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Citation: Brownen-Trinh, R., Cho, J. J. & Bilinski, P. (2025). Retail Investors' Trades around Comment Letter Disclosures. *Journal of Business Finance & Accounting*, 52(5), pp. 2175-2209. doi: 10.1111/jbfa.12863

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Link to published version: <https://doi.org/10.1111/jbfa.12863>

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Retail Investors' Trades around Comment Letter Disclosures

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ABSTRACT: How sophisticated are retail investors in monitoring their holdings? We answer this question by examining Robinhood investors' trades around the U.S. Securities and Exchange Commission (SEC) comment letter (CL) disclosures. We focus on CLs since, compared to periodic filings, CL disclosures are unscheduled (high search cost) and unstandardized with a significant variation in their content (high processing cost). We find that CLs attract Robinhood investors' attention, as evidenced by a significant abnormal Google search volume around CLs disclosure, particularly around more severe CLs. The number of Robinhood investors holding a stock reduces after a firm receives more severe CLs in anticipation of the future decline in stock prices. Our results are (i) robust to addressing the endogeneity concern, (ii) robust to controlling for concurrent information from insider sales, short-selling activity, Twitter, press, analysts, and other concurrent CLs, and (iii) do not reflect Robinhood investors relying on heuristics in analyzing CLs' content. Our evidence suggests that retail investors are sophisticated in processing CL disclosures as part of their portfolio monitoring activities.

Keywords: Retail Investors; Robinhood Investors; SEC Comment Letter

JEL Classifications: G18; M41; M48

Data Availability: Data are available from the public sources cited in the text.

^{*} Corresponding author. We thank Nerissa Brown (the editor), the anonymous referee, Theodore Christensen, Bret Johnson, Giovanna Michelon, Xi Chen, Tony Wang, Tami Dinh, Albert Mensah, and an anonymous referee, and participants of the 2024 JBFA Capital Markets Conference, the 2023 European Accounting Association Conference, and the 2022 BAFA SWAG Accounting and Finance Conference, and the reviewer of the 2024 Financial Accounting and Reporting Section Midyear conference for their useful comments and suggestions. All remaining errors are our own.

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1. INTRODUCTION

Retail investors have become important in capital markets, holding 37.6% of U.S. equities in October 2019.¹ However, they are frequently portrayed as naïve, relying on heuristics in decision-making, and hype-driven (Barber & Odean, 2008; Seasholes & Wu, 2007). Barber et al. (2022, p.3142) argue that ‘*Robinhood users* [a subgroup of retail investors] *are more likely to be influenced by attention than other investors*’ and *engage in ‘speculative trading.’* They argue that the Robinhood app design is specifically devoid of complex information to promote a focus on ‘*basic information*’ and ‘*trading simplicity*’ that ‘*reduces cognitive burdens, which leads investors to rely more on their intuition and less on critical thinking.*’² In contrast, Welch (2022, p.1489, 1491) finds that Robinhood traders ‘*had both good timing and good alpha*’, suggesting that the ‘*crazy mob*’ narrative is misleading. We contribute to the literature by exploring how efficiently retail investors monitor their holdings. Specifically, we focus on retail investors’ ability to identify and process unexpected (high information search costs) and unstandardized (high processing costs) financial information disclosure – the issuance of a comment letter.

We investigate retail investors’ attention and their trading activities surrounding the disclosure of comment letters (CLs) issued by the U.S. Securities and Exchange Commission (SEC) on firms’ 10-K filings. Our focus on CLs stems from three considerations. First, CLs are associated with significant search and processing costs compared to routine filings such as 10-Ks and 10-Qs. The predictability and high visibility of periodic filings across news outlets, retail investors’ trading apps, and social media present a challenge in disentangling whether observed retail investor behavior around periodic filing disclosures, such as stock trading,

¹ See <https://www.sifma.org/resources/research/who-owns-stocks-in-america/>

² Other research suggesting retail investors are naïve and unable to process accounting-related information include Lee (1992), Bhattacharya (2001), Battalio and Mendenhall (2005), Barber and Odean (2008), Ayers, Li, and Yeung (2011), and Malmendier and Shanthikumar (2007).

indicates their sophistication or reflects hype-driven trades based on analyst and news outlets advice and social media sentiment (Barber et al., 2022; Seasholes & Wu, 2007). CLs are unscheduled and lack visibility on companies' websites, trading apps, and public financial aggregators, such as Yahoo! Finance, and EDGAR's front page displaying the company's filings. Consequently, noticing CLs necessitates retail investors' attention and can be associated with significant search costs.

Second, CLs are non-standardized, encompassing both straightforward and complex dialogues between the company and the SEC, and prior research suggests a wide range of sophisticated investors' reactions to CL disclosure (Cunningham et al., 2017; Dechow et al., 2016; Gietzmann & Isidro 2013; Lee et al., 2023; Li & Liu 2017; Lowry et al 2020; Sandler, 2013).³ This implies that retail investors must possess a certain degree of sophistication to comprehend and evaluate the materiality of CLs' content and CLs' consequences for their holdings. Thus, CLs serve as a suitable laboratory for investigating whether (i) retail investors' attention extends beyond predictable and 'hype' disclosures such as 10-Ks and 10-Qs, and (ii) whether retail investors can process these financial disclosures as part of their portfolio monitoring. Our attention on retail investors' use of financial information in portfolio monitoring contrasts earlier research that examines the timing and performance of retail investors' trades, thus ignoring what happens to the holdings between the purchase and the sale of stocks.

Third, CLs on 10-Ks are most frequent (Dechow et al., 2016) and most homogenous under Section 408 of the Sarbanes-Oxley Act (SOX). SOX Section 408, "Enhanced Review of Periodic Disclosures by Issuers" mandates the "regular and systematic" review of a company's financial statements at least once every three years. Moreover, because of their importance, 10-

³ See <https://www.sec.gov/about/divisions-offices/division-corporation-finance/filing-review-process-corp-fin>. Dechow et al. (2016), Johnston and Petacchi (2017), and Ryans (2021) do not report significant immediate stock price response to CL disclosures, implying that CLs do not present clearly good or bad news.

K comment letters have received significant academic attention. This attention, in turn, helps us to identify the characteristics of CLs that should be cross-sectionally associated with retail investor behavior, which helps with identification.

We use retail investor trade data obtained from Robintrack for the period from May 1st, 2018 to August 31st, 2020, which provides counts of the number of investors holding a stock through a popular U.S.-based retail investor platform – Robinhood.⁴ Robinhood, founded in 2013, was the first brokerage to offer commission-free trading through a simple mobile app targeting small retail investors. By mid-2020, Robinhood attracted 13 million retail investors (Welch, 2022), and in the first half of 2022, the daily average trading volume was 2.3 million shares for Robinhood compared to 3 million shares for Fidelity broker (Barber, Huang, Jorion, Odean, & Schwarz, 2023). Barber et al. (2022) highlight that Robinhood trading counts mirror that of the net retail buying measure of Boehmer et al. (2021). Several studies have used Robinhood data to capture retail trading behavior (Eaton, Green, Roseman, & Wu, 2023; Ozik, Sadka, & Shen, 2021; Welch, 2022).⁵

Our first test examines whether retail investors are *aware* of CL disclosures. Awareness of information is a prerequisite for action as investors must first become alert to information before they can process and then act on it (Ben-Raphael, Da, & Israelsen, 2017). Following Da, Engelberg, and Gao (2011) and Niessner (2015), we focus on the abnormal Google search volume (SVI) around the CL disclosure. Compared to Bloomberg searches, SVI more closely approximates retail investors' information searches and attention (Ben-Rephael et al., 2017; Da et al., 2011; Drake, Roulstone, & Thornock, 2012). We find significant evidence of an increase in *abnormal* Google searches for the stock's tickers around the disclosure of the CL.

⁴ Although the Robinhood trading platform started in 2013, Robintrack provides Robinhood data only for the period from May 1st, 2018 to August 31st, 2020.

⁵ No other comparable data exists to identify retail investors directly. Barber and Odean (2000) and Grinblatt and Keloharju (2001) use retail investor data from 1990s, a time before the internet and commission-free trading. Barber et al. (2023) report that Boehmer et al (2021, 1) algorithm '*incorrectly signs 28% of identified [retail] trades, and yields uninformative order imbalance measures for 30% of stocks*'.

To push the analysis further, we investigate the content of CLs to identify the severity of SEC comments. Dechow, Ge, Larson, and Sloan (2011) and Dechow et al. (2016, 401) argue that revenue recognition CLs include the SEC's most serious concerns because revenue recognition is one of the top accounting policies addressed in CLs by the SEC Division of Corporation Finance, and it is most frequently manipulated by managers. CLs with comments pertaining to revenue recognition issues associate with a significant negative price impact (Dechow et al., 2011; Dechow et al., 2016; Ryans, 2021). We consider letters where the SEC highlights revenue recognition issues as the most severe CLs. Following Cassell, Dreher, and Myers (2013) and Ryans (2021), we also identify comments highlighting accounting issues other than revenue recognition, such as loan-loss allowances, goodwill impairment, and fair value estimates. Moreover, using Gietzmann and Pettinicchio (2014) method, we identify comments addressing non-accounting issues, such as omitted certifications and export controls. We consider CLs that address accounting issues other than revenue recognition and non-accounting issues as comparatively less severe than revenue recognition CLs. We find that the abnormal Google search volume is higher for CLs that include revenue recognition issues. Overall, our results suggest that retail investors are actively searching for information around CL disclosure, particularly for letters addressing more severe issues.

We conjecture that retail investors should act on CL disclosure if they expect to experience negative stock price effects after CL publication. Consistently, we validate earlier evidence that CL publication associates with lower future abnormal returns (Dechow et al., 2016; Lee et al., 2023).

