of fiscal-quarter end.<sup>10</sup>

We believe these five variables capture broad insights into retail investor portfolio holdings. The variables based on investor counts indicate how many unique investors have positions in a particular company, allowing us to examine whether more or fewer retail investors have positions following a disclosure event. We include investor volatility to better capture within-period turnover by examining variation at the hourly level in the number of retail investors. Intuitively, if there is significant variation from hour to hour over the three-day period surrounding the press release date, then this pattern suggests that investors are adjusting their portfolios even if there is no discernible change in the total number of investors over the three-day period. To the extent that investors adjust their portfolios more (less) on an event day relative to nonevent days, then the coefficient on the event day variable will be positive (negative). We control for lagged returns over the (-1, -4) and (-5, -25) time periods (e.g., Barrot et al. 2016). We also include two sets of fixed effects, firm and date, to fully absorb timeinvariant crossfirm heterogeneity and time trends.<sup>11</sup>

Table 6. Retail Investor Reaction to ESG Press Releases

The results of Equation (1) in Table 6 indicate that investors respond to non-ESG press releases, especially earnings announcements, but there is no detectable response to ESG press releases. For example, the coefficient on Non-ESG PR Day in column (1) is 0.843 with a t statistic of 5.11. This coefficient indicates an increase in retail investors who hold positions in the firm on days when there is a non-ESG press release relative to nonevent days. The economic magnitude of this coefficient is also meaningful, as it is approximately equal to the difference between the median value of  $\Delta RI_{t-1,t+1}$  and either the first or third quartile of that variable (as reported in Table 4). The coefficient on EA Day is approximately eight times larger, at 6.388, and strongly significant with a t statistic of 11.03. These results documenting a response to non-ESG press releases and earnings announcements are reassuring and help alleviate some potential limitations of our study, particularly given our null result discussed in the next paragraph, as they suggest that the Robinhood investors in our study react to firm-initiated press releases and that we are able to capture this response with the Robintrack data we use. Thus, the null result we discuss next is likely not because of either of these issues.

In contrast to the statistically and economically significant coefficients on *Non-ESG PR Day* and *EA Day*, the coefficient on *ESG PR Day* is economically small (e.g., 0.003 in column (1)) and indistinguishable from zero (e.g., *t* statistic of 0.02 in column (1)). The estimated coefficients on *ESG PR Day* across each of the five

Dependent variables	(1)	(2) Adi ARI, a. a	(3) ARI Volatilitu	(4) <i>Abs</i> $ABL$	(5) Abs Adi ARI
Dependent variables	$\Delta m_{t-1,t+1}$	$2 \operatorname{Im}_{t-1,t+1}$	$\Delta H $ voluning $t-1,t+1$	$105. \Delta M_{t-1,t+1}$	$2103.210j. \Delta M_{t-1,t+1}$
Event variables					
(1) ESG PR Day	0.003	0.004	0.001	-0.164	-0.149
-	(0.02)	(0.02)	(0.08)	(-1.12)	(-1.02)
(2) Non-ESG PR Day	0.843***	0.891***	0.051***	0.456***	0.269**
	(5.11)	(5.23)	(6.02)	(3.59)	(2.22)
p-value: (1) = (2)	[0.001]	[0.001]	[0.000]	[0.001]	[0.022]
(3) <i>EA Day</i>	6.388***	6.284***	0.495***	5.172***	3.661***
	(11.03)	(11.07)	(13.14)	(10.15)	(7.63)
Control variables					
$Return_{t-5,t-2}$	$-0.150^{***}$	$-0.153^{***}$	0.000	-0.007	0.057***
	(-10.09)	(-10.05)	(0.57)	(-0.53)	(4.57)
$Return_{t-25,t-6}$	-0.003	-0.003	-0.000	-0.008*	0.003
	(-0.48)	(-0.43)	(-0.85)	(-1.74)	(0.56)
Firm FE and date FE	Included	Included	Included	Included	Included
Adjusted R <sup>2</sup>	0.100	0.206	0.618	0.441	0.541
N	28,817	28,817	28,817	28,817	28,817

*Notes.* The table reports analyses of retail investors' reaction to ESG press release days, non-ESG press release days, and earnings announcement days relative to nonevent days. The regression analyses include four types of days: (1) *ESG PR Days*, (2) *Non-ESG PR Days*, (3) *EA Days*, and (4) *Nonevent Days.* We include indicator variables for *ESG PR Day*, *Non-ESG PR Day*, and *EA Day* according to the criteria defined in Appendix A but omit an indicator for *Nonevent Days.* Definitions for each variable can be found in Appendix A. The table reports ordinary least squares (OLS) coefficient estimates and (in parentheses) *t* statistics based on robust standard errors clustered by date. The table also reports *p*-values from *F* tests comparing the equality of coefficients. We include firm fixed effects (FEs) and date FEs in the regressions but do not report the coefficients.

\*Statistical significance at the 10% *p* level (two tailed); \*\*statistical significance at the 5% *p* level (two tailed); \*\*statistical significance at the 1% *p* level (two tailed).

different dependent variables indicate that there is no detectable difference between the changes in retail investor portfolios in response to ESG press releases and the routine portfolio adjustments that occur on nonevent days. Further, an *F* test comparing the equality of the coefficients on *ESG PR Day* and *Non-ESG PR Day* indicates that those coefficients are statistically different at the 1% level of significance in columns (1)–(4) and at the 5% level of significance in column (5).

The lack of statistical significance for the coefficients on *ESG PR Day* is not because of statistical power, as the coefficients are estimated for *ESG PR Day* with similar precision as for *Non-ESG PR Day*. That is, the standard errors are comparable for the coefficients on *ESG PR Day* and *Non-ESG PR Day*. More specifically, the standard errors for *ESG PR Day* in columns (1)–(5) are 0.150, 0.200, 0.013, 0.146, and 0.146, respectively. In comparison, the standard errors for *Non-ESG PR Day* in columns (1)–(5) are 0.165, 0.170, 0.009, 0.127, and 0.121, respectively. The average difference in the standard errors for these coefficients is only 18%. Overall, these results provide consistent evidence that ESG press releases are not associated with retail investor portfolio reallocations.

