

# The Irrelevance of ESG Disclosure to Retail Investors: Evidence from Robinhood

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## Abstract

Using an hourly dataset on retail investor individual security positions from Robinhood Markets, we find that ESG disclosures are irrelevant to retail investors' buy and sell decisions. The response to ESG press releases by retail investors is no different than the routine portfolio adjustments that occur on non-event days. In contrast, these same investors make economically meaningful changes to their portfolios in response to press releases that do not pertain to ESG, especially those that pertain to earnings announcements. Our findings are not due to a lack of statistical power or other data shortcomings. Retail investor indifference persists for ESG announcements that prior research has found to generate long-run shareholder returns. Our conclusions contrast with evidence from experimental studies that retail investors respond favorably to ESG disclosures.

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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). These investor preferences are important because they give rise to investor clientele and base effects, which ultimately have an influence on firms' cost of capital and future operating decisions (Christensen, Hail, Leuz, 2018; Naughton, Wang, and Yeung, 2019). While Hartzmark and Sussman (2019) find empirical evidence supporting these conjectured effects for mutual fund investors, the evidence on retail investors trading in individual companies is limited to experimental studies (e.g., Martin and Moser, 2016; Cheng, Green, and Ko, 2015). We complement these experimental studies by examining a similar research question—whether retail investors adjust their portfolios in response to ESG disclosures—but do so using an empirical archival approach that adds another dimension to our understanding of this important phenomena (e.g., Bloomfield, Nelson, and Soltes, 2016; Levitt and List, 2007).

We use data from Robinhood Markets Inc. (Robinhood) to provide direct evidence on retail investor portfolio decisions. To our knowledge, this study was the first to utilize Robinhood in an academic research setting. Robinhood is a FINRA-approved, SEC-registered broker-dealer that enables individuals to purchase stocks, exchange-traded funds, options, and cryptocurrency through the Robinhood website or mobile app. More than 10 million retail investors had registered with the company as of December 2019. A unique feature of Robinhood is that it 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 obtained a time-series of this popularity data from Robintrack, an independent website that retrieves the Robinhood popularity data for stocks and

ETFs on an hourly basis. The data we use contains the number of retail investors who own a particular security each hour from June 1<sup>st</sup>, 2018 through December 31<sup>st</sup>, 2019. Our proxy for ESG disclosure is firm-initiated ESG press releases on 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 surveys or studies of ESG performance because the press releases typically contain new information (Griffin and Sun, 2013). In contrast, information from ESG performance studies are typically made available several months after the underlying ESG activities. The press release data is also suited to the research design we employ, which is similar to a staggered event study that compares outcome variables across event and non-event days.

We use Robinhood data to produce a set of variables that capture retail investor portfolio changes—we measure the changes, absolute changes, and volatility in hourly changes in the number of retail investors over three-day windows centered on event days. We focus on the individual security level so that we can match firm disclosures with trading in that firm’s stock. 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. Collectively, these variables provide insights into whether new disclosures influence retail investor portfolios, and more specifically, whether they create more or less turnover among retail investors.

We begin our analysis by finding a substantial difference in how retail investors respond to ESG versus non-ESG press releases, and in particular, by finding that there is less portfolio reallocation and less growth in the number of investors in response to ESG press releases when compared to non-ESG press releases. This analysis focuses on the differential response across ESG

and non-ESG press releases by excluding earnings announcements and non-event days. The underlying assumption for this test is that investors receive information from the firm on both types of day, and that the primary difference is whether the information is ESG or non-ESG related. The effects we document are economically meaningful—for example, we find that the volatility (i.e., the turnover in the number of investors) over the three-day window centered on the press release day is approximately 15 percent lower for ESG than non-ESG press releases.

The inferences from these results are potentially at odds with the prior experimental literature on retail investors. In both the Cheng, Green, and Ko (2015) and Martin and Moser (2016) studies, the participants place a value on ESG disclosures and are more willing to take positions in companies providing these disclosures, while our evidence shows no such investing behavior. However, this interpretation is not conclusive because it relies on a relative comparison with non-ESG press release days. In other words, it could be that investors are adjusting their portfolios in response to ESG disclosures, just not as strongly as they adjust in response to non-ESG disclosures.

We address this possibility by extending our analysis to include non-event days and compare the retail investor response relative to these non-event days separately for ESG and non-ESG disclosures. These analyses show that investors respond to non-ESG press releases but that there is no detectable response to ESG press releases. The coefficients are positive and strongly significant in each specification that examines the response to a non-ESG press release, but indistinguishable from zero for ESG press releases. Overall, these results indicate that the retail investor response to an ESG press release is indistinguishable from the investor response to no press release. The lack of significance is not due to statistical power, as the coefficient estimates

for ESG press release days are estimated with similar precision as non-ESG press release days (i.e., the standard errors are similar in magnitude).

One potential concern with the interpretation of our results is the possibility that the ESG press releases lack the information content of the non-ESG press releases.<sup>1</sup> We examine and rule out this potential concern in two ways. First, we specifically examine whether there is a differential market return response to ESG versus non-ESG press releases (excluding announcements during earnings periods) and find no evidence suggesting any difference. Second, 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* (“*Best100*”), published annually by Fortune magazine. The *Best100* represents a setting where the news is easy to understand, highly visible, and positive from a value relevance perspective (Edmans, 2011). Even though our event study tests document a positive abnormal return for those firms that are receiving favorable news from *Best100*, we do not find any detectable change in any of our measures of retail investor activity. These findings provide additional support for our conclusion that retail investors appear to ignore ESG press releases.

Collectively, our results suggest that retail investors do not adjust their portfolios in response to ESG announcements. The response to ESG press releases is no different than the routine portfolio adjustments that occur on non-event days. That is, retail investors make as many changes to their portfolios on days when there is an ESG press release as on days when there are no press releases. In contrast, these same investors make economically meaningful changes to their portfolios in response to press releases that do not pertain to ESG, especially those that are earnings announcements. Our analyses do not indicate that these stark differences in retail investor portfolio

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<sup>1</sup> We note that prior research finds that retail investors view ESG disclosures favorably even when the disclosed ESG initiatives do not generate positive cash flows (e.g., Martin and Moser, 2016).

adjustments are due to differences in the information content of ESG versus non-ESG press releases. The market return response is no different for ESG versus non-ESG press releases. Moreover, even in the *Best100* setting where the news generates positive event-day abnormal returns, retail investors do not appear to adjust their holdings. Overall, it appears that retail investors view ESG disclosures as irrelevant when making portfolio allocation decisions.

There are a few caveats and clarifications to our conclusions. First, our results do not examine whether retail investors care about ESG performance, nor do we examine other possible investment vehicles, such as mutual funds. Rather, we focus only on the trading of individual firm securities by Robinhood investors in response to firm-specific disclosures. Second, even though Robinhood data provides insights into the trading of a substantial number of retail investors, it is possible that the actions of Robinhood investors may not accurately reflect those of the entire population of retail investors. For example, there are some aspects of Robinhood’s platform which suggest that it caters towards smaller investors who actively trade securities.<sup>2</sup> We view this difference as advantageous in our setting, as the ease of trading increases the power of our empirical tests. In addition, a narrative emerged in the wake of the events surrounding the stock of Gamestop, Inc. that characterized Robinhood investors as a “crazy mob.”<sup>3</sup> Welch (2021) concludes that the “crazy mob” narrative is inaccurate, that the aggregate Robinhood portfolio is a very good proxy for the household-equal-weighted portfolio, and that the performance is similar to that found in other studies using retail investor data, such as Barber and Odean (2000). Therefore, while we

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<sup>2</sup> For example, Robinhood allows users to purchase fractional shares and does not charge a commission for equity trades.