Having established that retail investors are aware of CL disclosure and that CLs associate with negative future returns, we move to the next step, where we examine the ability of retail investors to process and act on CL disclosure as captured by their trading behavior. We find that retail investors reduce holdings in stocks which they expect to experience negative price

impact due to CLs. Notably, this reduction is observed in stocks subject to SEC revenue recognition comments, which are viewed as a strong negative signal about a firm's reporting quality and anticipated stock price performance (Dechow et al., 2016; Lee et al., 2023). Examining if retail investors trade on CLs that address other accounting issues than revenue recognition, we find that Robinhood investors reduce holdings in companies where CLs include remarks on non-core earnings, a factor known to significantly affect short-term reported earnings and returns (Alfonso, Cheng, & Pan, 2015; Haw, Ho, & Li, 2011). Lastly, our analysis reveals that Robinhood investors also sell stocks receiving non-accounting-related comments, as these are associated with a marked negative abnormal return up to ten days post-CL release, as suggested by Ryans (2021). Overall, our results suggest that retail investors account for CL disclosure in their portfolio monitoring.

We acknowledge the potential endogeneity of CLs, as they may correlate with unobservable firm characteristics that influence retail investors' stock sales (the omitted correlated variables problem). To reinforce the validity of our results, we conducted a two-stage least squares analysis where we use the ‘*busyness*’ of the SEC’s Division of Corporation Finance as an instrument. Gunny and Hermis (2020, p.7) highlight that SEC activities are ‘*seasonally compressed because over 70 percent of registrants have a December fiscal year-end*’ and ‘*the SEC issues fewer comment letters when busy, focuses its limited resources on the most severe cases of disclosure non-compliance.*’ The instrument is exogenous to Robinhood trades and thus meets the relevance and exclusion conditions. The instrumental variable analysis corroborates the robustness of our results.⁶

We carry out a series of robustness tests that further substantiate our conclusion regarding the sophistication of Robinhood investors in processing CL disclosures. First, our analysis

⁶ We also carry out a placebo test using changes in retail investors’ holding before the CL release. There is no statistically significant association between these lagged change in retail holding and the CL disclosures.

considers the possibility that the results might reflect heuristic behavior, where retail investors respond to simple metrics of CL complexity such as the number of issues raised, rounds of conversation, duration, or word count between the SEC and the firm. These metrics might correlate with the CLs' content. However, even after accounting for these heuristic and readability indicators of CLs, our conclusions remain unchanged. Second, we control for additional signals potentially related to CL disclosures, which could influence Robinhood investors' trading decisions upon CL release. Specifically, our results are robust to controls for (i) insider sales preceding the CL release (Dechow et al., 2016), (ii) short-selling activity around the time of CL disclosure (Lee et al., 2023), (iii) press disclosure around CL, (iv) investor stock selling on Fridays, (v) analyst stock recommendations revisions around CL, (vi) concurrent disclosures of comment letters on other filings that 10-Ks, and (vii) concurrent corporate events and firm disclosures. Our results are also robust to the removal of the Covid-19 period from analysis to eliminate the potential influence of extreme market conditions in early 2020.

The final test relates Robinhood investors' stock sales to future stock price performance. We find that Robinhood investor trades correctly anticipate that more severe CLs will experience more negative future abnormal returns. Specifically, we find that the cumulative abnormal return for the period from day 31 to day 60 is negatively related to abnormal sales by Robinhood investors around severe CL disclosures.

Our study enriches prior research in two distinct ways. First, it presents novel evidence that Robinhood investors exhibit sophistication when confronted with unscheduled and potentially complex SEC CLs. This insight contributes to the sparse body of research on retail investors' efficacy in monitoring their portfolios. Our results challenge the notion that retail investors are 'naïve' and prone to 'heuristic' decision-making patterns (Barber, Lee, Liu, & Odean, 2009; Barber & Odean, 2000, 2013; Dahlquist et al., 2017; Kelley & Tetlock, 2013, 2017). The results complement recent research by Welch (2022), Gao et al. (2023), and Ozik

et al. (2021), who examine retail investors' portfolio returns. They argue that retail investors are sophisticated in their selection and timing of trades.

Second, we contribute novel evidence to the CL literature (Bozanic et al., 2017; Brown et al., 2018; Cassell et al., 2013; Cunningham & Leidner, 2022; Johnston & Petacchi, 2017; Robinson et al., 2011; Ryans, 2021). While the SEC issues CLs to ensure firms' compliance with generally accepted accounting principles and disclosure regulations, there is a concern about their complexity and accessibility, particularly for less sophisticated investors. Barber et al. (2021, p.3147) highlight that '*disclosure alone is not sufficient to assure good investor outcomes—how information is displayed can both help and hurt investors.*' As retail investors' market participation grows, it is crucial for the SEC to consider the effect of its enforcement actions on this group. Our research indicates that SEC CLs are useful to retail investors for portfolio monitoring. In this way, we also respond to Cunningham and Leidner's (2022) call for research to investigate the usefulness of SEC CLs to a broader range of market participants than sophisticated institutional investors.

2. INSTITUTIONAL BACKGROUND AND HYPOTHESIS DEVELOPMENT

The Division of Corporation Finance conducts periodic reviews of corporate 10-K filings to ensure reporting compliance. The division's primary mission, as described by the SEC (2017, 10), is to ensure that 'investors gain access to materially complete and accurate information about companies and the securities they offer and sell, thereby facilitating capital formation.' Periodic filings are reviewed at least once every three years. Upon identifying reporting issues, the division issues a CL to the firm. The firm is required to respond within ten business days, and the correspondence between the SEC and the company continues until the identified issues are resolved. Appendix 1 presents an example of CLs.

Compared to routine periodic filings such as 10-K and 10-Q, CLs are unscheduled and less

conspicuous.⁷ Their relatively low profile may lead to CLs being overlooked by retail investors, who are prone to attention biases (Grove et al., 2016; Hirshleifer & Teoh, 2003). Past research also suggests that retail investors do not efficiently process all publicly available information. Barber and Odean (2000) report that individual investors exhibit a preference for locally available and easily accessible information, leading to suboptimal investment decisions. Hong and Stein (2003) argue that retail investors are more likely to neglect fundamental information due to their reliance on momentum strategies.

Nevertheless, retail investors have the incentive to pay attention to and act on CLs. CLs can be associated with restatements, unexpected write-downs, and reductions in reporting earnings, and with future lawsuits, which in turn have a negative effect on the stock price performance (Anderson & Yohn, 2002; Francis et al., 1994; Kellogg, 1984; Palmrose et al., 2004). As retail investors have less diversified holdings than institutional investors (Barber et al., 2021), these negative idiosyncratic shocks can have material effects on their portfolios. However, retail investors need skills to identify which CLs contain ‘material’ information that is likely to lead to significant negative outcomes. Bozanic et al. (2017) and Ryans (2021) report that CLs are issued in approximately half of 10-K reviews in most years, suggesting that many involve innocuous comments. Cassell et al. (2013), Dechow et al. (2016) and Johnston and Pettachi (2017) find that only around 10% of CLs lead to an amended filing, and 3% of CLs result in a restatement. Nevertheless, Dechow et al. (2016) report a negative stock price drift following some revenue recognition CLs starting from approximately 20 days to 50 days after

⁷ CLs typically do not appear on company websites, nor are they highlighted by popular trading applications like Robinhood, or by widely used financial information aggregators such as Yahoo! Finance. CLs also do not feature prominently on the front page of EDGAR's company filings, requiring a deliberate search to access this information. See Appendix 2 for an illustration of Tesla filing search for the period from 17th September 2019 to the 28th October 2019. There are three individual SEC letters and corresponding response letters between the SEC and Tesla from 17th September 2019 (FIRST_LETTER_DATE) to 28th October 2019 (LAST_LETTER_DATE) associated with a unique number (CL_CON_ID) assigned by Audit Analytics, 152541. These CLs and correspondences were disseminated on the 26th November 2019 (FILE_DIS_DATE) and maintained their original dates. This feature makes it challenging for EDGAR users to notice when the correspondence becomes publicly available, and to view all the letters in the conversation.

the CL release. Lee et al. (2023) also report negative market reactions to some CL disclosures starting 30 days after the CL release that are exploited by short sellers. As retail investors typically have short holding periods when investing in individual stocks (Barber & Odean, 2013; Bhattacharya, Hackethal, Kaesler, Loos, & Meyer, 2012), they should be sensitive to the short-term price performance following ‘material’ CL releases.⁸ These considerations should motivate retail investors to be attentive to and act on disclosures likely to negatively affect their portfolio performance. Thus, our first hypothesis is as follows:

Hypothesis 1. *Retail investors are aware of CL disclosure around the letter publication date.*

Early research suggests that retail investors have limited ability to incorporate accounting-related information into their investment decisions (e.g., Ayers, Li, & Yeung, 2011; Battalio & Mendenhall, 2005; Malmendier & Shanthikumar, 2007). Barber and Odean (2000) report that retail investors underreact to new financial information. Barberis and Thaler (2003) emphasize the role of bounded rationality in leading investors to misinterpret accounting data. Grinblatt and Keloharju (2009) suggest that sensation-seeking and overconfidence lead to individual investors’ underreaction to financial information. Graham, Harvey, Rajgopal (2005) suggest that overly complex financial statements hinder retail investors’ ability to extract value-relevant information. Thus, retail investors may be unable to interpret and act on CL disclosures.

However, more recent research suggests an increasing investment sophistication of retail investors. Welch (2022) finds that portfolios of Robinhood investors do not underperform when compared to standard asset pricing benchmarks. Gao, Leidner, Myers, and Myers (2023) observe that enhanced transparency leads to a reduction in attention-driven trades among Robinhood investors. Ozik et al. (2021) find that the trading activities of Robinhood investors have contributed to narrowing stock bid-ask spreads and reducing the price impact of trades

⁸ Short holding periods means that retail investors may not benefit from future improvement in financial reporting associated with CL firms (Bozanic et al., 2017; Cao et al., 2021; Robinson et al., 2011).

during the COVID-19 pandemic.