As previously noted, the Robintrack data and the measures of retail investor activity we employ may have challenges related to the nature of Robinhood investors, the types of trades they pursue, and the fact that Robintrack data capture only the extensive margin of retail trading. Although we believe that some of these challenges are alleviated by finding a significant reaction to non-ESG press releases, we also partially address some of them by checking the robustness of our conclusions using the Abs. CAR method introduced by Boehmer et al. (2021), which has been used in a number of recent studies investigating retail investor trading behavior (e.g., Bushee et al. 2020, Moss 2022). Boehmer et al. (2021) exploit the regulatory law that only allows retail investor trades to be executed at share prices with fractional pennies to identify transactions as (a) retail buys if the transaction price is slightly below the round penny and (b) retail sells if the transaction price is slightly above the round penny. As a result, the Boehmer et al. (2021) approach provides a good way of identifying retail trades (low type I error), but it does so at the cost of leaving many retail trades unidentified because many transactions occur at nonfractional prices (high type II error) (e.g., Blankespoor et al. 2020). In untabulated analyses, we document no identifiable change in either retail investor buys or sells using the Boehmer et al. (2021) measures in response to ESG press releases, even though there are statistically significant responses to both non-ESG press releases and earnings announcements.

We also explore whether there is a specific component of ESG—environmental, social, or governance—that drives our results. We reestimate Equation (1) with one difference; we replace the binary indicator ESG PR Day with three binary indicator variables—*Environmental PR* Day, Social PR Day, and Governance PR Day-where each indicator takes the value of one if the ESG press release on that day primarily relates to environmental, social, or governance matters, respectively. The untabulated results indicate that our conclusions are not driven by one of the three components of ESG. The results for each coefficient mirror the results in Table 6, suggesting that none of the three components experience an investor response that differs from a nonevent day. As a result, we conclude that the findings in Table 6 are attributable to all three components of ESG rather than any single component. Overall, the results discussed so far indicate that there is no detectable response to ESG press releases by investors, even though these same investors respond to non-ESG press releases and respond very strongly to earnings announcements.

Next, we conduct a series of additional tests to better understand why retail investors might be indifferent to ESG press releases. We specifically examine three possible explanations for a lack of retail investor response to ESG press releases: lack of economic content, lack of visibility, and integration difficulties. Although the lack of economic content explanation focuses on the information contained in the ESG press release, the lack of visibility and integration difficulties explanations are derived from the investor processing costs framework, introduced by Blankespoor et al. (2019), for how investors might process a disclosure for use in trading decisions.

#### 4.2. Assessing the Economic Content of ESG Press Releases

First, to examine whether ESG press releases contain meaningful economic content, we examine whether there is an overall stock price and volume response to each type of event day using the following specifications:

Abs. 
$$CAR_{t-1,t+1} = \alpha + \beta_1 ESG \ PR \ Day_{i,t}$$
  
+  $\beta_2 Non-ESG \ PR \ Day_{i,t} + \beta_3 EA \ Day_{i,t}$   
+  $\sum \gamma_j Controls_{i,t} + Fixed \ Effects + \varepsilon_{i,t}$   
(2a)

*Share*  $Turnover_{t-1,t+1} = \alpha + \beta_1 ESGPRDay_{i,t}$ 

+ 
$$\beta_2 Non-ESG PR Day_{i,t} + \beta_3 EA Day_{i,t}$$
  
+  $\sum \gamma_j Controls_{i,t} + Fixed Effects + \varepsilon_{i,t}$ .  
(2b)

ESG PR Day, Non-ESG PR Day, and EA Day are defined in the same way as in Equation (1). In addition, the baseline comparison group continues to be nonevent days. Abs.  $CAR_{t-1,t+1}$  equals the absolute value of the cumulative abnormal return measured as the difference between the stock return and the value-weighted CRSP index return over the three-day window surrounding the press release. This measure captures the magnitude of the investor reaction to the announced information, regardless of how positive and negative effects are distributed across the sample. All else equal, absolute abnormal returns will be larger when more new information is revealed by the disclosures. *Share Turnover*<sub>t-1,t+1</sub> equals the total number of shares traded over the same threeday window scaled by shares outstanding at the previous quarter end. We expect to see higher trading volume when more new information is revealed by the disclosures. We control for *Size*, *M/B*, and *Return*<sub>t-251,t-26</sub> to capture long-term momentum (Carhart 1997). The sample and fixed effects are the same as those used in Equation (1), meaning that the coefficient on *ESG PR Day* captures the differential return response to ESG press releases relative to nonevent days.

The results in Table 7 indicate that both ESG and non-ESG press releases generate an overall market response. The coefficients are positive and significant for both variables in each specification, meaning that those days are associated with changes in price and trading volume. Not surprisingly, the coefficients on *EA Day* are several orders of magnitude greater than the coefficients on either *ESG PR Day* or *Non-ESG PR Day* and *Non-ESG PR Day* are close in magnitude, they are statistically different. An *F* test that compares the equality of the coefficients on *ESG PR Day* and *Non-ESG PR Day*.