<sup>3</sup> Andrew Left of Citron referred to Robinhood Investors as the “angry mob” in response to the rapid increase in Gamestop’s stock price from \$20 to over \$300 in January, 2021. The extraordinary increase in Gamestop’s stock price generated substantial losses for hedge funds that had previously held short positions on the stock. For example, see <https://www.cnbc.com/2021/01/29/citron-research-short-seller-caught-up-in-gamestop-squeeze-pivoting-to-finding-long-opportunities.html>.

cannot account for all the differences between Robinhood investors and the general population of retail investors, we don't believe that these differences are enough to affect our conclusions.<sup>4</sup> Nonetheless, we acknowledge this is a potential weakness in our study.

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 disclosure of ESG activities tend to attract institutional investors. Hartzmark and Sussman (2019) exploit the introduction of ESG ratings by Morningstar to show that perceptions about sustainability drive mutual fund flows: being categorized as low (high) sustainability results in net outflow (inflow) by mutual funds. Our evidence suggests that retail investors do not adjust their holdings of individual firm securities in response to ESG disclosures.

Second, we contribute to the literature that examines how retail investors view ESG disclosures about the firm. Experimental research by Martin and Moser (2016) finds that retail investors positively value managers' disclosures of unprofitable green investments, particularly when the disclosures focus on the societal benefits of their investments. Cheng, Green, and Ko (2015) use two different experiments to document that nonprofessional investors perceive ESG indicators to be more important, and are more willing to invest in the company, if ESG indicators have higher strategic relevance. While participants view ESG disclosures favorably in a laboratory setting, our results indicate that these disclosures do not affect retail investors' actual portfolio choices even when those disclosures are associated with long-term shareholder value. This finding

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<sup>4</sup> Many practitioner articles and research studies have also begun to use Robinhood trading data as a proxy for individual retail investor activity. For example, Wolfe Research introduced a suite of stock-selection signals based on retail participation estimated using Robinhood/Robintrack data (Wolfe Research, 2020).

confirms the importance of using different approaches to validate important research questions (e.g., Bloomfield, Nelson and Soltes, 2016).

Our findings are also of practical importance given the increased focus on the development of standardized corporate ESG disclosures by politicians and regulators. The SEC has recently noted the increasing importance of ESG disclosures and indicated that the needs of financial statement users are not being met under the current regime.<sup>5</sup> Moreover, the demand from a broad base of investors for more ESG disclosures has grown substantially over time. For example, investors representing more than \$29 trillion in assets called on the SEC in July 2020 to issue rules requiring corporate climate risk disclosure.<sup>6</sup> Our evidence that retail investors do not appear to respond to firm specific ESG disclosures should be considered in the development of future disclosure regulation.

We proceed as follows. Section 2 provides the literature review and hypothesis development and Section 3 outlines our data collection and sample construction. We present our research design and results in Section 4, and then conclude in Section 5.

## **2. Literature Review and Hypothesis Development**

While there is a large literature that examines the financial consequences of ESG initiatives (e.g., Cheng and Watson, 2015), the studies that examine the consequences of ESG disclosure for investor portfolios do not require that there be financial benefits to ESG performance and

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<sup>5</sup> For example, see Commissioner Allison Herren Lee’s Aug. 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](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>6</sup> The press release is available at <https://www.ceres.org/news-center/press-releases/40-investors-nearly-1-trillion-join-other-leaders-urge-us-financial>.



disclosure. Rather, these studies are derived from 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 of ESG initiatives. They also predict that investors who have a preference for ESG activities will respond to information about the 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 (Christensen, Hail, and Leuz, 2018).

Prior studies have examined how ESG information influences different classes of investors. Hartzmark and Sussman (2019) exploit the introduction of 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. For retail investors, prior studies rely on controlled laboratory experiments. Cheng, Green, and Ko (2015) use two different experiments to document that nonprofessional investors (graduate masters students) perceive ESG indicators to be more important, and are more willing to invest in the company, if ESG indicators have higher strategic relevance. Martin and Moser (2016) find that investors (undergraduate students) positively value managers' decisions to contribute to an environmental charity and respond positively to disclosures of such contributions even when they reduce firm cash flows. In both studies, the general view is that retail investors are more willing to invest in companies that pursue ESG initiatives and provide ESG disclosures. Consistent with Friedman and Heinle (2016), the

conclusions in these papers are not based on the notion that the disclosed ESG activities generate positive future cash flows for the firm. Rather, they are driven by retail investor preferences for ESG focused firms.

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. We believe the continued examination of this important research question is warranted because, as stated by Bloomfield, Nelson, and Soltes (2016), the literature can best progress by including complementary contributions from a variety of methods to advance our knowledge of important phenomena. In addition, the decision-making environment inside the laboratory versus outside is likely to be materially different in our case, thus leaving open the possibility that our empirical setting generates different conclusions.

In reference to the external validity of laboratory experiments, Levitt and List (2007) note that the financial implications, the nature and extent of scrutiny by others, the particular context in which a decision is embedded, and the manner in which participants and tasks are selected can all impact whether results generalize outside the carefully controlled setting of the laboratory. In the context of our research question, it is plausible that the participants in the laboratory experiments were willing to assign higher values to ESG disclosures because doing so has modest financial implications, whereas actual retail investors are impacted by their portfolio allocation decisions and may be more focused on generating positive investment returns. Additionally, the participants knew they were being observed in the experimental setting, and so their answers may be influenced by social desirability bias (Paluck and Shafir, 2017).<sup>7</sup> In contrast, the Robinhood investors are

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<sup>7</sup>In the *Handbook of Economic Field Experiments* chapter on the psychology of construal, Paluck and Shafir (2017) state, “‘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...”

acting in private and, thus, are unaffected by this bias. There are almost certainly other differences in our setting across the dimensions identified by Levitt and List (2007), but these additional differences only add to our view that further research using different methods is necessary.