We expect that if retail investors are aware of CLs, they will incorporate CL disclosures in their portfolio monitoring by selling stocks of firms that receive more severe CLs in anticipation of future stock price declines for these firms. Thus, our second hypothesis is as follows:

Hypothesis 2. *Retail investors sell stocks that receive more severe comment letters.*

3. MEASURES OF RETAIL INVESTORS' ATTENTION AND TRADES, AND CONTENT OF COMMENT LETTERS

3.1 Retail investors' attention

Our first test examines Robinhood investors' attention to CL disclosures. We follow Da et al. (2011) and use the Google search index (SVI) of the company's official ticker. Compared to searches on the Bloomberg terminal, which are considered a measure of institutional attention, Google searches more closely approximate retail investors' information acquisition and attention (Ben-Rephael et al., 2017; Da et al., 2011; Drake et al., 2012) and are positively correlated to retail trading (Da et al., 2011). However, although the literature suggests that Google searches are more likely to capture retail investor attention, we cannot rule out that some of the searches can be by institutional investors' information acquisition.

We also recognize that retail investors may directly search EDGAR filings for comment letter correspondence rather than use Google search. However, Google searches may (i) partially capture EDGAR access to comment letters and (ii) include access to other repositories of information and discussion about the comment letter. The former reflects that Google searches can link directly to the comment letter or, at minimum, to the EDGAR repository. The latter statement reflects that Google searches can link to comment letters on the companies' Investor Pages and to other discussion forums, articles or mirror pages for company filings and

comment letters. This latter effect is particularly important considering the relatively low level of EDGAR downloads of comment letters compared to that of 10-Ks (Dechow et al., 2016). Hence, we anticipate that Google searches better capture the range of information sources that retail investors may use to learn about the comment letter.

For this test, we first obtain a daily Google search index for tickers of companies in our sample from Google Trends. The index takes a value between 0 and 100 with a value of 100 indicating days that receive the highest number of searches for a specific period. We then estimate the abnormal Google search frequency as the difference between the natural logarithm of the Google Search Volume Index during days 0 to 1 from the CL release date and the natural logarithm of the median of Google Search Volume Index on the same weekdays over the previous 8 weeks, $Abnormal_LogGSVI[0,1]$. We focus on search volume on day 0 and 1 to allow for the delayed retail investor reaction.

3.2 Retail investors' trade

In the second test, we investigate retail investors' trades around the public dissemination of SEC CLs. For this test, we rely on the data on users' holdings on the Robinhood trading platform provided by Robintrack. Robinhood made it possible to extract the number of anonymous investors on their platform holding a particular stock at approximately hourly intervals, which allows us a high level of granularity in identifying retail trades. However, the limitation of the data is that we observe only the total number of Robinhood investors holding the stock without the holding amount.

For each stock traded on Robinhood, Robintrack reports the total number of subscribers holding the stock at an hourly frequency. Since our analysis is on a daily level, we only keep the last observation when major US exchanges close (4pm EST as the end of the trading day). Following Moss et al. (2023) and to allow for retail investors' delayed reaction, we calculate the two-day change in the number of retail investors holding the associated stock from the end

of day $t-1$ to the end of day $t+1$. These changes in retail investors' holdings are then adjusted for the aggregate underlying growth in the number of Robinhood investors, defined as the proportion of Robinhood investors holding the stock at the end of day $t-1$ multiplied by the two-day change in the aggregate number of Robinhood investors reported across all stocks from the end of day $t-1$ to the end of day $t+1$. Here, we capture the change in Robinhood investors for a firm that is different from the change that arises from the growth in the total number of Robinhood investors. Moss et al. (2023, p.8) highlight that “*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*”. Our measure thus is:

$$AdjdRI[0,1]_{i,t} = \frac{RI_{i,t+1} - RI_{i,t-1}}{RI_{i,t-1}} - \frac{RI_{i,t-1}}{Robinhood_{t-1}} \times \frac{Robinhood_{t+1} - Robinhood_{t-1}}{Robinhood_{t-1}} \quad (1)$$

where $AdjdRI[0,1]_{i,t}$ denotes adjusted abnormal changes in the number of retail investors holding a stock i in a two-day window when a CL is released for the company on day t . $RI_{i,t+1}$, $RI_{i,t}$, and $RI_{i,t-1}$ denote the number of retail investors holding stock i at the end of day $t+1$, day t , and day $t-1$, respectively. $Robinhood_{t+1}$, $Robinhood_t$ and $Robinhood_{t-1}$ denote the aggregate number of Robinhood investors reported across all stocks at the end of day $t+1$, day t , and day $t-1$, respectively.

As Robintrack provides information on the overall number of Robinhood investors holding the stock at a particular point in time (reported on an hourly basis) rather than the detailed holding of each investor, we can only estimate the abnormal changes in the number of Robinhood investors holding a stock. Hence, similar to Moss et al. (2023), our change in retail holding measure captures the extensive margin rather than the intensive margin of retail ownership.

3.3 Severity of comment letters

Bozanic et al. (2017) and Ryans (2021) report that CLs are common and are issued in approximately half of the SEC reviews in most years with many having only minor comments. This result helps to explain the evidence of no significant average price reaction to CL release (Dechow et al., 2016; Johnston & Petacchi, 2017). However, research also reports that more severe CLs associate with material negative outcomes such as negative price reactions after CL disclosure (Dechow et al., 2016; Ryans, 2021) and costly remediation, including write-downs, restatements, and changes in reporting quality (Bozanic et al., 2017; Cassell et al., 2013). If Robinhood investors are sophisticated in their processing of CLs, they should sell their holdings following a ‘severe’ CL disclosure in anticipation of these negative outcomes.

Prior research has used several approaches to identify more severe CLs. The first approach relies on the quantitative signals of CL importance, which capture the cost of responding to SEC queries. These quantitative measures of CL severity include the number of letters and days in a CL conversation, and the total number of issues mentioned in the initial letter from the SEC to a firm (Cassell, et al., 2013; Heese, Khan, & Ramanna, 2017). Here, the higher the number of issues highlighted by the SEC or the longer the letter, the higher the remediation costs, i.e. the letter is considered more severe.

The second approach focuses on the content of CLs in which revenue recognition issue is considered among the most important issues identified by the SEC (e.g., Dechow et al., 2016; Gunny & Hermis, 2020; Ryans, 2021). This measure has certain predictive power for future financial reporting outcomes such as restatement or write-down. Ryan (2021) highlights that each approach we discuss previously excels in a specific setting and there is no uniformly agreed ‘best’ measure of CL severity.

The third approach is based on investor attention, which is measured using EDGAR downloads (Ryans, 2021). These measures have certain predictive power for future financial

reporting outcomes, such as restatements or write-downs (Ryans, 2021). However, Dechow et al. (2016) highlight that CL downloads from EDGAR are relatively infrequent compared to 10-K filing downloads, which can potentially reduce the power of using EDGAR downloads as a measure of severity as many of the observations would take the value of zero. In addition, since the EDGAR log file from the 1st of July 2017 to the 18th of May 2020, is not available on the SEC website, for our sample period from the 1st of May 2018, to the 31st of August 2020, there are only 14 CL observations, which is insufficient for the regression analysis.⁹ Therefore, our analysis relies on the first two methods to identify severe CLs: quantitative signals (the number of issues, days, and rounds) and the content of CLs. These methods were selected because the signals are readily observable and accessible to retail investors at the time of dissemination.

To identify more severe CLs based on their content, we use Audit Analytics CL classification which has a taxonomy of 31 issues mentioned in the CLs in the context of financial reporting (see Appendix 3). Specifically, we construct a continuous variable, *RevRecog*, which is the natural logarithm of the number of revenue recognition issues in the initial letter sent by the SEC. To illustrate, the CL from Appendix 1 contains two accounting-related issues (i) capitalization of expenditures and (ii) revenue recognition. This CL would be categorized as having a revenue recognition issue.

Next, adopting the topic classifications in Cassell et al. (2013), we further classify all remaining issues into (i) accounting issues excluding revenue recognition (*Acct without RevRecog*), such as loan-loss allowances, goodwill impairment, and fair value estimates, and (ii) topics unrelated to accounting (*NonAcct*), such as issues related to Management Discussion and Analysis, legal matters, omitted certifications and export controls (see Appendix 3).¹⁰ Both *Acct without RevRecog* and *NonAcct* are measured as the natural logarithms of the number of

⁹ <https://www.sec.gov/data-research/sec-markets-data/edgar-log-file-data-sets>

¹⁰ According to Cunningham and Leidner (2022), 75% of the initial 10-K CLs contain at least one accounting-related comments, implying that resolving accounting issues is important to both reviewers and firms.

issues classified into Accounting Rule and Accounting Disclosure Issues (except revenue recognition) and other all issues, respectively.

To understand whether retail investors reduce holdings in stocks that receive more severe CLs, we employ the following model:

$$AdjdRI[0,1]_{i,t} = \alpha_0 + \alpha_1 RevRecog_{i,t} + \alpha_2 Acct\ without\ RevRecog_{i,t} + \alpha_3 NontAcct_{i,t} \\ + Controls + Industry\ effects + Year \times Quarter\ effects + \varepsilon, \quad (2)$$

where $AdjdRI[0,1]_{i,t}$ is the adjusted abnormal changes in the number of retail investors holding a stock i in a two-day window (days 0 and 1) when a CL is released for the company on day t . Consistent with H2, we expect α_1 to be significantly negative. We do not build predictions for α_2 and α_3 as prior research provides mixed evidence on how investors react to CLs that include less severe comments related to accounting (except revenue recognition) and non-accounting issues. *Controls* is a vector of control variables that we describe in the next section. *Industry effects* capture the industry effect of CLs.¹¹ We use *Year* $\times$ *Quarter* effects to capture time trends in the release of CLs (Ryans, 2021) that can correlate with Robinhood trades.¹² We cluster standard errors at firm level, and in robustness tests, we show consistency of results using other ways of standard error clustering.