Table 7. Market Reaction to ESG Press Releases

	(1)	(2)
Dependent variables	Abs. $CAR_{t-1,t+1}$	Share $Turnover_{t-1,t+1}$
Event variables		
(1) ESG PR Day	0.100*	0.001***
, j	(1.93)	(3.30)
(2) Non-ESG PR Day	0.232***	0.002***
	(6.35)	(8.45)
p-value: (1) = (2)	[0.039]	[0.002]
(3) EA Day	2.111***	0.015***
	(17.08)	(21.46)
Control variables		
Size	-0.327***	-0.005***
	(-3.09)	(-9.23)
M/B	0.002***	-0.000
	(2.76)	(-0.23)
$Return_{t=251,t=26}$	-0.000	-0.000***
	(-0.52)	(-3.44)
Firm FE and date FE	Included	Included
Adjusted R <sup>2</sup>	0.203	0.704
N	28,817	28,817

*Notes.* The table reports analyses of the market reaction to ESG press releases, non-ESG press releases, and earnings announcements relative to nonevent days as indicated by the market reaction. The analyses repeat those in Table 6 with market reaction measures as dependent variables. Definitions for each variable can be found in Appendix A. The table reports OLS coefficient estimates and (in parentheses) *t* statistics based on robust standard errors clustered by date. We include firm fixed effects (FEs) and date FEs in the regressions but do not report the coefficients.

\*Statistical significance at the 10% p level (two tailed); \*\*\*statistical significance at the 1% p level (two tailed).

indicates that those coefficients are statistically different at the 5% level of significance in column (1) and at the 1% level of significance in column (2). We note that this difference does not explain the substantially smaller retail investor reaction shown in Table 6. Specifically, the coefficients on the market reaction to ESG press release days are about 43%–50% of the coefficients for non-ESG press release days. In comparison, the average coefficient in columns (1)–(3) of Table 6 for ESG PR Day is less than 1% of the corresponding coefficients for *Non-ESG PR Day*.<sup>12</sup>

Second, we explore how the economic content of ESG and non-ESG press releases influences retail investor portfolios by separating the event days according to the magnitude of the day's stock return. More specifically, we separate the ESG PR Day variable into three groups: top quartile (Q4), middle two quartiles (Q2 and Q3), and bottom quartile (Q1), with the result that the mean stock return is 1.73% in Q4, 0.13% in Q2 and Q3, and -1.74% in Q1. Similarly, we separate the Non-ESG *PR Day* variable into three groups: top quartile (Q4), middle two quartiles (Q2 and Q3), and bottom quartile (Q1), with the result that the mean stock return is 2.10% in Q4, 0.13% in Q2 and Q3, and -2.01% in Q1. Intuitively, this breakdown of press release days allows us to identify those days where the overall market reaction is strongest, which in turn, allows us to make inferences based on those press releases that are likely to be the most economically important. We have no prediction of the effect in the middle of the distribution.

We reestimate Equation (1) using these six variables in lieu of the ESG PR Day and Non-ESG PR Day variables. The results are presented in Table 8. The pattern across Q1 and Q4 for the non-ESG press releases lines up with economic intuition. Retail investors are adjusting their portfolios for both groups, and the strongest adjustments are for negative return days (i.e., Q1). The coefficient for Non-ESG PR Day in column (1) of Table 6 is 0.843. In Table 8, we can see that this overall coefficient is a combination of three parts—a coefficient of 0.642 for those events in the highest quartile of stock returns, a coefficient that is indistinguishable from 0 for those events in the middle two quartiles of stock returns, and a coefficient of 2.391 for those events in the lowest quartile of stock returns. In contrast, the coefficients on each of the ESG PR Day components are generally indistinguishable from zero. There is only one marginally significant coefficient among the 10 coefficients for ESG PR Day (Q1) and ESG PR Day (Q4), and that coefficient is negative. Overall, this evidence suggests that economic content is unlikely to explain why retail investors are not responding to ESG press releases.

#### 4.3. Assessing the Role of Visibility

Next, we use TVL data to assess whether there is a differential retail investor response based on the visibility

	(1)	(2)	(3)	(4)	(5)
Dependent variables	$\Delta RI_{t-1,t+1}$	$Adj.\Delta RI_{t-1,t+1}$	$\Delta RI$ Volatility $_{t-1,t+1}$	$Abs.\Delta RI_{t-1,t+1}$	Abs. Adj. $\Delta RI_{t-1,t+1}$
Event variables					
ESG PR Day (Q4)	-0.625	-0.693*	0.024	0.384	0.369
	(-1.45)	(-1.78)	(1.31)	(1.25)	(1.30)
ESG PR Day (Q2 & Q3)	0.006	0.005	-0.018	$-0.593^{***}$	-0.379*
	(0.02)	(0.02)	(-1.30)	(-2.91)	(-1.75)
ESG PR Day (Q1)	0.600	0.675	0.013	0.121	-0.222
-	(1.49)	(1.62)	(0.64)	(0.43)	(-0.74)
Non-ESG PR Day (Q4)	0.642**	0.659**	0.094***	0.635**	0.325
-	(2.01)	(2.09)	(5.37)	(2.53)	(1.34)
Non-ESG PR Day (Q2 & Q3)	0.157	0.235	-0.001	-0.103	-0.055
-	(0.78)	(1.11)	(-0.10)	(-0.71)	(-0.36)
Non-ESG PR Day (Q1)	2.391***	2.409***	0.111***	1.375***	0.847***
	(6.70)	(6.64)	(6.32)	(4.69)	(3.14)
EA Day	6.396***	6.292***	0.495***	5.180***	3.665***
	(11.08)	(11.11)	(13.20)	(10.19)	(7.65)
Control variables					
$Return_{t-5,t-2}$	$-0.150^{***}$	$-0.152^{***}$	0.001	-0.007	0.057***
	(-10.06)	(-10.04)	(0.59)	(-0.52)	(4.59)
$Return_{t-25,t-6}$	-0.003	-0.003	-0.000	-0.008*	0.003
	(-0.46)	(-0.41)	(-0.76)	(-1.68)	(0.59)
Firm FE and date FE	Included	Included	Included	Included	Included
Adjusted R <sup>2</sup>	0.101	0.206	0.618	0.441	0.541
Ν	28,817	28,817	28,817	28,817	28,817

 Table 8. Retail Investor Reaction to ESG Press Releases by Quartiles of Stock Returns

*Notes.* The table reports analyses of retail investors' reaction to ESG press release days grouped into quartiles by stock return, non-ESG press release days grouped into quartiles by stock return, and earnings announcement days relative to nonevent days. The analyses mirror those in Table 6 with groups of *ESG PR Day* and *Non-ESG PR Day* based on the magnitude of the firm's stock return. Definitions for each variable can be found in Appendix A. The table reports OLS coefficient estimates and (in parentheses) *t* statistics based on robust standard errors clustered by date. We include firm fixed effects (FEs) and date FEs in the regressions but do not report the coefficients.