### **3. Data and Sample**

#### **3.1 Retail Investor Data**

Our retail investor data tracks the trading activities of retail investors who use Robinhood Markets Inc. as their brokerage firm. Robinhood is a FINRA-approved, SEC-registered broker-dealer that enables individuals to purchase stocks, exchange-traded funds (ETFs), options, and cryptocurrency through the Robinhood website or mobile app. Launching in 2015, Robinhood was the first brokerage with zero-commission trades, and, as of December 2019, more than 10 million retail investors have registered with the company. This compares to Charles Schwab, Fidelity, E-Trade, and TD Ameritrade who each have 12 million, 30 million, 5 million, and 11 million investors, respectively.<sup>8</sup> According to a survey, Robinhood investors have a median age of 30, tend to be new investors (i.e., 50% are first-time investors), and have between \$1,000 and \$5,000 in their brokerage account.<sup>9</sup> Thus, Robinhood investors are well suited to provide information about retail investors.<sup>10</sup>

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

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<sup>8</sup> Source: <https://blog.robinhood.com/?offset=1579010442457>;  
<https://www.investopedia.com/articles/professionals/110415/biggest-stock-brokerage-firms-us.asp>

<sup>9</sup> Source: <https://techcrunch.com/2020/02/20/robinhood-profiles-morgan-stanley-etrade/>

<sup>10</sup> Previous studies on retail investors often use trade size as a proxy for retail order flow. However, as computer algorithms have become an important feature of institutional order executions, trade size partition has become substantially less useful as a proxy for retail order flow (e.g., Boehmer, Jones, Zhang, and Zhang, 2020).

Robinhood popularity data for stocks and ETFs on an hourly basis via a public API. Our sample starts on June 1<sup>st</sup>, 2018, when Robintrack’s time-series database first became available (see Figure 2 for an example).<sup>11</sup> For every security that is available to purchase on Robinhood, the Robintrack data provides the security ticker symbol, a timestamp of when the API was accessed, and the number of Robinhood investors who own the security.<sup>12</sup>

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 June 1<sup>st</sup>, 2018 – December 31<sup>st</sup>, 2019. The growth in securities available is primarily driven by an increase in the number of ETFs. Total investor positions more than doubles 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 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 year-quarter (i.e., year-quarter fixed effects), which allows us to better identify the abnormal change for a particular type of press release.

### **3.2 ESG Press Releases Sample**

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

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<sup>11</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<sup>st</sup>, 2018 because the data is not consistently retrieved for most of May 2018. As of August 2020, Robinhood discontinued the public disclosure of this data. Any data that was collected prior to August 2020 remains publicly available.

<sup>12</sup> Robinhood data tracks the number of investors who own a security but does not capture the trading activities of investors who have an existing position in the security and add to their position or sell some, but not all, of their position.

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

Next, we matched CSRWire press releases to CRSP/Compustat company names, resulting in 477 press releases disclosed by a public company. We used a name matching algorithm and then verified each match manually. We merged in the Robinhood data using ticker symbol. Lastly, we required non-missing regression variables and for press releases to not occur on the same day as a firm's earnings announcement. The CSRWire press releases sample contains 460 press releases disclosed by 86 firms.<sup>13</sup> For these 86 firms, we searched RavenPack for additional ESG-related press releases using keywords provided to us by a RavenPack representative (see Appendix A for details). The search 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 (i.e., ESG PR Day), and 86 firms. The two data sources are complementary as CSRWire consisted of press releases primarily related to environmental and social issues, while RavenPack consisted of press releases primarily related to governance issues. Appendix A describes how we classified the press releases into environmental, social, or governance categories.

Table 2 describes our sample composition by industry (Panel A) and month (Panel B). In Panel A, we present the number of firms and ESG PR Days by one-digit standard industrial classification code (SIC1). From a firm perspective, the two manufacturing industries (SIC1 = 2

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<sup>13</sup> There is sometimes a delay between the firm's press release date and the posting date on CSRWire. Therefore, we manually checked and corrected the press release event date for all 460 CSRWire press releases.

and 3) and the Finance, Insurance, and Real Estate industry (SIC1 = 6) are the most well represented, though our sample is not concentrated in any one industry. We observe similar patterns for composition by ESG PR Days.

In Panel B, 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 is steadily growing over our sample, though the rate of growth is lower than that of the entirety of Robinhood.

### **3.3 Descriptive Statistics**

Throughout our analyses, we identify four types of days: (1) *ESG PR Day* as described above. (2) *Non-ESG PR Day* are days in which the firm released a press release (source: RavenPack) that is not environmental, social, or governance related, and the firm did not release an ESG press release or announce earnings. (3) *EA Day* are days in which the firm announces earnings as identified by the earlier of IBES or Compustat. (4) *Non-Event Day* are 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 *Non-Event 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. We exclude these days because their three-day window includes either an *EA Day* or *Non-ESG PR Day*, and therefore including these days would contaminate our inferences.

In Table 3 Panel A, we provide descriptive statistics for our five primary dependent variables (described in more detail in Section 4), two supplementary dependent variables, six control variables, as well as 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 *Non-Event Day* are included in the sample for which we tabulate descriptive statistics. The average firm has 4,147 retail investors on Robinhood (*Unscaled RI<sub>t</sub>*), and the average three-day change in the number of retail investors is 7 (*Unscaled  $\Delta RI_{t-1,t+1}$* ). In Panel B, 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 Environment, Social, and Governance PR Day observations exceeds All ESG PR Day observations due to 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.

#### 4. Research Design and Results

Our first analysis focuses on the effect of ESG press releases on retail investor portfolios by comparing the differential investor response to ESG versus non-ESG press releases. For this analysis, our sample consists of days on which the firm provided an ESG related press release and did not announce earnings (i.e., *ESG PR Day*), and days on which the firm released a non-ESG press release but not an ESG press release or earnings announcement (i.e., *Non-ESG PR Day*). We exclude non-event days and earnings announcement days because these days are likely to be fundamentally different from non-earnings announcement days on which the firm issues a press release (e.g., Blankespoor, deHaan, and Zhu, 2018). We compare the relative response to ESG versus non-ESG press releases because we believe that these two types of disclosures are the most likely to generate the same level of investor interest. We employ the following specification:

$$RI\_RESPONSE_{i,t} = \alpha + \beta_1 ESG\ PR\ Day_{i,t} + \sum \gamma_j Controls + Fixed\ Effects + \varepsilon_{i,t} \quad (1)$$

We measure the retail investor response ( $RI\_RESPONSE_{i,t}$ ) using five different outcome variables. First, we calculate the aggregate change in the number of investors on Robinhood who hold stock in firm  $i$  over the three-day window centered on the press release day.<sup>14</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 the distribution of 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 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 for a firm that 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 for this variable. 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,  $\Delta RI Volatility_{t-1,t+1}$ , which we calculate as the standard deviation of hourly changes in the number of Robinhood investors who own the firm's

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<sup>14</sup> Our conclusions are unchanged when we use a five-day event window.



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.

We believe that these five variables capture broad insights into retail investor portfolios. 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 discernable change in the total number of investors over the three-day period.

We control for lagged returns over the (-1, -4) and (-5, -25) time periods (e.g., Barrot, Kaniel, and Sraer, 2016). We include firm and year-quarter fixed effects to fully absorb time-invariant cross-firm heterogeneity and time trends. The coefficient of interest is on the variable *ESG PR Day*, which is a binary variable that takes the value of 1 for days on which the firm provided an ESG press release and did not announce earnings. The coefficient on this variable identifies the differential response by investors on ESG versus non-ESG days. To the extent that investors adjust their portfolios less (more) in response to ESG press releases relative to non-ESG press releases, then the coefficient on this variable will be negative (positive).