3.4 Control variables for the main analyses

Following prior studies (Barber & Odean, 2008; Chi & Shanthikumar, 2017), we use a comprehensive set of variables known to affect changes in retail investors' portfolios. We include firm growth (*Growth*), firm size (*Size*), book-to-market ratio (*BM*), leverage (*Lev*), the number of analysts following a firm (*Follow*), an indicator for net loss (*Loss*), profitability

¹¹ We use the SEC industry office classification to define industry fixed effect. The results also hold when we use the 12 Fama-French industry classification (results untabulated).

¹² Ryans (2021) show trends in CLs' topics. To illustrate, he highlights that 'Goodwill impairment comments (Topic 2), were elevated during the stock market decline of 2009, when firms were more likely to be trading below book value, a condition that appears to prompt the SEC to question the carrying value of goodwill and companies' impairment testing procedure', Ryans (2021, 54).

(*ROA*), bid-ask spreads (*Spread*), momentum based on the past 12-month return (*Momentum*), and institutional ownership (*IO*). Studies find that retail investors are more likely to trade in larger, more liquid, and risky stocks, with higher institutional ownership, growth, profitability, and momentum (Barber et al., 2022; Eaton et al., 2023). Following Cassell et al. (2013), we also control for whether a firm makes a restatement from the first CL date to the closing CL date (*CL_Restatement*) as investors can react to the restatement rather than the CL itself. In addition, we include the lagged daily return and short-run momentum for the one-week period prior to the CL release date (*RetPre1D* and *MomentumPre7D*, respectively) to ensure that our results are not attributable to recent market trends (Boehmer et al., 2021). Variables' definitions are in Appendix 5.

4. SAMPLE SELECTION AND DESCRIPTIVE STATISTICS

4.1. Sample selection

We collect SEC CLs related to 10-K filings, which are the primary focus of the SEC review process and amount to over 70 percent of reviewed filings (Bozanic et al., 2017; Lee et al., 2023), from Audit Analytics. We then merge them with the security ticker symbols traded on Robinhood.¹³ The sample period is from the 1st May 2018 to the 31st August 2020, because Robintrack only provides Robinhood retail investor data for this period. Accounting and stock price data are from COMPUSTAT and CRSP. Analyst coverage and stock recommendation data are from I/B/E/S. Institutional stock holding is from Thomson Reuters 13F. After excluding observation with missing data, the final sample contains 626 distinct CLs.¹⁴ In the analysis of retail investors' attention, we obtain the Google search index from Google Trends.

¹³ Robinhood typically allows individual investors to trade stocks and ETFs listed on the Nasdaq and New York Stock Exchange (NYSE), and American depositary receipts (ADRs). Robinhood typically does not support over-the-counter (OTC) securities and in the past has limited individual investors from purchasing penny stocks, which have relatively high risk.

¹⁴ We carry out a robustness test in which we only use a sample of firms with stock prices being equal to or greater than \$1 (or \$5). Our results hold. These untabulated results are available upon request.

With 12 missing Google trend observations, the sample for this analysis contains 614 unique CLs. Table 1 presents the details of our sample construction.

[Insert Table 1 about here]

4.2. Descriptive statistics

Table 2 reports the summary statistics for variables included in our main regressions. The mean abnormal Google search volume is 0.309 suggesting significant information searchers for the firm around the CL disclosure. The mean value of *AdjdRIOI* is 0.001 indicating no change in retail investors' stock holdings for an average CL. This result is consistent with earlier findings that most CLs include innocuous comments (Bozanic et al., 2017; Ryans, 2021) and do not associate with significant immediate price reactions (Cassell et al., 2013; Dechow et al., 2016; Johnston & Pettachi, 2017). Thus, if retail investors are rational, we should not observe trade for an average CL. The evidence of no retail trading for an average CL means individual investors may be unaware of or unable to process CLs, which further motivates our analysis.

The CLs of the sample firms have approximately 4 issues in total, which is the sum of 0.286 CLs with revenue recognition issues, 0.925 accounting (without revenue recognition) and 2.853 non-accounting issues. The mean number of non-accounting issues is larger than accounting issues since 30 out of a total of 31 categories belong to the former category. The mean value for revenue recognition (*RevRecog*) is 0.286, constituting approximately 7% (calculated as $0.286/4$) of total issues and 25% (calculated as $0.286/(0.925+0.286)$) of total accounting issues.¹⁵ This proportion is substantive and aligns with Gunny and Hermis (2020), suggesting that the SEC devotes greater attention to serious disclosure issues such as revenue recognition. The descriptives for controls are consistent with past research (Dechow et al., 2011; Dechow et al., 2016; Ryans, 2021). Appendix 6 presents the Pearson correlation matrix for the variables. The correlations are consistent with previous research.

¹⁵ The mean value for revenue recognition issues (*RevRecog*) is similar to Lee et al. (2023).

[Insert Table 2 about here]

5. RETAIL INVESTOR'S ATTENTION AND TRADES AROUND COMMENT LETTER DISCLOSURE

5.1. Retail investors' attention to comment letter disclosure

The first test examines if retail investors are aware of CL disclosure, which we capture by the abnormal Google search frequency as discussed in section 3.1. In Panel A of Table 3, a univariate test for all CLs indicates that the mean $Abnormal_LogGSVI[0,1]$ is 0.309, significantly different from zero.¹⁶ When testing the abnormal Google search volume for day 0 and day 1, separately, we find that abnormal Google search volume is significantly higher on the CL release date, which suggests that retail investors promptly search for information about the firm on the CL disclosure day. When we divide the sample based on the presence of revenue recognition issues in the CLs, we find that there is a significantly higher abnormal Google search volume around CL dissemination dates for CLs that include revenue recognition comments. Thus, Robinhood investors seem to engage in more information acquisitions for more severe CLs.

[Insert Table 3 about here]

We further investigate retail investors' attention to the release of CL using regression analysis to account for CL characteristics. Table 3, Panel B shows that the abnormal Google search volume is significantly higher for CLs that include revenue recognition issues. Other accounting issues (apart from revenue recognition), and non-accounting issues do not significantly contribute to an increase in abnormal Google search activity. The results of firms'

¹⁶ When we do not take the natural logarithm when calculating the abnormal Google search measure, there is a 9.51% higher search volume on the two days following the CL disclosure date compared to a comparable period before the CL release. We also find significantly higher search volume when we calculate abnormal Google search volume using the median GSVI on the same weekday of previous ten weeks (untabulated), which suggests that the choice of the 'normal' period for capturing Google searches for a firm does not alter our conclusions.

characteristics and market information show that loss-making firms and firms with high ROA also receive more attention from retail investors. There is no evidence of a statistically significant correlation between institutional ownership correlates and abnormal Google searches, supporting our assumption that Google searches are more likely to capture retail investor information acquisition. Overall, Table 3 indicates that CL disclosure garners attention from retail investors, which is consistent with hypothesis 1. This effect is stronger for CLs that include more severe issues, in particular, the revenue recognition topic.¹⁷ However, attention to CLs does not necessarily imply that retail investors possess sophistication in processing the content of these letters. To evaluate the depth of their understanding and processing capabilities, we conduct an analysis of Robinhood trading activities surrounding CL disclosure.

5.2 Changes in the number of Robinhood investors holding the stock

Retail investors will sell holdings in firms that receive CLs if they anticipate poor short-term return performance of these stocks. Dechow et al. (2016) and Lee et al. (2023) find negative abnormal returns starting from approximately 20 days after the CL disclosure for firms that receive the most severe comments, such as CL highlighting revenue recognition. To validate their findings, in untabulated results, we find negative abnormal returns of 0.136% in a 30-day window starting 20 days after the CL release. These types of negative returns should incentivize retail investors to reduce holdings in more severe CL stocks that are anticipated to have stock price declines.

Next, we move to the main part of the analysis where we investigate abnormal trades by Robinhood investors around CL disclosure. The top row of Panel A, Table 4 presents univariate evidence on the average effect to CL issuance using all CLs. We do not find evidence that retail

¹⁷ To build confidence that Google searches reflect information acquisition about comment letters, we perform a placebo test. We randomly select a date for the company outside the comment letter and 10K filing dates and repeat the analysis from Table 3 for these placebo days. We do not find evidence of significant abnormal Google searches around placebo days (result untabulated). This result gives us confidence that we capture investor attention to comment letter disclosure.

investors reduce their holdings following an average CL publication.¹⁸ This benchmark case is useful for two reasons. First, not every CL should prompt stock selling as some CLs can include innocuous comments (Bozanic et al., 2017; Ryans, 2021). Rather, investors should examine the content of the CL to understand if action is needed. Second, this result helps us to understand if retail investors do not overreact on average to CL disclosure (e.g., retail investors could be selling stocks without regard for the CL content).¹⁹ The bottom row of Panel A reveals significant reductions in the proportion of Robinhood investors owning a stock after the issuance of more severe CLs. Jointly, the univariate evidence provides preliminary evidence consistent with our prediction that Robinhood investors exhibit sophistication in the way they react to CL disclosure.

In Panel B of Table 4, column 1 shows a statistically significant decrease in the holdings of Robinhood investors in response to CLs that contain comments on revenue recognition issues. This effect is economically significant - a one standard deviation change in revenue recognition issues (*RevRecog*) is associated with a sales volume approximately twelve times greater than the average retail investor's response to all CLs.²⁰ This result is consistent with hypothesis 2, and consistent with Table 3, Panel B evidence that retail investors engage in more intense information acquisition for CLs that include revenue recognition issues.

[Insert Table 4 about here]

Column 2 reveals that after accounting for revenue recognition comments, there is no discernible evidence of Robinhood investors selling stock in response to CLs addressing other (non-revenue) accounting issues. This pattern suggests that within the realm of accounting

¹⁸ We find similar evidence for a median CL.

¹⁹ The evidence of no significant retail trading for an average comment letter in Panel B of Table 4 does not contradict the evidence that retail investors search for information for an average comment letter, as captured by Google search volume (Table 3, Panel A). The Google search volume test examines if retail investors are aware of the comment letter. Awareness of information is a prerequisite for action as investors must first become alert to information before they can process and then act on it (Ben-Raphael, Da, & Israelsen, 2017).