\*Statistical significance at the 10% *p* level (two tailed); \*\*statistical significance at the 5% *p* level (two tailed); \*\*statistical significance at the 1% *p* level (two tailed).

of ESG press releases (e.g., Blankespoor et al. 2018). Unlike traditional ESG data sets that are focused on annual ratings and periodic corporate disclosure, TVL locates and analyzes ESG-relevant articles from external sources for each company to produce a daily Pulse score (e.g., see Serafeim and Yoon 2022, 2023).<sup>13</sup> The TVL Pulse score excludes firm-initiated press releases to measure how third-party stakeholders perceive ESG information. It is especially effective at identifying visibility from a retail investor perspective because its algorithms pull information from a variety of external sources, including those favored by retail investors, such as local news and social media. However, it is likely that the score is also influenced by the economic content of the ESG information. Therefore, although we use the TVL Pulse score as a way to capture visibility, it is not independent of economic content. We use the change in daily TVL Pulse score, where a positive change (i.e., an increase in the TVL Pulse score) indicates favorable ESG news. TVL made data freely available to academic researchers until its acquisition by FactSet was announced in 2020. Therefore, our analysis based on the TVL data is limited to a subset of the sample period (i.e., June 1, 2018 to July 31, 2019).

Table 9 provides summary statistics for the change in TVL Pulse score across the four types of days. Particularly

noteworthy is that the absolute change in TVL Pulse score is largest for *ESG PR Day*, validating that the ESG press releases we study are publicly visible and contain novel ESG information. The average absolute change in the TVL Pulse score for *ESG PR Day* is 1.430, which is higher than the averages of 1.127 for *Non-ESG PR Day*, 0.937 for *EA Day*, and 0.751 for *Nonevent Day*. We conduct our empirical tests by separating *ESG PR Day* events into quartiles based on the change in the TVL Pulse score. Specifically, we separate the *ESG PR Day* variable into three groups: top quartile (Q4), middle two quartiles (Q2 and Q3), and bottom quartile (Q1), where the mean

Table 9. Mean TVL Pulse Score by Type of Event Day

	Ν	$\Delta TVL \ Score_t$	Abs. $\Delta TVL$ Score <sub>t</sub>
ESG PR Days	450	0.095	1.430
Non-ESG PR Days	1,664	-0.020	1.127
EA Days	343	0.070	0.937
Nonevent Days	16,357	0.010	0.751

*Notes.* The table displays the means of  $\Delta Score_t$ , the daily change in a firm's TVL ESG Pulse score, and *Abs.*  $\Delta Score_t$ , the daily absolute change in a firm's TVL ESG score, by event type. Definitions for each variable can be found in Appendix A. The analyses using TVL data run from June 1, 2018 to July 31, 2019 because of data availability.

Dependent variables	(1)	(2) Adi ARI, 11	(3) ARI Volatility a tua	(4) Abs. ARI, 111	(5) Abs. Adi. ARI. 11
	$ma_{t-1,t+1}$	$1 m j \cdot m \alpha_{t-1,t+1}$	Life v commy t-1,t+1	$11001 \text{ mm} \text{ mm}_{t-1,t+1}$	1000 1000 1000 100t = 1,t+1
Event variables					
ESG PR Day (Q4)	0.124	-0.001	-0.002	-0.515	-0.626
	(0.21)	(-0.00)	(-0.07)	(-1.38)	(-1.37)
ESG PR Day (Q3 & Q2)	0.236	0.203	0.011	0.019	-0.198
-	(0.83)	(0.75)	(0.75)	(0.08)	(-0.91)
ESG PR Day (Q1)	0.220	0.357	-0.005	-0.703	-0.680
	(0.32)	(0.54)	(-0.14)	(-1.33)	(-1.23)
Non-ESG PR Day	0.838***	0.956***	0.060***	0.462***	0.299**
·	(4.01)	(4.34)	(5.33)	(2.90)	(1.98)
EA Day	6.998***	6.983***	0.503***	5.219***	3.321***
-	(10.05)	(10.10)	(11.03)	(8.53)	(5.91)
Control variables					
$Return_{t-5,t-2}$	$-0.187^{***}$	$-0.180^{***}$	-0.003***	$-0.051^{***}$	0.022
	(-9.39)	(-8.67)	(-3.38)	(-3.22)	(1.53)
$Return_{t-25,t-6}$	-0.021***	$-0.014^{*}$	-0.002***	-0.027***	-0.015**
	(-2.76)	(-1.71)	(-5.41)	(-4.37)	(-2.53)
Firm FE and date FE	Included	Included	Included	Included	Included
Adjusted $R^2$	0.125	0.245	0.638	0.461	0.570
N	18,814	18,814	18,814	18,814	18,814

Table 10. Retail Investor Reaction to ESG Press Releases by Quartiles of Changes in TVL Pulse Score

*Notes*. The table reports analyses of retail investors' reaction to ESG press release days split by changes in TVL score, non-ESG press release days, and earnings announcement days relative to nonevent days. Definitions for each variable can be found in Appendix A. The analyses using TVL data run from June 1, 2018 to July 31, 2019 because of data availability. The table reports OLS coefficient estimates and (in parentheses) *t* statistics based on robust standard errors clustered by date. We include firm fixed effects (FEs) and date FEs in the regressions but do not report the coefficients.