The results of equation (1) are provided in Table 4. The dependent variable is noted at the top of each column. Across each column, the coefficient on the *ESG PR Day* indicator variable is negative and significant. For example, in column (1), the coefficient on *ESG PR Day* is -0.891 with a  $t$ -statistic of 3.13. This coefficient value indicates that, within the same firm-quarter, the change in the dependent variable  $\Delta RI_{t-1,t+1}$  is smaller on days when the firm issues an ESG press

release versus those days when it issues a non-ESG press release. In other words, there is a relative decrease in the number of retail investors in the three-day window surrounding ESG press releases when compared to the change in the number of retail investors in the three-day window surrounding non-ESG press releases. Similarly, the coefficient of -0.051 in column (3), indicates that  $\Delta RI Volatility_{t-1,t+1}$  is lower on ESG relative to non-ESG press release days, meaning that there are fewer portfolio reallocations (i.e., turnover) by investors on ESG days when compared to non-ESG days. Each of the coefficients in columns (1) through (5) provide similar inferences—all are negative and statistically significant, and all indicate that there is a relative decline in the number of retail investors and fewer portfolio reallocations in response to ESG press releases.

In each case, the estimated coefficients are also economically meaningful. For example, in column (1), the coefficient of -0.891 on *ESG PR Day* 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 3 Panel A). In other words, the change in the dependent variable when *ESG PR Day* takes the value of one is enough to shift the value of  $\Delta RI_{t-1,t+1}$  from either the third quartile to the median or from the median to the first quartile. The coefficient on *ESG PR Day* in the  $\Delta RI Volatility_{t-1,t+1}$  specification in column (3) represents approximately 15 percent of the mean value of the dependent variable (i.e., coefficient estimate of 0.051 divided by mean of 0.343).

Collectively, these results provide inferences that are potentially at odds with the prior experimental literature on retail investors. In both the Cheng, Green, and Ko (2015) and Martin and Moser (2016) studies, the participants place a value on ESG disclosures and are more willing to take positions in companies providing these disclosures. The negative coefficients in each specification suggest that the opposite is true. However, because the specification compares ESG press release days to non-ESG press release days, it could be that investors are adjusting their

portfolios in response to ESG disclosures, just not as strongly as they adjust in response to non-ESG disclosures. To test whether this scenario explains the results in Table 4, we estimate the following specification:

$$RI\_RESPONSE_{i,t} = \alpha + \beta_1 ESG\ PR\ Day_{i,t} + \beta_2 Non-ESG\ PR\ Day_{i,t} + \beta_3 EA\ Day_{i,t} + \sum_j \gamma_j Controls + Fixed\ Effects + \varepsilon_{i,t} \quad (2)$$

The dependent variables, controls, and fixed effects are the same as those used in equation (1). We extend our analysis by incorporating both earnings announcement and non-event days in our sample. As a result, we estimate equation (2) with a sample that includes four types of days: (1) *ESG PR Day*, (2) *Non-ESG PR Day*, (3) *EA Day*, and (4) *Non-Event Day*. Further, we exclude days that meet the criteria of a *Non-Event Day* when that trading day falls directly before or after an *EA Day* or *Non-ESG PR Day*. We exclude these days because their three-day window includes either an *EA Day* or *Non-ESG PR Day*, and therefore, including these days would contaminate our inferences.

The results of equation (2) in Table 5 indicate that investors respond to non-ESG press releases, especially earnings announcements, but that there is no detectable response to ESG press releases. For example, the coefficient on *Non-ESG PR Day* in column (1) is 0.756 with a *t*-statistic of 4.61. 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 non-event 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 3 Panel A). The coefficient on *EA Day* is approximately eight times larger at 6.007 and is strongly significant with a *t*-statistic of 10.62. These values are reassuring, as prior research has demonstrated that earnings announcements are a critically important event to the firm.

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 (i.e., -0.073) and indistinguishable from zero (i.e., *t*-statistic of 0.36). The estimated coefficient on *ESG PR Day* indicates that there is no detectable difference between the changes in retail investor portfolios in response to ESG press releases and no news. In other words, these results suggest that investors view ESG press releases to be equivalent to a day with no news. The results are consistent across each of the five different dependent variables. In each case, the coefficient on *ESG PR Day* is close to zero with *t*-statistics that are not close to conventional levels of statistical significance, whereas the coefficients on *Non-ESG PR Day* are always positive and strongly significant, with *t*-statistics ranging from 2.88 to 6.27. These results provide consistent evidence that ESG press releases are not used by retail investors for the purposes of portfolio reallocation.

The lack of statistical significance for the coefficients on *ESG PR Day* is not due to statistical power, as the coefficient estimates for *ESG PR Day* are estimated with similar precision as *Non-ESG PR Day* (i.e., the standard errors are similar in magnitude). For example, when using *Adj.  $\Delta RI_{t-1,t+1}$*  as the dependent variable, the 95% confidence interval for the *ESG PR Day* coefficient estimate ranges from -0.366 to 0.440 (i.e., coefficient estimate of  $0.037 \pm 1.96 \times$  standard error of 0.206). The upper-bound of the 95% confidence interval implies that the retail investor reaction to ESG press release days is no larger than about half of their reaction to non-ESG press releases (i.e., *ESG PR Day* confidence interval upper-bound of 0.440 divided by *Non-ESG PR Day* coefficient of 0.864). Thus, the economic significance on *ESG PR Day* would be small even if statistical significance were established.

Overall, the results in Table 5 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. These results suggest that the differential response to ESG versus non-ESG press releases in Table 4 is attributable to a non-reaction to ESG press releases rather than a subdued reaction relative to non-ESG press releases.<sup>15</sup>

One potential concern with the interpretation of our results is that the ESG press releases lack the economic content of the non-ESG press releases. We conduct two sets of analyses to mitigate this concern. First, we examine whether there is a differential price response to ESG versus non-ESG press releases using the following specifications:

$$CAR_{t-1,t+1} = \beta_1 ESG\ PR\ Day_{i,t} + \sum \gamma_j Controls + Fixed\ Effects + \varepsilon_{i,t} \quad (3a)$$

$$Abs.\ CAR_{t-1,t+1} = \beta_1 ESG\ PR\ Day_{i,t} + \sum \gamma_j Controls + Fixed\ Effects + \varepsilon_{i,t} \quad (3b)$$

$CAR_{t-1,t+1}$  equals the cumulative abnormal return measured as the difference between the stock return and the risk free rate over the three-day window surrounding the press release, and  $Abs.\ CAR_{t-1,t+1}$  denotes its absolute value. We control for the risk factors from the Carhart four-factor model. 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 versus non-ESG press releases. To the extent that ESG press releases produce a lower return response than non-ESG press releases, then the coefficient will be negative. The results in Table 6 suggest that there is no measurable difference in the return response to ESG versus non-ESG press releases. The coefficients are directionally negative, but are close to zero, and the  $t$ -statistics are

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<sup>15</sup> We also explore whether there is a specific component of ESG—environmental, social or governance—that drives our results. We re-estimate equation (1) and (2) 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 results (untabulated) 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 4 and Table 5, respectively, suggesting that none of the three components experience an investor response that differs from a non-event day. As a result, we conclude that the findings in Tables 4 through 5 are driven by all three components of ESG rather than any single component.

not close to conventional levels of significance. These results indicate that the economic news conveyed by both the ESG and non-ESG press releases are comparable.