²⁰ This is calculated as $(-0.027 \times 0.452)/0.001$ where -0.027 is the coefficient on *RevRecog*, 0.452 is the standard deviation of *RevRecog*, and 0.001 is the mean value of *AdjdRI*[0,1].

issues highlighted by the SEC in CLs, revenue recognition stands out as the key concern. This evidence aligns with the SEC’s focus on proper revenue recognition implementation in 10-K filings (Dechow et al., 2016). We also find that Robinhood investors sell stocks of firms that receive non-accounting comments. This evidence is consistent with Ryans (2021), who reports that non-accounting comments, such as on omitted certificates and export controls, are associated with negative abnormal returns after the CL release.

In further analysis, we follow Cassell et al. (2013) and split *Acct without RevRecog* into core (*Acct_Core without RevRecog*), non-core (*Acct_NonCore*), and other (*Acct_Others*). Each measure captures the natural logarithm of the number of issues related to core earnings, non-core earnings, and others (i.e., classification and fair value issues), respectively.²¹ We then estimated an augmented version of equation 2 with these variables instead of *Acct without RevRecog*. Column 3 indicates that Robinhood investors reduce holdings where CLs include comments on non-core earnings. Prior research suggests that these CLs tend to have a significant short-term effect on reported earnings and returns (Alfonso et al., 2015; Haw et al., 2011). Ryans (2021) reports that some non-core comments, such as on non-GAAP measures and consolidation, are associated with significant negative abnormal returns after the CL release. This effect is also economically significant, since a one standard deviation increase in *Acct_NonCore* associates with stock sales of 6 times larger compared to the sample mean of retail investor reaction to all CLs (calculated as $(-0.008 \times 0.761) / 0.001$).

Overall, our evidence in Table 4 is consistent with the prediction that Robinhood investors are able to identify the more material CLs, which are more likely to lead to negative outcomes after the letter release and reduce their holdings in these firms.²² The impact is economically

²¹ Appendix 4 reports the definitions of the *Acct_Core without RevRecog*, *Acct_NonCore*, and *Acct_Others* measures.

²² For the robustness test, we repeat the tests using the changes in retail investor holding on the day of the CL disseminations (instead of the two-day window). The results confirm that retail investors’ stock selling in response to revenue recognition CLs primarily occurs on the day of CL disclosure. These untabulated results are available upon request.

significant. This evidence suggests a certain level of sophistication in retail investors' processing of CL disclosure.²³

To promote generalizability of our results, we also examine how Robinhood investors react to disclosure of comment letters on other than 10-K filings. We expect that how retail investors would react to the non-10-K CLs is similar to our main hypothesis. Specifically, we expect retail investors to sell their holdings in stocks that receive more severe non-10-K CLs. As this type of CL is less researched in prior literature and is likely more heterogeneous in terms of its content, it is not obvious how to measure its severity. Hence, we simply classify issues mentioned in those letters into accounting and non-accounting issues. The results in Table A7.2 in Appendix 7 indicate a negative reaction from Robinhood investors when the CLs on these filings contain more accounting issues i.e. they are perceived as more severe letters. Thus, our results seem to generalize to other types of CLs.

5.3. Addressing the endogeneity concern

We recognize that CLs are endogenous and may associate with unobservable firm characteristics that, in turn, predict retail investors' stock sales in response to severe CLs (the omitted correlated variables problem). For example, CL issuance can correlate with deteriorating market conditions and instances when managers shore up firm performance through earnings management that the SEC staff identifies. Retail investors sell their shares in anticipation of poorer future performance due to deteriorating firm performance. However, this prediction suggests that we should observe Robinhood sales even before the CL release, which is not the case as evidenced in placebo tests in Table A7.3 in Appendix 7.

Nonetheless, to build confidence in our conclusions, we also perform a two-stage least squares analysis. Our instrument is the SEC's Division of Corporation Finance 'busyness'.

²³ We also estimate the regression equation 2 for different treatments of standard errors and year and quarter fixed effects. These results are reported in Table A7.1 in Appendix 7. Our main findings that Robinhood investors reduce holdings in stocks that receive more severe CLs are unchanged.

Gunny and Hermis (2020, 7) highlight that SEC activities are seasonally compressed and ‘*the SEC issues fewer comment letters when busy, focuses its limited resources on the most severe cases of disclosure noncompliance, and extends the amount of time between receiving a firm's filing and issuing a comment letter.*’ Hence, we expect the Division of Corporation Finance ‘busyness’ instrument to be positively correlated with the revenue recognition variable, an important indication of the severity of the CL. In addition, thus it meets the relevance and exclusion conditions. Similar to Gunny and Hermis (2020), we define *ADO_Busyness*, which is an indicator of the busyness of the review department and equals 1 if the firm with a fiscal year-end in December.

Table 5 reports first stage regression results of the regression of the *RevRecog* variable on the *ADO_Busyness*. It indicates that *RevRecog* is positively associated with (*ADO_Busyness*, which is consistent with Gunny and Hermis (2020, p.25) ‘*that firms filing their 10-K during the SEC’s busy time are more likely to receive a CL related to revenue noncompliance.*’ The second stage regressions present evidence consistent with our main results that Robinhood investors reduce holdings in firms that receive more severe CLs, consistent with our main regression results. Column 2 presents a negative and significant coefficient on *RevRecog*, implying that a one-unit increase in the log-transformed revenue recognition issues is associated with a 20.6% decrease in the retail investor holdings (calculated as the exponential of the coefficient of *RevRecog* minus one, multiplied by 100).

[Insert Table 5 about here]

5.4. Heuristic and readability measures of CL severity

Our result could capture Robinhood investors reacting to heuristic measures of CL severity that could correlate with the CL content. For example, revenue recognition comments may correlate with longer CLs or letters involving several rounds of communication between the firm and the SEC. Robinhood investors may react to these heuristic measures rather than the content-

driven measures. This type of result would suggest a relatively low level of Robinhood investors' sophistication in their CL analysis.

To test this prediction, we add several 'heuristic' measures to the regression model. Specifically, we use three filing review outcomes variables that have been commonly used in prior research (Cassell et al., 2013; Ege, Glenn, & Robinson, 2020; Heese et al., 2017): (i) *TotalIssues without RevRecog* measured as the natural log of the number of issues identified in the first letter sent by the SEC except revenue recognition, (ii) *TotalRounds*, measured as the natural log of the number of letters sent by the SEC to the firm during the CL conversation and (iii) *TotalDays*, measured as the natural log of the number of days taken to close the CL conversation from the originating CL to the "No Further Comment" letter.²⁴

Robinhood investors may sell stocks that received less readable CLs rather than process the content of the letter. To address this concern, we include three readability measures of CLs: the natural logarithm of the number of words (*TotalWords*), the fog index (*FogIndex*), and the percentage of negative words (*Negative*) as the proxies for the length, complexity, and tone of the CLs, respectively (Cassell, Cunningham, & Lisic, 2019; Ege et al., 2020).

Table 6 reports regression results when we augment equation 2 with the heuristic measures of CL severity and the CL readability measures. In columns 2 and 3, we continue to find a significant coefficient on *RevRecog*, suggesting that Robinhood investors react to the content of the letter, not the heuristic measures. Further, heuristic and readability measures are largely insignificant, which suggests that Robinhood investors look beyond heuristic measures of CL complexity when deciding to trade on CL release.

[Insert Table 6 about here]

²⁴ While *TotalIssues* reflects the extent of the comment received, *TotalRounds* and *TotalDays* are used as the proxy for the cost of CL remediation (Cassell et al., 2013).

5.5. Confounding effects

Our results could be influenced by confounding effects which coincide with the release of CL. To account for this effect, we consider a series of potential factors including: (i) insider sales around the CL release (Dechow et al., 2016), (ii) high short interest before the CL announcement (Lee et al., 2023), (iii) media articles about the firm around the CL release and social media activity on Twitter, (iv) stock selling on Fridays, (v) analyst recommendations and revisions around the CL announcement, (vi) the effect of comments on other filings that are in the same 10-K CLs, (vii) the effect of Covid-19, and (viii) the effect of other contemporaneous filings.

5.5.1. Insider sales around CL disclosure

Dechow et al. (2016) find significant insider sales prior to revenue recognition CL releases. Robinhood investors may use insider sales as a trade signal rather than examine the CL content. To test this alternative explanation, we control for insider sales prior to the CL release. The SEC mandates that insiders file Form 4 within two business days of a trade. We control for insider sales in three windows: from day -5 to day -1 before the CL release, from day -10 to day -6, and period more than 11 days prior to CL disclosures. Specifically, *InsiderSales*[-5,-1] is calculated as the average daily insider sales divided by the number of shares outstanding from day -5 to day -1 relative to the CL release date. We create the insider sales measures for other windows in a similar way. This information would be available to Robinhood investors at the CL release day.

Table 7, column 1 reports results for equation 2 augmented with the measures of the intensity of insider sales before CL release. We corroborate earlier evidence that Robinhood investors trade on more severe CLs. Robinhood trading does not correlate with insider sales measured at any length. Thus, controlling for the confounding effect of insider sales leaves our conclusions unchanged.

[Insert Table 7 about here]

5.5.2. High short interest before CL disclosure

Lee et al. (2023, p.375) find that short sellers front-run CL disclosures and take a position based on the economic consequence of the letters, though they conclude that ‘*front running the comment letter disclosure is not the optimal trading strategy for short sellers*’ as ‘*short sellers can gain similar profits, and bear less risk, if they put off increasing their short positions until after the disclosure.*’ Robinhood investors may use short interest as a heuristic measure of CL severity. Thus, it is short-selling rather than the information revealed in the CL that influences Robinhood trades. To address this concern, we augment equation 2 with an indicator variable equal to 1 if a firm’s short interest, as a percentage of shares outstanding, is in the top median during a year. Results in column 2 of Table 7 show no significant coefficient on short interest, and our main results remain unchanged.