\*Statistical significance at the 10% *p* level (two tailed); \*\*statistical significance at the 5% *p* level (two tailed); \*\*\*statistical significance at the 1% *p* level (two tailed).

change in the TVL Pulse score is 2.48 in Q4, 0.00 in Q2 and Q3, and -2.24 in Q1. In a broad sense, the top quartile captures events that provide the most positive change in the TVL Pulse score, the bottom quartile captures events that provide the most negative change in the TVL Pulse score, and the middle two quartiles are associated with no change in the TVL Pulse score.

The results, provided in Table 10, indicate that the lack of retail investor portfolio adjustment is consistent across all groupings. There are no statistically significant coefficients among the 10 coefficients for *ESG PR Day* (*Q*1) and *ESG PR Day* (*Q*4), and the insignificant coefficients are both positively and negatively signed. These results provide evidence that the visibility of the ESG press release is unlikely to change our conclusion, as retail investors do not appear to respond to even the most visible ESG announcements.

#### 4.4. Fortune's "100 Best Companies to Work for" Event Study

Lastly, we consider one specific type of ESG press release—the announcement that the company has either been added to or improved its ranking on the "100 Best Companies to Work for" list (i.e., *Best100*), published annually by *Fortune* magazine. We use the *Best100* for two reasons. First, prior research has used the *Best100* to document a positive relation between employee satisfaction (a component of ESG performance) and equity returns. Edmans (2011) finds that a value-weighted portfolio of the *Best100* earned abnormal returns of 3.5% per year from 1984 to 2009, which implies that inclusion in the *Best100* is associated with long-term value creation. Second, it is a highly visible event,<sup>14</sup> and it is relatively straightforward for investors to process the consequence of inclusion on this list, given its prominence across industries.<sup>15</sup> In our study, we rely on this known event day response to examine whether retail investors adjust their portfolio holdings. Overall, the *Best100* provides a setting where the news is highly visible, easy to process, and unambiguously positive from an ESG perspective.

Tables 11 and 12 provide descriptive information for the sample we use for this analysis. Table 11 outlines the sample selection procedure. There are 48 public firms on the *Best100* list in either 2019 or 2020, and we use the 478 S&P 500 firms that were not included on these lists as the control firms. Each firm is included for two event dates on which *Fortune* announced the *Best100* list: (1) February 14, 2019 and (2) February 18, 2020, resulting in a maximum of 1,052 firm days for the event study. We drop firm-day observations without requisite data (including Robinhood data) and firmday observations whose earnings release coincided with the *Best100* announcement. This leaves a total sample of 941 firm-day observations, including 46 firmday observations where the firm's ranking on the

Sample selection criteria	# of Firms	# of Firm Days
Public firms on "100 Best Companies to Work for" list (2019 or 2020)	48	
S&P 500 firms (excluding "100 Best Companies to Work for" firms)	478	
Maximum number of firm days for event study		1,052
Matched to CRSP/Compustat and Robinhood data		1,024
All requisite regression variables		1,021
Nonoverlap with earnings announcements		941
"100 Best Companies to Work for" event study sample		941

Table 11. Fortune's "100 Best Companies to Work for" Event Study Sample Formation

*Notes.* The table details the sample formation process for the "100 Best Companies to Work for" event study analyses. The sample includes firms that are members of either the *Fortune*'s "100 Best Companies to Work for" list in 2019 or 2020 or the S&P 500 at any point from January 1, 2019 through February 29, 2020. Each firm is included for two event dates on which *Fortune* announced its 2019 and 2020 lists: (1) February 14, 2019 and (2) February 18, 2020, resulting in a maximum of 1,052 firm days for the event study. We then matched each firm day to CRSP/Compustat/Robinhood (1,027 remaining). We required that variables used in our analyses be nonmissing (1,021 remaining) and that the event day not be within the three-trading day period centered on a firm's earnings announcement (941 remaining). See Appendix A for variable descriptions.

*Best100* improved from the previous year's list or the firm was unranked in the previous year and ranked in the current year. The control sample of 895 firm-day observations consists of 26 firm-day observations where the firm's ranking deteriorated from the previous year's list or S&P 500 firms that were not included on the *Best100* in either 2019 or 2020. The descriptive statistics for this sample, provided in Table 12, show, as expected, that the firms in this analysis are somewhat larger and have more investors on Robinhood than the sample used in our main analyses.

We employ the following specification to test the response of retail investors to the announcement of an improvement for the firm on the *Best100*:

$$RI\_RESPONSE_{i,t} = \alpha + \beta_1 Better \ Rank_{i,t} + \sum \gamma_j Controls_{i,t} + \varepsilon_{i,t}.$$
(3)

The specification follows from Equation (1). We use the same five outcome variables to measure the retail investor response (*RI\_RESPONSE*<sub>*i*,*i*</sub>) but no longer include firm or

date fixed effects because these analyses examine only the investor response surrounding the two dates where *Best100* is announced. Because we no longer include firm fixed effects, we supplement the control variables in Equation (1) with *Size*, *M/B*, and *ROA*. The variable of interest, *Better Rank*, is an indicator variable that takes the value of one for those firms whose ranking on the *Best100* improved from the previous year's list or those that were unranked in the previous year and ranked in the current year and zero otherwise. The results are presented in Table 13. Across each column, the coefficient on *Better Rank* is insignificant, indicating no detectable change in the portfolios of retail investors in response to the *Best100* announcement.