Next, 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 relatively straight-forward for investors to process the consequence of inclusion on this list, given its prominence across industries.<sup>16</sup> In our study, we rely on this known event day response to examine whether retail investors adjust their portfolio holdings. Overall, the *Best100* gives us a setting where the news is easy to process and unambiguously positive from an ESG perspective.

Table 7 provides descriptive information for the sample we use for this analysis. Panel A 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 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 firm-day observation because the *Best100* announcement coincided with its earnings release. This leaves a total sample of 941 firm-day observations including 46 firm-day observations where the

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<sup>16</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.

firm's ranking on the *Best100* improved from the previous year's list, or where 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 Panel B, 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*:

$$RI\_RESPONSE_{i,t} = \alpha + \beta_1 Better Rank_{i,t} + \sum \gamma_j Controls + \varepsilon_{i,t} \quad (4)$$

The above specification follows from Equation (1). We use the same five different outcome variables to measure the retail investor response ( $RI\_RESPONSE_{i,t}$ ). We no longer include firm or quarter fixed effects because these analyses only examine the investor response surrounding the two dates where *Best100* is announced. Since we no longer include firm fixed effects, we supplement the control variables in Equation (1) with *SIZE*, Market-to-Book (*M/B*) and Return-on-Assets (*ROA*). The variable of interest, *Better Rank*, is an indicator variable that takes the value of 1 for those firms whose ranking on the *Best100* improved from the previous year's list, or where the firm was unranked in the previous year and ranked in the current year, and zero otherwise. The results are presented in Table 8. Across each column, the coefficient on *Better Rank* is insignificant, indicating that there is no detectable change in the portfolios of retail investors in response to the *Best100* announcement.

Before concluding that retail investors do not appear to respond to *Best100* announcements, we examine whether there is a broader stock market response to ensure that our results are not due

to a lack of power or a lack of information content. We use an event study format, where we measure returns over the three day window centered on the *Best100* announcement using the same excess return proxies as Equation (3). We control for *SIZE*, *M/B* and  $Return_{t-251,t-26}$  to capture long-term momentum. The results in Table 9 show that there is a positive market response for the 48 firm-day observations where the *Best100* ranking improved relative to the control group of unranked firm-day observations. 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.

Collectively, the results in Tables 4 through 9 suggest the ESG announcements are irrelevant to retail investors. The portfolio adjustments that we detect for ESG press releases are no different than the routine portfolio adjustments that occur on non-event days. Our findings do not appear to be due to a lack of statistical power, since we document that investors make economically meaningful changes to their portfolios in response to press releases that do not pertain to ESG activities, especially if those press releases are earnings announcements. In addition, our results do not appear to be due to differences in the information content of ESG versus non-ESG press releases. We find that the market return response is no different for ESG versus non-ESG press releases. In addition, even though the broader market responds favorably to announcements of *Best100*, retail investors do not adjust their portfolios in response to this news. Overall, our analyses indicate that ESG press releases do not drive the buy and sell decisions of retail investors.



## 5. Conclusion

We find that retail investors adjust their portfolios substantially less on days with ESG press releases relative to days with non-ESG press releases. In fact, we find that the investor response to ESG press releases is indistinguishable from non-event days. In other words, when firms issue press releases, retail investors only seem to adjust their portfolios in response to those disclosures that do not pertain to ESG matters. We conclude that ESG disclosure is irrelevant to retail investors' portfolio reallocation decisions. Our results generate inferences that are potentially at odds with the prior experimental studies on retail investors' response to ESG activities. For example, Martin and Moser (2016) show that retail investors are more willing to take positions in companies providing ESG disclosures in a laboratory setting. The conflicting results highlight the importance of using multiple research methods across different settings.

Our findings have significant implications for the literature that examines how investors process ESG disclosures. This literature has important capital market implications because retail investor preferences can give rise to investor clientele and base effects, which can affect firms' cost of capital and feed back into firms' future ESG activities (Christensen, Hail, and Leuz, 2018). To date, most studies that examine the consequences of ESG disclosures have viewed investors as a homogenous group (e.g., Serafeim and Yoon, 2021). However, our results indicate that retail investors do not respond to ESG disclosures, even though prior studies have established contrasting findings for mutual fund investors (Hartzmark and Sussman, 2019). Therefore, our findings suggest that future studies may need to disentangle investor responses across mutual funds versus individual firm securities to provide a more complete perspective.

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## Appendix A

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

**Table A1: CSRWire ESG Press Releases**

<b>Classification</b>	<b>Keywords</b>
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

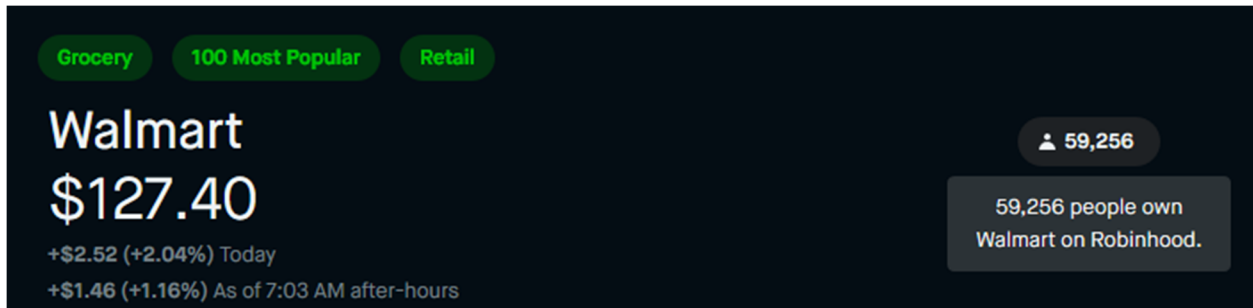
This table presents the press release keywords and their classifications for CSRWire press releases. On the CSRWire website, each press release is tagged with at least one of the above keywords. In a first step, we categorized these keywords into ESG categories. Keywords that are ambiguous were classified 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 A2: RavenPack ESG Press Releases**

<b>Classification</b>	<b>Keywords</b>
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

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 inquired with RavenPack and received a list of 14 *Group* values based on RavenPack’s classification of ESG events. We retrieved all press releases with these *Group* values. 10 out of the 14 *Group* values were not found in our sample (e.g., 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. The research team discussed and resolved the cases with disagreement. Select *Group-type* values were excluded (i.e., manually excluded category) due to insufficient information.