5.5.3. Media attention - News and Twitter activity around CL release

Robinhood investors may react to the analysis of the CL in traditional media and on social media.²⁵ To control for this effect, we include the percentage change in news article counts from the day after the CL dissemination date relative to the day before the CL dissemination date, $\Delta Ratio_NewsCount[0,1]$. To capture social media activity, we calculate the percentage change in Twitter post counts from the day after the CL dissemination date relative to the day before the CL dissemination date, $\Delta Ratio_TwitterCount[0,1]$.

Table 7, column 3 shows that traditional media does not associate with Robinhood trades around CL release. However, we find a *positive* effect for Twitter activity consistent with the evidence in Barber et al. (2022). Thus, social media attention on the CL release day prompts

²⁵ We also use other measures of familiarity and media attention bias advertising expenses in the regression model 2. Our main results hold. To further account for familiarity, we also repeat the tests on a subsample in which observations belonging to retail and consumer goods industry firms are excluded. Our results remain unchanged. These untabulated results are available upon request.

purchases of the stock, a result that is counter to our main results. Our main conclusion that Robinhood investors sell their holdings on the receipt of more severe CL remains unchanged.

5.5.4. Stock selling on Fridays

We also examine if our results could capture a correlation between CL release and the day-of-the-week effect. Specifically, Robinhood investors may sell some of their holdings on Fridays to avoid assuming the risk of holding the position through the weekend. We create an indicator variable for Friday and include it in the model. Column 4 of Table 7 indicates that our conclusions are unchanged, and the Friday indicator variable does not correlate with Robinhood trades.

5.5.5. Analyst stock recommendations and revisions

Next, we address the concern that our results could capture concurrent revision in analysts' forecasts, which in turn prompt Robinhood investors to sell. We create a variable *AnalystRecommend*, which is the difference in the consensus analyst recommendations on the CL announcement relative to the pre-announcement period, and *AnalystRevision*, which is an indicator variable equal to 1 if there is an analyst recommendation revision issued over the subsequent two days after releasing CLs. As reported in column 5 of Table 7, we find a consistent result on the sophistication in Robinhood investors' processing of CLs when we control for revisions in analyst recommendations.

5.5.6. The effect of comments on other filings

Some 10-Ks can be reviewed in conjunction with other filings, such as an S-3 or S-4. Hence, it is possible that our results could be influenced by these other filings rather than the content of the SEC comments related to 10-K. To address this concern, we first identify CLs that also contain comments on other filings. We then create two new variables including *Other_CLs*, an indicator of whether CLs contain comments on other filings, and

Num_Refer_Filings, the number of filings referenced in the 10-K CL. Results in column 6, Table 7 reveal that our main conclusions remain unchanged when we add these two variables to the regression.²⁶

Finally, we also consider the joint effect of all confounding variables. Specifically, we include all the variables discussed here in the regression model.²⁷ Column 7 in Table 7 indicates that our main result about the negative relation between more severe CL and Robinhood investors' holdings is unchanged. Overall, Table 7 results suggest that retail investors do not piggyback on other contemporaneous signals that are associated with CL disclosure, but their trades are attributable to the content of CLs.

5.5.7. The effect of COVID-19

Since our sample period spans from May 1st, 2018, to August 31st, 2020, our results may be affected by the Covid-19 pandemic. For instance, lockdown periods can cause more abnormal attention from retail investors, who are more likely to search for information related to ticker symbols, SEC CLs, and revenue recognition issues. In addition, during that time, the filing review process transitioned over to remote work, so the content and substance of the CLs could have changed (e.g., Cunningham & Leidner, 2022). Including $Year \times Quarter$ fixed effects helps to alleviate concerns about exogenous shocks caused by Covid lockdowns. However, to further substantiate our results, we repeat our main analyses, excluding 38 firm-quarter observations

²⁶ To explore this analysis further, we perform two additional tests. First, we create an indicator variable, *OtherFiling*, that takes the value of 1 if there are corporate announcements and filings, such as 8-K filings, disclosed during the period from day -1 to +1 centered on the CLs release date, and 0 otherwise. We then include this variable in the regression. Panel A of Table A7.4 in Appendix 7 indicates that our conclusions are unchanged in this model. Second, we removed observations with corporate events/announcements/filings within the 3-day window centered on the CLs release date. We then re-estimated the regression model for this sample. Panel B of Table A7.4 in Appendix 7 demonstrates that our main conclusions remain unchanged for this sample. This result is also consistent with the fact that the SEC, not the firm, determines the timing of the CL release date. This indicates that firms are unlikely to be able to time corporate events and releases at the CL announcement date.

²⁷ Ege, Glenn, and Robinson (2020) argue that transactional filings are largely unexpected and can temporarily increase the SEC's workload, reducing the SEC's resources that can be devoted to reviews of periodic filings. Consistent with their findings, we do not find a significant impact of the abnormal transactional filings on the total number of issues or the number of revenue recognition issues. However, to control for the possible effect of these transactions on retail trades, we include the measure of abnormal transactional filings in regression model 2, and our main results hold. These untabulated results are available upon request.

with CL release dates on or after 1st March 2020. We present the results in Table A7.5 in Appendix 7. We find that our results are robust in the pre-Covid period.

5.6. Robinhood trading and future abnormal returns

The final test investigates whether retail investors' decision to liquidate their holdings in response to severe CLs anticipates poor future stock returns for these firms. For this test, we relate abnormal Robinhood sales on the CL disclosure to abnormal returns after the CL publication. Specifically, for the 90-day period from 2 days after the CL disclosure, we examine whether the changes in retail investors' holdings are positively associated with cumulative abnormal stock returns (using the market-adjusted model), and whether this relation is more pronounced to revenue recognition issues.²⁸ We employ the following regression model:

$$CAR_{i,t} = \alpha_0 + \alpha_1 AdjDRI[0,1]_{i,t} + \alpha_2 RevRecog_{i,t} + \alpha_3 AdjDRI[0,1]_{i,t} \times RevRecog_{i,t} \\ + Controls + Industry\ effects + Year \times Quarter\ effects + \varepsilon, \quad (3)$$

As prior studies report a delayed market reaction to CLs disclosure (see, e.g., Dechow et al., 2016), we employ CAR for three different windows $[+2,+30]$, $[+31,60]$, and $[+61,+90]$. Results in Table 8 column 3 demonstrate a significantly positive relation between $CAR[+31,+60]$ and $AdjDRI[0,1]$, suggesting that stock selling by retail investors around the CL dissemination dates is associated with subsequent future stock price decline in the period from day 31 to day 60. This relation is more pronounced for revenue recognition CLs (column 4) as evidenced by the positive coefficient on the interaction term $AdjDRI[0,1] \times RevRecog$.

[Insert Table 8 about here]

6. CONCLUSIONS

In this study, we investigate retail investors' monitoring behavior of their holdings, specifically

²⁸ We calculate the cumulative abnormal return (CAR) as the cumulation of daily stock returns less CRSP capitalization weighted market return.

their capacity to utilize the acquisition of financial information through SEC CLs. Our results indicate that retail investors pay attention to CL disclosures, as evidenced by a substantial increase in abnormal Google search activity surrounding the disclosure dates. Moreover, retail investors reduce their holdings in response to CLs related to revenue recognition issues. Our results are robust to alternative research designs and controlling for other information channels that could affect the investment decisions of retail investors. Overall, our results suggest that Robinhood investors are sophisticated in their ability to process CLs.

Our evidence contributes to the literature by demonstrating that Robinhood investors exhibit sophistication in effectively monitoring their holdings through the analysis of SEC CLs. This result challenges the common perception of retail investors as 'naïve' or 'heuristic' decision-makers. In addition, our conclusions extend the CL literature, addressing concerns about the complexity of SEC CLs and their relevance to less sophisticated investors. Our evidence suggests that CLs are valuable to retail investors in their portfolio monitoring. Overall, the SEC should be aware of how its enforcement actions affect a particular group of investors, and this implication is essential for the SEC's regulatory efforts.

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Table 1. Sample selection

Sample Selection Process	# of distinct comment letter
All distinct types of CLs with the first letter initiated by the SEC (<i>form_fkey</i> = “UPLOAD”) in Audit Analytics between May 1 st 2018 and August 31 st 2020.	4,494
Less: missing Robinhood holdings from days 0 to 1 from the CL release date	(2,609)
Less: CL conversations in which the number of total issues, rounds, or days equals to zero	(457)
Less: missing variables from Audit Analytics, Compustat, CRSP, IBES, and Thomson Reuters 13F	(472)
Less: CLs unrelated to the 10-K filing (i.e., <i>web_grp_fil_ref</i> contains “10-K” or “10K”)	(330)
The final sample for 10-K CLs	626
Less: missing values for Google search variable, <i>Abnormal_LogGSVI</i> [0,1]	(12)
Sample for abnormal Google attention (Table 3)	614

The table reports the sample section process.