As with our prior analyses, this lack of retail investor response is not because of a lack of economic content or statistical power. In untabulated analyses, we use an event study design, where we measure returns over the three-day window centered on the *Best100* announcement using the firm's market-adjusted returns. We

**Table 12.** Fortune's "100 Best Companies to Work for" Event Study Descriptive Statistics (N = 941)

Variable	Mean	Standard deviation	P1	P25	Median	P75	P99
Investor reaction variable	es						
Unscaled RI <sub>t</sub>	7,318	22,819	60	401	1,182	3,663	161,255
Unscaled $\Delta RI_{t-1,t+1}$	29	177	-374	-6	2	15	1,198
$\Delta RI_{t-1,t+1}$	2.803	16.838	-31.284	-0.585	0.196	1.487	106.752
Adj. $\Delta RI_{t-1,t+1}$	-5.877	23.348	-164.056	-3.602	-0.828	0.027	31.868
$\Delta RI V olatility_{t-1,t+1}$	0.648	1.699	0.032	0.112	0.201	0.423	12.861
Abs. $\Delta RI_{t-1,t+1}$	5.819	17.851	0.000	0.321	1.006	3.425	133.854
Abs. Adj. $\Delta RI_{t-1,t+1}$	8.743	26.548	0.021	0.437	1.317	4.819	185.466
Control variables							
$Return_{t-5,t-2}$	1.357	2.890	-6.148	-0.019	1.457	2.696	10.820
$Return_{t-25,t-6}$	3.933	7.605	-15.461	-0.902	4.486	8.951	22.394
Size	9.994	1.101	7.507	9.260	9.863	10.694	12.825
M/B	4.965	17.814	-67.776	1.264	2.456	5.291	122.696
ROA	1.066	2.735	-12.571	0.323	1.080	2.340	7.751

Notes. The table presents distributional descriptive statistics for variables used in our "100 Best Companies to Work for" analyses. See Appendix A for variable descriptions.

Dependent variables	(1) $\Delta R I_{t-1,t+1}$	(2) Adj. $\Delta RI_{t-1,t+1}$	(3) $\Delta RI \ Volatility_{t-1,t+1}$	(4) Abs. $\Delta RI_{t-1,t+1}$	(5) Abs. Adj. $\Delta RI_{t-1,t+1}$
Event variable					
Better Rank	1.713	-3.965	0.408	4.493	4.716
	(0.44)	(-1.12)	(1.12)	(1.20)	(1.22)
Control variables				, , ,	
$Return_{t=5,t=2}$	0.841***	0.804***	0.037	0.475	0.206
,	(2.69)	(2.78)	(1.21)	(1.38)	(0.50)
$Return_{t-25,t-6}$	-0.115	0.160	-0.015*	-0.178**	-0.261**
,	(-1.62)	(1.49)	(-1.91)	(-2.32)	(-2.33)
Size	2.757***	-6.051***	0.471***	4.502***	7.576***
	(3.55)	(-5.35)	(6.60)	(5.99)	(6.30)
M/B	0.017	0.007	0.002	0.010	0.004
	(0.97)	(0.34)	(1.00)	(0.58)	(0.18)
ROA	-0.074	0.676***	-0.030**	-0.147	-0.595***
	(-0.52)	(3.64)	(-2.05)	(-1.04)	(-2.93)
Adjusted R <sup>2</sup>	0.048	0.078	0.087	0.078	0.086
N	941	941	941	941	941

Table 13. Retail Investor Reaction to Announcement of Fortune's "100 Best Companies to Work for" List

*Notes.* The table reports analyses of retail investors' reaction to the announcement of *Fortune*'s "100 Best Companies to Work for" list for firms whose ranking improved relative to firms whose ranking declined and S&P 500 firms that did not make the list. The regression analysis includes firms that are members of either the *Best100* list in 2019 or 2020 or the S&P 500 at any point from January 1, 2019 through February 29, 2020. The two event dates are those on which *Fortune* announced its 2019 and 2020 lists: (1) February 14, 2019 and (2) February 18, 2020. Our variable of interest, *Better Rank*, is an indicator variable for firms whose ranking on the list improved from the previous year's list, including those firms that were unranked in the previous year and are ranked in the current year. For details on the remaining variables, see Appendix A. The table reports OLS coefficient estimates and (in parentheses) *t* statistics based on robust standard errors.

\*Statistical significance at the 10% p level (two tailed); \*\*statistical significance at the 5% p level (two tailed); \*\*statistical significance at the 1% p level (two tailed).

control for Size, M/B, and  $Return_{t-251,t-26}$  to capture long-term momentum. The untabulated results show a positive market response to firms improving on the *Best100* relative to the control firms. These results suggest that the broader market interprets the Best100 announcement as positive, consistent with the results in Edmans (2011). In addition, the statistical significance of the returns indicates that our sample of 941 firm-day observations does not lack the power necessary to detect capital market responses. Overall, our analyses indicate that retail investors do not respond to the Best100 announcement, despite the fact that it is a highly visible event with economic content that is relatively easy to process. We interpret this as evidence that retail investors do not appear to respond even when the content of the ESG press release is relatively easy to integrate and hence, that integration difficulty is unlikely to be influencing the overall response to ESG press releases by retail investors.

#### 5. Conclusion

Our results consistently show that there are no detectable portfolio adjustments by retail investors in response to ESG press releases and that the absence of a retail investor response is unlikely to be attributable to a lack of economic content, a lack of visibility, or integration difficulties. Because our analyses focus on short-term portfolio adjustments, they do not consider all of the possible ways that investors could process ESG disclosures. As a result, our findings are only an initial exploration of a very important research question, and we leave it to future studies to investigate the overall demand for ESG disclosures and to consider other ways in which different investor classes process this type of information.