Figure 1: Real Time Disclosure of Retail Investor Positions on Robinhood



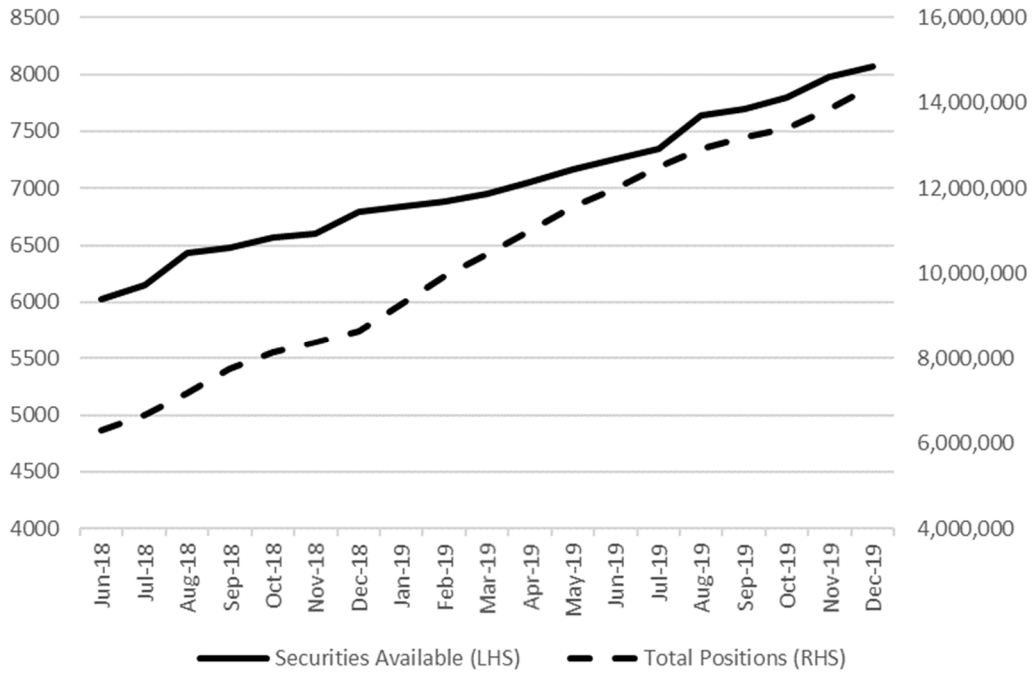
The figure provides a screen shoot of <https://robinhood.com/stocks/WMT> as of May 18, 2020, which includes disclosure of retail investor positions for Walmart in real time.

Figure 2: Time Series of Retail Investor Positions on Robintrack



The figure provides a screen shoot of <https://robintrack.net/symbol/WMT> as of May 18, 2020, which includes the time series of retail investor positions for Walmart from May 1, 2018 to May 18, 2020.

**Figure 3: Available Securities and Total Positions on Robinhood Markets**



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 is for the entirety of Robinhood universe and not restricted to our sample. Values are as of the last trading day of each month in our sample June 2018 – December 2019.

**Table 1: ESG Press Releases Sample Formation**

<i>Sample Selection Criteria</i>	<i># of Press Releases</i>	<i># of PR Days</i>	<i># of Firms</i>
CSRWire Press Releases (June 1 <sup>st</sup> , 2018 – December 31 <sup>st</sup> , 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
Non-overlap with earnings announcements	460	443	86
CSRWire Press Releases	460	443	86
Add: RavenPack ESG Press Releases	370	355	
<b>ESG Press Releases Sample</b>	830	798	86

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<sup>st</sup>, 2018 – December 31<sup>st</sup>, 2019 (source: [https://www.csrwire.com/press\\_releases](https://www.csrwire.com/press_releases)). We then matched each CSRWire press release to a company name in CRSP/Compustat (477 remaining). Next, we merged to the Robinhood data using a firm’s trading ticker symbol (469 remaining). We required that variables used in our analyses are non-missing (465 remaining) and that the press release was not 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 A for details). RavenPack adds 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.



**Table 2: Sample Composition***Panel A: Sample Composition by Industry (1-digit SIC)*

<i>SIC1</i>	<i>Industry Description</i>	<i>Firms</i>		<i>ESG PR Days</i>	
		<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>
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%

*Panel B: Sample Composition by Month*

<i>Month</i>	<i># of Firms</i>	<i>ESG PR Days</i>	<i># of Investor Positions</i>
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	85	27	334,558
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

The sample contains 86 unique firms who released 830 ESG press releases on 798 firm-days (i.e., ESG PR Days) from June 2018 to December 2019. Panel A presents the number of firms and ESG PR days for our sample by one-digit standard industry classification code (SIC1). Panel B presents the number of firms, ESG PR days, and the number of Robinhood investor positions for our sample of firms by month. Percentages may not add to 100 due to rounding.

**Table 3: Descriptive Statistics***Panel A: Descriptive Statistics for Variables Used in the Regression Analyses (N = 28,833)*

<i>Variable</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>P1</i>	<i>P25</i>	<i>Median</i>	<i>P75</i>	<i>P99</i>
<i>Investor Reaction Variables:</i>							
Unscaled $RI_t$	4,147	6,904	117	461	1,432	4,721	34,678
Unscaled $\Delta RI_{t-1,t+1}$	7	66	-185	-9	0	9	353
$\Delta RI_{t-1,t+1}$	0.655	6.102	-16.301	-0.894	0.000	0.900	32.967
Adj. $\Delta RI_{t-1,t+1}$	-1.883	6.684	-31.205	-2.843	-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. $\Delta RI_{t-1,t+1}$	2.954	5.960	0.000	0.311	0.898	2.737	37.070
Abs. Adj. $\Delta RI_{t-1,t+1}$	3.757	6.683	0.014	0.397	1.211	3.933	38.957
$CAR_{t-1,t+1}$	0.094	2.773	-8.043	-1.392	0.199	1.663	7.877
Abs. $CAR_{t-1,t+1}$	2.091	1.934	0.024	0.695	1.535	2.878	9.761
<i>Control Variables:</i>							
$Return_{t-5,t-2}$	0.179	3.322	-9.585	-1.609	0.300	2.048	9.583
$Return_{t-25,t-6}$	0.719	7.517	-20.690	-3.633	1.157	5.243	21.000
$MKTRF_t$	0.037	0.886	-2.950	-0.340	0.100	0.560	2.330
$HML_t$	-0.041	0.600	-1.450	-0.430	-0.110	0.340	1.600
$SMB_t$	-0.040	0.498	-1.360	-0.350	-0.040	0.280	1.300
$UMD_t$	0.015	0.743	-2.320	-0.420	0.050	0.500	1.750

*Panel B: Means of Retail Investor Reaction Variables by Types of Event Days*

		(1)	(2)	(3)	(4)	(5)
			Adj.	$\Delta RI$	Abs.	Abs. Adj.
Means by Type	<i>N</i>	$\Delta RI_{t-1,t+1}$	$\Delta RI_{t-1,t+1}$	Volatility	$\Delta RI_{t-1,t+1}$	$\Delta RI_{t-1,t+1}$
Environment PR Days	161	0.325 (0.78)	-1.803*** (-3.76)	0.298*** (11.67)	2.735*** (7.31)	3.349*** (7.50)
Social PR Days	298	0.876** (2.49)	-2.508*** (-5.98)	0.401*** (15.20)	3.280*** (10.61)	4.421*** (11.75)
Governance PR Days	350	0.051 (0.21)	-2.425*** (-8.02)	0.329*** (18.63)	2.690*** (11.73)	3.651*** (12.27)
All ESG PR Days	798	0.403** (2.14)	-2.337*** (-10.33)	0.349*** (25.75)	2.915*** (17.11)	3.891*** (18.38)
Non-ESG PR Days	2,594	1.451*** (9.43)	-1.690*** (-10.64)	0.445*** (40.39)	4.055*** (27.06)	4.929*** (30.80)
EA Days	498	6.564*** (12.21)	3.826*** (8.34)	0.831*** (21.41)	8.314*** (15.51)	7.746*** (14.64)
Non-Event Days	24,943	0.462*** (12.90)	-2.003*** (-49.55)	0.322*** (122.28)	2.734*** (77.97)	3.551*** (88.34)