Table 2. Descriptive statistics

Variable	N	Mean	Std. Dev.	P25	Median	P75
Google Searches and Adjusted Retail Investor Holdings						
<i>Abnormal_LogGSVI[0,1]</i>	614	0.309	2.124	-0.223	0.000	0.470
<i>AdjdRI[0,1]</i>	626	0.001	0.079	-0.013	-0.004	0.004
Revenue Recognition						
<i>RevRecog</i>	626	0.286	0.452	0.000	0.000	1.000
Accounting Topics without Revenue Recognition vs. Non-Accounting Topics						
<i>Acct without RevRecog</i>	626	0.925	1.107	0.000	1.000	1.000
<i>NonAcct</i>	626	2.853	2.610	1.000	2.000	4.000
Core Accounting Topics without Revenue Recognition, Non-Core, and Other Accounting Topics						
<i>Acct_Core without RevRecog</i>	626	0.211	0.456	0.000	0.000	0.000
<i>Acct_NonCore</i>	626	0.478	0.761	0.000	0.000	1.000
<i>Acct_Others</i>	626	0.235	0.477	0.000	0.000	0.000
Control Variables						
<i>Growth</i>	626	0.058	0.414	-0.036	0.020	0.086
<i>Size</i>	626	8.065	1.768	6.936	8.000	9.144
<i>BM</i>	626	0.466	0.425	0.187	0.381	0.689
<i>Lev</i>	626	0.341	0.220	0.181	0.331	0.464
<i>Follow</i>	626	2.062	0.686	1.609	2.079	2.565
<i>Loss</i>	626	0.244	0.430	0.000	0.000	0.000
<i>ROA</i>	626	0.002	0.054	0.000	0.007	0.018
<i>Spread</i>	626	0.145	0.382	0.023	0.050	0.106
<i>Momentum</i>	626	0.073	0.401	-0.155	0.035	0.223
<i>IO</i>	626	0.757	0.251	0.667	0.825	0.922
<i>CLRestatement</i>	626	0.016	0.125	0.000	0.000	0.000
<i>RetPreID</i>	626	-0.001	0.025	-0.012	0.000	0.011
<i>MomentumPre7D</i>	626	-0.004	0.075	-0.037	-0.001	0.031

The table presents the descriptive statistics of the main variables related to issues in SEC CLs and control variables used in our multivariate regressions. In this table, the number of revenue recognition, accounting, and non-accounting issues are presented without natural logarithm for more intuitive interpretations. All variables are defined as in Appendix 5. *, **, *** indicate statistical significance (two-tailed) at the 0.1, 0.05 and 0.01 percent levels, respectively.

Table 3. Abnormal Google attention around CL dissemination dates**Panel A: Univariate analysis**

	<i>Abnormal_LogGSVI[0,1]</i>	p-value for diff
All CLs		
All 10K CL (n=614)	0.309*** (t: 3.61)	
Searches on day 0 and 1		
All 10K CL – day 0 (n=614) (i.e., <i>Abnormal_LogGSVI[0]</i>)	0.462*** (t: 4.33)	0.002***
All 10K CL – day 1 (n=614) (i.e., <i>Abnormal_LogGSVI[1]</i>)	0.086* (t: 1.57)	
Severity of CLs		
10K CL incl. <i>RevRecog</i> (n=176)	0.611*** (t: 3.60)	0.032**
10K CL excl. <i>RevRecog</i> (n=438)	0.188* (t: 1.91)	

Panel B: Multivariate regression analysis: The effect of SEC CL on abnormal Google search index

Variable	Pred Sign	Dependent Variable = <i>Abnormal LogGSVI</i> [0,1]			
		Total Issues (1)	Accounting (2)	Revenue Recognition (3)	Revenue Recognition (4)
<i>TotalIssues</i> (= <i>Acct</i> + <i>NonAcct</i>)	+/?	0.137 (0.83)			
<i>Acct</i>	+/?		0.140 (0.84)		
<i>RevRecog</i>	+			0.731** (2.09)	0.710** (2.03)
<i>Acct without RevRecog</i>	?			-0.045 (-0.28)	
<i>Acct_Core without RevRecog</i>	?				0.343 (0.92)
<i>Acct_NonCore</i>	?				0.010 (0.05)
<i>Acct_Others</i>	?				-0.169 (-0.59)
<i>NonAcct</i>	?		0.073 (0.53)	0.126 (0.93)	0.109 (0.80)
<i>Growth</i>		0.405 (1.32)	0.403 (1.31)	0.369 (1.14)	0.377 (1.17)
<i>Size</i>		-0.248*** (-3.36)	-0.250*** (-3.40)	-0.254*** (-3.47)	-0.253*** (-3.45)
<i>BM</i>		-0.193 (-0.84)	-0.194 (-0.84)	-0.135 (-0.59)	-0.108 (-0.45)
<i>Lev</i>		-0.276 (-0.65)	-0.273 (-0.64)	-0.218 (-0.51)	-0.241 (-0.57)
<i>Follow</i>		0.142 (0.74)	0.143 (0.75)	0.156 (0.82)	0.158 (0.83)
<i>Loss</i>		0.429* (1.72)	0.424* (1.70)	0.412* (1.66)	0.404 (1.62)
<i>ROA</i>		5.169** (2.17)	5.080** (2.13)	5.293** (2.29)	5.190** (2.24)
<i>Spread</i>		-0.331 (-1.51)	-0.333 (-1.51)	-0.347 (-1.51)	-0.364 (-1.54)
<i>Momentum</i>		-0.019 (-0.07)	-0.021 (-0.08)	-0.026 (-0.10)	-0.027 (-0.10)
<i>IO</i>		0.183 (0.46)	0.193 (0.49)	0.157 (0.40)	0.157 (0.40)
<i>CLRestatement</i>		0.186 (0.42)	0.182 (0.41)	0.238 (0.55)	0.249 (0.56)
<i>RetPre1D</i>		1.688 (0.43)	1.658 (0.42)	1.192 (0.30)	0.778 (0.19)
<i>MomentumPre7D</i>		0.778 (0.54)	0.791 (0.55)	0.848 (0.59)	0.898 (0.62)
<i>Intercept</i>		0.964 (0.76)	0.946 (0.75)	0.981 (0.81)	0.700 (0.55)
SEC Ind-Office FE		Yes	Yes	Yes	Yes
Year*Quarter FE		Yes	Yes	Yes	Yes
Number of Obs		614	614	614	614
Adjusted R ²		0.021	0.020	0.026	0.025

Panel A presents the results of univariate analysis for the relationship between retail investors' abnormal attention to 10K comment letters over the subsequent two days. Panel B reports the results of the multivariate regression analysis of the relationship between abnormal Google search volume and comment letter contents. Google Search Volume Index (GSVI) is defined as the daily search frequency from Google Trends based on the stock Ticker. *Abnormal_LogGSVI*[0,1] represents the abnormal level of attention, defined as the difference between the natural logarithm of Google Search Volume Index during days 0 to 1 from the comment letter release date and the natural logarithm of the median GSVI on the same weekdays of previous 8 weeks. *TotalIssues* is the sum of *Acct* and *NonAcct* (column 1). *Acct* is further divided into *RevRecog* and *Acct without RevRecog*. *Acct without RevRecog*

is then subdivided into *Acct_Core without RevRecog*, *Acct_NonCore*, and *Acct_Others*. Appendix 5 defines the variables. *, **, *** indicate statistical significance (two-tailed) at the 0.1, 0.05 and 0.01 percent levels, respectively.

Table 4. Retail investor holdings during SEC CL release**Panel A: Univariate analysis**

	n	<i>AdjdRI</i> [0]		<i>AdjdRI</i> [0,1]	
10K CLs	626	0.00083	(0.626)	0.00073	(0.817)
10K CLs with <i>RevRecog</i>	179	-0.00531***	(<0.00)	-0.00070***	(<0.00)

Panel B: Multivariate regression analysis for the effect of revenue recognition issues on retail investor holdings

Variable	Pred Sign	Dependent Variable = <i>AdjdRI</i> [0,1]		
		(1)	(2)	(3)
<i>RevRecog</i>	-	-0.027** (-2.16)	-0.029** (-2.20)	-0.030** (-2.26)
<i>Acct without RevRecog</i>	?		-0.005 (-1.10)	
<i>Acct_Core without RevRecog</i>	?			0.008 (1.00)
<i>Acct_NonCore</i>	?			-0.008* (-1.82)
<i>Acct_Others</i>	?			-0.005 (-0.91)
<i>NonAcct</i>	?		-0.007 (-1.61)	-0.007* (-1.68)
<i>Growth</i>			0.003 (0.54)	0.003 (0.54)
<i>Size</i>			0.001 (0.37)	0.001 (0.38)
<i>BM</i>			-0.006 (-0.86)	-0.005 (-0.66)
<i>Lev</i>			-0.016 (-0.56)	-0.016 (-0.58)
<i>Follow</i>			-0.011** (-2.06)	-0.010** (-2.05)
<i>Loss</i>			0.007 (0.70)	0.008 (0.71)
<i>ROA</i>			0.006 (0.22)	0.003 (0.11)
<i>Spread</i>			-0.003 (-0.43)	-0.004 (-0.56)
<i>Momentum</i>			0.005 (0.89)	0.005 (0.91)
<i>IO</i>			0.015 (1.01)	0.014 (0.94)
<i>CLRestatement</i>			-0.002 (-0.21)	-0.000 (-0.00)
<i>RetPre1D</i>			-0.020 (-0.13)	-0.033 (-0.22)
<i>MomentumPre7D</i>			0.004 (0.11)	0.005 (0.12)
<i>Intercept</i>		-0.013 (-0.43)	-0.011 (-0.32)	-0.011 (-0.32)
SEC Ind-Office FE		Yes	Yes	Yes
Year*Quarter FE		Yes	Yes	Yes
Number of Obs		626	626	626
Adjusted R ²		0.023	0.025	0.024

This table illustrates the effect of SEC CLs on the abnormal retail investor holding (*AdjdRI*[0,1]) during days 0 to 1 following the CL release date. Panel A displays the results of the univariate analysis regarding the change in retail investor holdings on day 0 or days 0 to 1 following the CL release date, categorized by the type of CLs. Panels B and C present the results of the multivariate regression of the relationship between retail investor holdings and total issues (*TotalIssues*) and content of CLs as in equation 2. Control variables are the same as those presented in Panel C. Column 1 of Panel C includes only the number of revenue recognition issue (*RevRecog*). Column 2 of

Panel C includes the number of revenue recognition issues (*RevRecog*), the number of non-revenue accounting issues (*Acct without RevRecog*), and the number of non-accounting issues (*NonAcct*). In column 3 of Panel C, we split *Acct without RevRecog* into core, non-core, and other accounting topics based on the extent of materiality. Appendix 5 defines the variables. All continuous variables are winsorized at the 1th percentile and 99th percentile levels. Standard errors are clustered at the firm level, and t-values in parentheses. *, **, *** indicate statistical significance (two-tailed) at the 0.1, 0.05 and 0.01 percent levels, respectively.