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#### **Appendix A. Variable Definitions**

Table A.1. Variable Definitions

Variable	Definition
Investor reaction variables	
Unscaled RI <sub>t</sub>	The number of Robinhood investors who own the firm's stock on day t.
Unscaled $\Delta RI_{t-1,t+1}$	The three-day change in the number of Robinhood investors who own the firm's stock centered on day $t$ .
$\Delta RI_{t-1,t+1}$	The three-day change in the number of Robinhood investors who own the firm's stock centered on day $t$ . This value is then scaled by the natural logarithm of a firm's assets.
Adj. $\Delta RI_{t-1,t+1}$	Adjusts $\Delta RI_{t-1,t+1}$ for the aggregate growth of Robinhood investor positions by taking the actual change in Robinhood investors minus an expected change in Robinhood investors, where the expected change in Robinhood investors is defined as the firm's percentage share of total Robinhood investor positions on day $t - 2$ multiplied by the change in total Robinhood investor positions during the three-day window centered on day $t$ . This value is then scaled by the natural logarithm of a firm's assets.
$\Delta RI \ Volatility_{t-1,t+1}$	The standard deviation of hourly changes in the number of Robinhood investors who own the firm's stock over the three-day window centered on day <i>t</i> . This value is then scaled by the natural logarithm of a firm's assets.
Abs. ARI, 1411	The absolute value of $\Delta R_{L-1+1}$ .
Abs. Adi. $\Delta RI_{t-1,t+1}$	The absolute value of $Ad_i$ , $\Delta R_{l-1+1}$ .
Abs. $CAR_{t-1,t+1}$	The absolute value of the firm's cumulative stock return, adjusted for the value-weighted CRSP index, over the three-day window centered on day <i>t</i> .
Share $Turnover_{t-1,t+1}$	The total number of shares traded over the three-day window centered on day $t$ scaled by shares outstanding at the previous quarter end.
Days of interest	
ESG PR Day	Days on which the firm released an environmental-, social-, or governance-related press release as identified by CSRWire or RavenPack Analytics (see Appendix B for details) and did not announce earnings. This variable takes the value of 1 if a day meets the criteria for this type of day and 0 otherwise.
Non-ESG PR Day	Days on which the firm released a press release that is not environmental, social, or governance related, and the firm did not release an ESG press release or announce earnings. This variable takes the value of 1 if a day meets the criteria for this type of day and 0 otherwise.
EA Day	Days on which the firm announces earnings as identified by the earlier of IBES or Compustat. This variable takes the value of 1 if a day meets the criteria for this type of day and 0 otherwise.
Nonevent Day	All days in our sample period that are not designated as an ESG PR Day, Non-ESG PR Day, or EA Day. Further, if a day meets the criteria of a Nonevent Day but is the trading day directly before or after an EA Day or Non-ESG PR Day, then it is excluded from the sample. These observations are excluded because the three-day measurement period captures the reaction to days $t - 1$ and $t + 1$ . This variable takes the value of 1 if a day meets the criteria for this form of day and 0 athenvite.
Additional variables	takes the value of 1 if a day meets the cifteria for this type of day and 0 otherwise.
Return 54 2	The firm's cumulative stock return over the window $t = 5$ to $t = 2$ .
Return $25 \pm 6$	The firm's cumulative stock return over the window $t = 25$ to $t = 6$ .
$Return_{t=251,t=26}$	The firm's cumulative stock return over the window $t - 251$ to $t - 26$ .
Size	The natural logarithm of market value of equity.
M/B	The ratio of market value of equity divided by book value of equity.
ROA	The ratio of earnings before extraordinary items divided by average total assets of quarters $q$ and $q - 1$ .
$\Delta TVL \ Score_t$	The daily change in a firm's Truvalue Labs ESG Pulse score.
Abs. $\Delta TVL \ Score_t$	The absolute value of $\Delta TVL \ Score_t$ .
Better Rank	Indicator variable equals 1 for firms whose ranking on <i>Fortune</i> 's "100 Best Companies to Work for" list improved from the previous year's list, including those firms that were unranked in the previous year and are ranked in the current year, and equals 0 otherwise.

*Notes*. This table presents the definitions of variables used in our analyses. Robinhood data are downloaded from https://robintrack.net./. Return and share volume data are downloaded from CRSP. Press release data are from CSRWire and RavenPack Analytics. Accounting data are from Compustat or IBES. The TVL data were provided by Truvalue Labs. Accounting variables and market values are measured as of the previous fiscal quarter end unless specified otherwise.

#### Appendix B. Press Release Classification

This appendix describes how we classified ESG press releases into environmental, social, or governance categories.

Classification	Keywords
Environmental	Environment; green building; green products & services; renewable & alternative energy; sustainability; technology
Social	academia; activism; careers; community development; economic development; fair trade & supply chain; health & wellness; human resources & diversity; human rights; philanthropy & corporate contributions; social entrepreneurship; volunteerism; women
Governance	Business ethics; corporate governance; socially responsible investing; stakeholder engagement
Manually classified	Events; finance; ratings & awards; research, reports & publications

*Notes*. This table presents the press release keywords and their classifications for CSRWire press releases. On the CSRWire website, each press release is tagged with at least one of the keywords. In a first step, we categorized these keywords into ESG categories. Keywords that are ambiguous were classified into the manually classified category. In a second step, we classified the press releases into the ESG categories based on the keyword mappings. For press releases with keywords belonging to more than one ESG category as well as press releases with keywords only belonging to the manually classified category, we reviewed the press releases to better understand the issues and help us with its classification. We also ensured that at least two members of the research team independently classified each of these press releases and then discussed and resolved the cases with disagreements.