*(continued)*

**Table 3 (continued)**

The table presents descriptive statistics for the variables used in our paper. Panel A 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<sub>t</sub>* is the number of Robinhood investors who own the firm's stock on day *t*. (2) *Unscaled ΔRI<sub>t-1,t+1</sub>* is the three-day change in the number of Robinhood investors who own the firm's stock centered on day *t*. We then present five different dependent variables used in our regression analyses to measure the reaction of retail investors: All five dependent variables are scaled by the firm's natural logarithm of assets as of fiscal-quarter end. (1) *ΔRI<sub>t-1,t+1</sub>* is the three-day change in the number of Robinhood investors who own the firm's stock centered on day *t*. (2) *Adj. ΔRI<sub>t-1,t+1</sub>* adjusts *ΔRI<sub>t-1,t+1</sub>* 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*. (3) *ΔRI Volatility<sub>t-1,t+1</sub>* is 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*. (4) *Abs. ΔRI<sub>t-1,t+1</sub>* is the absolute value of *ΔRI<sub>t-1,t+1</sub>*. (5) *Abs. Adj. ΔRI<sub>t-1,t+1</sub>* is the absolute value of *Adj. ΔRI<sub>t-1,t+1</sub>*. All Robinhood data is downloaded from robintrack.net. In an additional analysis, we use two dependent variables to capture the materiality of the event as captured by the market reaction: (1) *CAR<sub>t-1,t+1</sub>* is a firm's cumulative stock return, adjusted for the risk-free rate, over the three-day window centered on day *t*. (2) *Abs. CAR<sub>t-1,t+1</sub>* is the absolute value of *CAR<sub>t-1,t+1</sub>*. We use two control variables: (1) *Return<sub>t-5,t-2</sub>* is a firm's cumulative stock return over the four-day window *t-5* to *t-2*. (2) *Return<sub>t-25,t-6</sub>* is a firm's cumulative stock return over the 20-day window *t-25* to *t-6*. Return data is retrieved from CRSP. We use the Carhart four-factor model risk factors for day *t* as control variables: (1) *MKTRF<sub>t</sub>*, (2) *SMB<sub>t</sub>*, (3) *HML<sub>t</sub>*, and (4) *UMD<sub>t</sub>*. The factors are as defined in Carhart (1997) and retrieved from the Fama-French & Liquidity Factors database on WRDS. Panel B 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* are days in which the firm released an environmental, social, or governance related press release as identified by CSRWire or RavenPack Analytics (see Appendix A for details) and did not announce earnings. 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 due to concurrence of two types of ESG press releases on the same day for seven days of our sample. (2) *Non-ESG PR Days* are days in 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. (3) *EA Days* are days in which the firm announces earnings as identified by the earlier of IBES or Compustat. (4) *Non-Event Days* are 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 *Non-Event 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*, and, if the observations were included, then the reaction variables would be biased for *Non-Event Days*. These four types of days are our variables of interest, and in regression analyses the variables take the value of '1' if they meet the criteria for that day and '0' otherwise.

**Table 4: Retail Investor Reaction to ESG Press Releases Relative to Non-ESG Press Releases**

	(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. $\Delta RI_{t-1,t+1}$
<i>Event Variable:</i>					
ESG PR Day	-0.891*** (-3.13)	-0.906*** (-3.21)	-0.051*** (-3.68)	-0.717*** (-3.38)	-0.560*** (-2.72)
<i>Control Variables:</i>					
Return <sub>t-5,t-2</sub>	-0.122*** (-3.08)	-0.139*** (-3.44)	0.000 (0.18)	-0.011 (-0.35)	0.058* (1.91)
Return <sub>t-25,t-6</sub>	0.001 (0.03)	-0.015 (-0.90)	-0.000 (-0.17)	-0.003 (-0.20)	0.007 (0.55)
Firm & Year-quarter Fixed Effects	Included	Included	Included	Included	Included
Adjusted R <sup>2</sup>	0.073	0.127	0.545	0.363	0.469
N	3,391	3,391	3,391	3,391	3,391

The table reports analyses of retail investors' reaction to ESG press releases relative to Non-ESG press releases. This regression analysis only includes two types of days: (1) *ESG PR Days* are days in which the firm released an environmental, social, or governance related press release as identified by CSRWire or RavenPack Analytics and did not announce earnings. (2) *Non-ESG PR Day* are days in 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. We include an indicator variable for *ESG PR Day* according to the criteria above but omit an indicator for *Non-ESG Days*. Thus, the coefficient on *ESG PR Day* measures the retail investor reaction to these events relative to days on which the firm released a non-ESG press release. For details on the remaining variables see Table 3. The table reports OLS coefficient estimates and (in parentheses) *t*-statistics based on robust standard errors clustered by day. We include firm and calendar year-quarter fixed effects in the regressions but do not report the coefficients. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% p-levels (two-tailed), respectively.

**Table 5: Retail Investor Reaction to Three Types of Events Relative to Non-Event Days**

	(1)	(2)	(3)	(4)	(5)
Dependent variables:			$\Delta RI$		
	$\Delta RI_{t-1,t+1}$	Adj. $\Delta RI_{t-1,t+1}$	Volatility $_{t-1,t+1}$	Abs. $\Delta RI_{t-1,t+1}$	Abs. Adj. $\Delta RI_{t-1,t+1}$
<i>Event Variables:</i>					
ESG PR Day	-0.073 (-0.36)	0.037 (0.18)	0.002 (0.22)	-0.111 (-0.75)	-0.121 (-0.81)
Non-ESG PR Day	0.756*** (4.61)	0.864*** (5.09)	0.053*** (6.27)	0.525*** (4.11)	0.352*** (2.88)
Earnings Announcement Day	6.007*** (10.62)	5.832*** (10.35)	0.500*** (13.70)	5.467*** (11.27)	4.092*** (9.18)
<i>Control Variables:</i>					
Return <sub>t-5,t-2</sub>	-0.116*** (-8.68)	-0.136*** (-9.86)	0.001** (2.06)	-0.003 (-0.25)	0.057*** (5.61)
Return <sub>t-25,t-6</sub>	-0.005 (-0.84)	-0.015*** (-2.61)	0.000 (0.50)	-0.003 (-0.64)	0.013*** (2.90)
Firm & Year-quarter Fixed Effects	Included	Included	Included	Included	Included
Adjusted R <sup>2</sup>	0.089	0.190	0.613	0.436	0.530
N	28,833	28,833	28,833	28,833	28,833

The table reports analyses of retail investors' reaction to ESG press release days, non-ESG press release days, and earnings announcement days relative to non-event days. This regression analysis includes four types of days: (1) *ESG PR Days* are days in which the firm released an environmental, social, or governance related press release as identified by CSRWire or RavenPack Analytics and did not announce earnings. (2) *Non-ESG PR Day* are days in 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. (3) *EA Days* are days in which the firm announces earnings as identified by the earlier of IBES or Compustat. (4) *Non-Event Days* are 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 *Non-Event 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. We include indicator variables for *ESG PR Day*, *Non-ESG PR Day*, and *EA Day* according to the criteria above but omit an indicator for *Non-Event Days*. Thus, the coefficients on *ESG PR Day*, *Non-ESG PR Day*, and *EA Day* measure the retail investor reaction to these events relative to non-event days. For details on the remaining variables see Table 3. The table reports OLS coefficient estimates and (in parentheses) *t*-statistics based on robust standard errors clustered by day. We include firm and calendar year-quarter fixed effects in the regressions but do not report the coefficients. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% p-levels (two-tailed), respectively.