Table B.2. RavenPack ESG Press Releases

Classification	Keywords
Environmental	None in our sample
Social	<i>Group</i> = regulatory and <i>Type</i> = regulatory investigation; <i>Group</i> = corporate responsibility and <i>Type</i> = sponsorship; <i>Group</i> = corporate responsibility and <i>Type</i> = donation
Governance	<i>Group</i> = labor issues and <i>Type</i> = executive appointment; <i>Group</i> = labor issues and <i>Type</i> = executive death; <i>Group</i> = labor issues and <i>Type</i> = executive resignation; <i>Group</i> = labor issues and <i>Type</i> = executive salary
Manually excluded	<i>Group</i> = labor issues and <i>Type</i> = hirings; <i>Group</i> = legal and <i>Type</i> = legal issues; <i>Group</i> = legal and <i>Type</i> = settlement; <i>Group</i> = legal and <i>Type</i> = verdict; <i>Group</i> = legal and <i>Type</i> = patent infringement; <i>Group</i> = legal and <i>Type</i> = sanctions; <i>Group</i> = regulatory and <i>Type</i> = regulatory stress test

*Notes.* This table presents the press release keywords and their classifications for RavenPack press releases. Each RavenPack press release is tagged with a *Topic, Group,* and *Type* (listed here in the order of increasing specificity). In a first step, we retrieved all press releases using the list of 14 *Group* values. Ten *Group* values were not found in our sample (these were aid, bankruptcy, civil unrest, crime, health, industrial accidents, natural disasters, pollution, security, and war conflict). In a second step, for each *Group* variable and *Type* variable combination (*Group-type*) in our sample, at least two members of the research team independently classified the *Group-type* into one of the three ESG categories. In cases of disagreement, the research team discussed and resolved the classification decisions. Select *Group-type* values were excluded (i.e., manually excluded category) because of insufficient information.

#### Endnotes

<sup>1</sup> Robinhood is a Financial Industry Regulatory Authority-approved, SEC-registered broker-dealer that enables individuals to purchase stocks, exchange-traded funds, options, and cryptocurrency through the Robinhood website or mobile app. It had 4.3 million monthly active users as of December 2019.

<sup>2</sup> Although the lack of economic content explanation focuses on the information content or the materiality of the disclosure signal itself (e.g., Khan et al. 2016), the lack of visibility and integration difficulties explanations take an investor information processing perspective and closely follow the "awareness, acquisition, and integration" framework for how investors process a disclosure for use in trading decisions introduced by Blankespoor et al. (2019).

<sup>3</sup> Welch (2022) found that the "crazy mob" narrative that emerged in the wake of events surrounding the stock of Gamestop, Inc. was not supported by the data and that the aggregate Robinhood portfolio is a good proxy for the household equal-weighted portfolio.

<sup>4</sup> For example, see Commissioner Allison Herren Lee's August 26, 2020 comments about the need to explicitly require certain types of

ESG disclosures as part of Regulation S-K, available at https:// www.sec.gov/news/public-statement/lee-regulation-s-k-2020-08-26#\_ftn23. She notes in part that it "has never been more clear that investors need information regarding, for example, how companies treat and value their workers, how they prioritize diversity in the face of profound racial injustice, and how their assets and business models are exposed to climate risk as the frequency and intensity of climate events increase."

<sup>5</sup> In the *Handbook of Economic Field Experiments* chapter on the psychology of construal, Paluck and Shafir (2017, p. 261) state that "social desirability bias'—the tendency to answer questions in a manner that will be viewed favorably by others, in this case by the experimenters—is a serious risk."

<sup>6</sup> Robintrack began pulling data from Robinhood's real-time API in early May 2018. After discussions with the creator of Robintrack and reviewing the data ourselves, we begin our sample on June 1, 2018 because the data are not consistently retrieved for most of May 2018. As of August 2020, Robinhood discontinued the public disclosure of these data. Any data that were collected prior to August 2020 remain publicly available. <sup>7</sup> The reduction in the sample of press releases from 2,203 to 477 is consistent with other studies. For example, a similar pattern can be observed in Griffin and Sun (2013), which uses CSRWire to assess the market reaction to CSR-related news releases from 2000 through 2010. According to table 1 in Griffin and Sun (2013), the authors identified 575 "greenhouse gas emission"-related PRs, but the final sample is reduced to 172 PRs once they exclude noncompany disclosure and nonmatches to Compustat/CRSP.

<sup>8</sup> There is sometimes a delay between the firm's press release date and the posting date on CSRWire. Therefore, we manually checked the press release event date for all 460 CSRWire press releases and made corrections where appropriate.

<sup>9</sup> Our conclusions are unchanged when we use a five-day event window.

<sup>10</sup> Scaling is necessary in our analyses because otherwise, the Robinhood variables would generally take on larger values for larger firms, and hence, our results could be in part attributable to firm size. As a robustness test, we use unscaled values for each of our dependent variables and find similar results.

<sup>11</sup> We ensure that our research design is not adversely influenced by our fixed effect structure by performing the fixed effect diagnostic tests recommended in deHaan (2021). There are very few observations that do not have variation within fixed effects. For example, for the firm fixed effects, there are two firms without a non-ESG PR day. Overall, all of our independent variables of interest (i.e., event variables) retain over 95% of the variation after including the fixed effects.

<sup>12</sup> The coefficients in Table 6, columns (4) and (5) are difficult to compare because the coefficients on *ESG PR Day* are negative.

<sup>13</sup> Every day, TVL uses machine learning to find ESG-relevant articles for each company and classifies the news not only as positive versus negative in a binary way but also, by degrees of positivity or negativity. Its proprietary system uses natural language processing to interpret semantic content. According to TVL, the change in sentiment score captures new news (i.e., THE TVL Pulse score changes only when there is new news), and the score is specific to visible events about which the news articles are written. See section 3.1 in Serafeim and Yoon (2023) for a detailed description and interpretation of the TVL data.

<sup>14</sup> Edmans (2011) notes that the *Best100* "is also particularly visible: from 1998 it has been widely disseminated by *Fortune*, and it covers large companies (median market value of \$5bn in 1998). Moreover, it is released on a specific event date which attracts widespread attention, because it discloses information on several companies simultaneously" (Edmans 2011, p. 622).

<sup>15</sup> For this reason, Edmans (2011) excludes any event-study reaction to list inclusion and captures only long-run drift in his analyses of the long-term consequences to employee satisfaction.

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