**Table 6: Stock Return Reaction to ESG PRs Relative to Non-ESG PRs**

Dependent variables:	(1) <i>CAR</i> <sub>t-1,t+1</sub>	(2) <i>Abs. CAR</i> <sub>t-1,t+1</sub>
<i>Event Variable:</i>		
ESG PR Day	-0.033 (-0.29)	-0.023 (-0.29)
<i>Control Variables:</i>		
MKTRF <sub>t</sub>	1.032*** (7.91)	-0.080 (-1.07)
HML <sub>t</sub>	0.431** (2.28)	-0.140 (-1.09)
SMB <sub>t</sub>	-0.134 (-0.78)	-0.039 (-0.36)
UMD <sub>t</sub>	-0.141 (-0.90)	-0.115 (-1.13)
Firm & Year-quarter Fixed Effects	Included	Included
Adjusted R <sup>2</sup>	0.116	0.140
N	3,391	3,391

The table reports analyses of the materiality of ESG press releases relative to Non-ESG press releases as indicated by the market reaction. This regression analysis only includes two types of days: (1) *ESG PR Days* are days in which the firm released an environmental, social, or governance related press release as identified by CSRWire or RavenPack Analytics and did not announce earnings. (2) *Non-ESG PR Day* are days in 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. We include an indicator variable for *ESG PR Day* according to the criteria above but omit an indicator for *Non-ESG Days*. Thus, the coefficient on *ESG PR Day* measures the market reaction to these events relative to non-event days. For details on the remaining variables see Table 3. The table reports OLS coefficient estimates and (in parentheses) *t*-statistics based on robust standard errors clustered by day. We include firm and calendar year-quarter fixed effects in the regressions but do not report the coefficients. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% p-levels (two-tailed), respectively.

**Table 7: Fortune’s “100 Best Companies to Work For” Event Study Sample Description***Panel A: Sample Formation*

<i>Sample Selection Criteria</i>	<i># of Firms</i>	<i># of Firm Days</i>
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
Non-overlap with earnings announcements		941
<b>100 Best Companies to Work For Event Study Sample</b>		<b>941</b>

*Panel B: Descriptive Statistics for Variables Used in the Regression Analyses (N = 941)*

<i>Variable</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>P1</i>	<i>P25</i>	<i>Median</i>	<i>P75</i>	<i>P99</i>
<i>Investor Reaction Variables:</i>							
Unscaled $RI_t$	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
$\Delta RI$ Volatility $_{t-1,t+1}$	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
$CAR_{t-1,t+1}$	0.640	2.058	-5.769	-0.446	0.667	1.804	6.711
Abs. $CAR_{t-1,t+1}$	1.641	1.500	0.030	0.585	1.238	2.213	7.082
<i>Control Variables:</i>							
$Return_{t-5,t-2}$	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
$Return_{t-251,t-26}$	0.064	0.221	-0.436	-0.090	0.071	0.204	0.680
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

The table provides basic information for the 100 Best Companies to Work For event study. Panel A details the sample formation process. The sample includes firms who 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 during January 1, 2019 - February 29, 2020. Each firm is included for two event dates on which Fortune announced their 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/Roanhood (1,027 remaining). We required that variables used in our analyses are non-missing (1,021 remaining) and that the event day was not within the three trading day period centered on a firm’s earnings announcement (941 remaining). Panel B presents distributional descriptive statistics for variables used in our analyses. See Table 3 for variable descriptions of the investor reaction variables. We use the following control variables: (1)  $Return_{t-5,t-2}$  is a firm’s cumulative stock return over the four-day window  $t-5$  to  $t-2$ . (2)  $Return_{t-25,t-6}$  is a firm’s cumulative stock return over the 20-day window  $t-25$  to  $t-6$ . (3)  $Return_{t-251,t-26}$  is a firm’s cumulative stock return over the window  $t-251$  to  $t-26$ . (4)  $SIZE$  is the natural logarithm of market value of equity. (5) Market-to-Book ( $M/B$ ) is the ratio of market value of equity divided by book value of equity. (6) Return on Assets ( $ROA$ ) is the ratio of earnings before extraordinary items divided by average total assets of quarter  $q$  and  $q-1$ . Return data is retrieved from CRSP. Accounting data and market values are measured as of the fiscal quarter-end.

**Table 8: Retail Investor Reaction to Announcement of Fortune' 100 Best Companies to Work For List**

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

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 who did not make the list. The regression analysis includes firms who are members of either the *Best100* list in 2019 or 2020 or the S&P 500 at any point during January 1, 2019 - February 29, 2020. The two event dates are those on which Fortune announced their 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 who were unranked in the previous year and are ranked in the current year. For details on the remaining variables, see Table 3 and Table 7. The table reports OLS coefficient estimates and (in parentheses) *t*-statistics based on robust standard errors. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% p-levels (two-tailed), respectively.



**Table 9: Stock Return Reaction to Announcement of Fortune’s 100 Best Companies to Work For List**

Dependent variables:	(1) <i>CAR</i> <sub>t-1,t+1</sub>	(2) <i>Abs. CAR</i> <sub>t-1,t+1</sub>
<i>Event Variables:</i>		
Better Rank	0.836** (2.41)	0.625** (2.32)
<i>Control Variables:</i>		
Size	0.371*** (5.69)	-0.128*** (-2.81)
M/B	0.001 (0.23)	-0.001 (-0.56)
Return <sub>t-251,t-26</sub>	-1.301*** (-3.63)	-0.843*** (-3.11)
Adjusted R <sup>2</sup>	0.049	0.034
N	941	941

The table reports analyses of the materiality of an improved ranking on Fortune’s 100 Best Companies to Work For List as indicated by the market reaction. The regression analysis includes firms who are members of either the *Best100* list in 2019 or 2020 or the S&P 500 at any point during January 1, 2019 - February 29, 2020. The two event dates are those on which Fortune announced their 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 who were unranked in the previous year and are ranked in the current year. For details on the remaining variables, see Table 3 and Table 7. The table reports OLS coefficient estimates and (in parentheses) *t*-statistics based on robust standard errors. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% p-levels (two-tailed), respectively.