Table 5. Retail investor reaction to revenue recognition CLs: Two-Stage Least-Square (2SLS) regression

Variable	Pred Sign	Dependent Variable =	Dependent Variable =
		<i>RevRecog</i>	<i>AdjdRI[0,1]</i>
		1st Stage (1)	2nd Stage (2)
<i>RevRecog</i>	-		-0.230** (-2.03)
<i>Acct without RevRecog</i>			-0.004 (-0.49)
<i>NonAcct</i>			-0.208** (-2.23)
<i>ADO_Busyness</i>	+	0.102** (2.35)	
Controls		Yes	Yes
SEC Ind-Office FE		Yes	Yes
Year*Quarter FE		Yes	Yes
Number of Obs		626	626
Adjusted R ²		0.188	0.025
Wald χ^2			29.12
Tests of endogeneity:			
Durbin χ^2			5.76**
Wu-Hausman			5.45**

This table presents the regression results using the two-stage least-squares (2SLS) method for analyzing retail investor holdings on revenue recognition CLs. Column 1 reports the first stage regression results of *RevRecog*, using *ADO_Busyness* as an instrumental variable. Column 2 presents the instrumental variable (IV) regression results as the second stage after controlling the endogeneity of the *RevRecog*. *ADO_Busyness* is defined as an indicator variable equal to 1 if the firm with a fiscal year-end in December, and 0 otherwise. Control variables are the same as those presented in Table 3 Panel C. Appendix 5 defines the variables. All continuous variables are winsorized at the 1st percentile and 99th percentile levels. Standard errors are clustered at the firm level, and t-values in parentheses. *, **, *** indicate statistical significance (two-tailed) at the 0.1, 0.05 and 0.01 percent levels, respectively.

Table 6. Regression results of SEC CL outcomes and readability on retail investor portfolios

Variable	Pred Sign	Dependent Variable = <i>AdjdRI</i> [0,1]		
		(1)	(2)	(3)
<i>TotalIssues</i>	-/?	-0.004 (-0.86)		
<i>RevRecog</i>	-		-0.031** (-1.96)	-0.031** (-1.97)
<i>TotalIssues without RevRecog</i>	?		-0.003 (-0.54)	
<i>Acct without RevRecog</i>	?			-0.002 (-0.36)
<i>NonAcct</i>	?			-0.003 (-0.65)
<i>TotalRounds</i>	?	-0.006 (-0.24)	-0.006 (-0.28)	-0.006 (-0.27)
<i>TotalDays</i>	?	0.007 (0.94)	0.008 (1.06)	0.008 (1.03)
<i>TotalWords</i>	-/?	-0.022* (-1.75)	-0.019* (-1.67)	-0.019 (-1.56)
<i>FogIndex</i>	?	0.001 (0.64)	0.001 (0.65)	0.001 (0.59)
<i>Negative</i>	-/?	0.001 (0.23)	-0.001 (-0.45)	-0.001 (-0.44)
Controls		Yes	Yes	Yes
SEC Ind-Office FE		Yes	Yes	Yes
Year*Quarter FE		Yes	Yes	Yes
Number of Obs		463	463	463
Adjusted R ²		0.211	0.218	0.216

This table presents the regression results on whether retail investors respond to review outcomes and the readability of initial CLs. We include measures of the total number of issues, rounds, and days (*TotalIssues*, *TotalRounds*, and *TotalDays*, respectively). *TotalIssues* is divided into *RevRecog* and *TotalIssues without RevRecog*. *TotalIssues without RevRecog* is further split into *Acct without RevRecog* and *NonAcct*. We also control for CLs' readability by including the total number of words (*TotalWords*), the fog index (*FogIndex*), and the percentage of average negative word (*Negative*) represent the length, complexity, and tone of the CLs, respectively. Control variables are the same as those presented in Table 3 Panel C. Appendix 5 defines the variables. All continuous variables are winsorized at the 1 percent and 99 percent levels. Standard errors are clustered at the firm level, and t-values in parentheses. *, **, *** indicate statistical significance (two-tailed) at the 0.1, 0.05 and 0.01 percent levels, respectively.

Table 7. Retail investors and CLs in consideration of confounding effect

Variable	Dependent Variable = <i>AdjdRI</i> [0,1]						
	Insider sales (1)	High short interest (2)	Media coverage (3)	Friday (4)	Analyst (5)	Other CLs & Refer files (6)	All (7)
<i>RevRecog</i>	-0.030** (-2.14)	-0.028** (-2.17)	-0.021*** (-2.84)	-0.029** (-2.20)	-0.028** (-2.19)	-0.028** (-2.23)	-0.020*** (-2.64)
<i>Acct without RevRecog</i>	-0.006 (-1.16)	-0.005 (-1.07)	-0.007 (-1.11)	-0.005 (-1.09)	-0.005 (-1.18)	-0.005 (-1.04)	-0.007 (-1.18)
<i>NonAcct</i>	-0.006 (-1.61)	-0.007 (-1.62)	-0.006 (-1.38)	-0.007 (-1.62)	-0.007* (-1.67)	-0.007* (-1.67)	-0.007 (-1.58)
<i>InsiderSales</i> [-1,-5]	-0.006 (-0.34)						-0.001 (-0.09)
<i>InsiderSales</i> [-6,-10]	0.005 (0.47)						0.001 (0.22)
<i>Insidersales</i> [<-11]	0.028 (0.81)						-0.006 (-0.44)
<i>High_ShortInterest</i>		-0.004 (-0.75)					-0.003 (-0.37)
Δ <i>Ratio_NewsCount</i> [0,1]			-0.000 (-0.36)				-0.000 (-0.25)
Δ <i>Ratio_TwitterCount</i> [0,1]			0.005*** (24.80)				0.005*** (24.84)
<i>Friday</i>				-0.004 (-0.75)			0.008 (1.20)
<i>AnalystRecommend</i>					-0.000 (-0.16)		-0.001 (-0.20)
<i>AnalystRevision</i>					-0.027** (-2.09)		-0.028** (-2.36)
<i>Other_CLs</i>						-0.022 (-1.08)	-0.042** (-2.24)
<i>Num_Refer_Filings</i>						-0.002 (-0.30)	0.003 (0.41)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SEC Ind-Office FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year*Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Obs	626	626	458	626	626	626	458
Adjusted R ²	0.024	0.024	0.591	0.024	0.025	0.023	0.589

This table presents the regression results of retail investor holdings on revenue recognition CLs after controlling for various potential channels that could influence the investment decisions of retail investors. Columns 1-5 present the regression results, including insider sales, high short interest, media coverage, an indicator for Friday, and variables related to analysts as additional controls, respectively. In column 6, all additional control variables are considered. *InsiderSales*[-1,-5], *InsiderSales*[-6,-10], and *InsiderSales*[<-11] are calculated as the average daily insider sales divided by the number of shares outstanding during days -1 to 5, -6 to -10, and less than -11 from the CL release date to the closing CL date, respectively. *High_ShortInterest* is defined as an indicator variable equal to 1 if a firm's short interest, as a percentage of shares outstanding, is in the top median during a year. Δ *Ratio_NewsCount*[0,1] and Δ *Ratio_TwitterCount*[0,1] represent the effect of media coverage using Bloomberg and Twitter, respectively. *Friday* is an indicator variable equal to 1 if the day of CL release is Friday, and 0 otherwise. *AnalystRecommend* is defined as the latest median consensus analyst recommendations that are available prior to the dissemination of CLs. *AnalystRevision* is an indicator variable equal to 1 if there is analyst recommendation revision issued around the CL release date, and 0 otherwise. *Other_CLs* is an indicator variable equal to 1 if any CL related to other transactional filings is disclosed at the 10K CL releasing date. *Num_Refer_Filings* is defined as the number of filings referenced in the 10K CL. Control variables are the same as those presented in Table 3 Panel C. Appendix 5 defines the variables. All continuous variables are winsorized at the 1 percent and 99 percent levels. Standard errors are clustered at the firm level, and t-values in parentheses. *, **, *** indicate statistical significance (two-tailed) at the 0.1, 0.05 and 0.01 percent levels, respectively.

Table 8. Cumulative abnormal returns following SEC CL dissemination

Variable	Dependent Variable = $CAR[+2, +30]$		Dependent Variable = $CAR[+31, +60]$		Dependent Variable = $CAR[+61, +90]$	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>AdjdRI</i> [0,1] (a)	-0.048 (-0.85)	-0.031 (-0.51)	0.098** (2.33)	0.079 (1.58)	-0.037 (-0.48)	-0.032 (-0.39)
<i>RevRecog</i>		0.012 (0.77)		0.043** (2.35)		-0.011 (-0.77)
<i>AdjdRI</i> [0,1] × <i>RevRecog</i> (b)		-0.386 (0.88)		1.432** (2.47)		-0.358 (-0.84)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
SEC Ind-Office FE	Yes	Yes	Yes	Yes	Yes	Yes
Year*Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Number of Obs	626	626	626	626	626	626
Adjusted R ²	0.053	0.053	0.000	0.011	0.044	0.042
F test: (a) + (b) = 0		0.335		0.008		0.345

The table presents the coefficients and corresponding t-statistics of the regressions of post-SEC CL dissemination cumulative abnormal return (*CAR*) on abnormal changes in retail holding during the dissemination dates (*AdjdRI*[0,1]) and the revenue recognition issues (*RevRecog*). $CAR[+2, +30]$ denotes cumulative abnormal returns for the period from day +2 to day +30 following the dissemination date. $CAR[+31, +60]$ denotes cumulative abnormal returns for the period from day +31 to day +60 following the dissemination date. $CAR[+61, +90]$ denotes cumulative abnormal returns for the period from day +61 to day +90 following the dissemination date. Control variables are the same as those presented in Table 3 Panel C. Appendix 5 defines the variables. All continuous variables are winsorized at the 1 percent and 99 percent levels. Standard errors are clustered at the firm level, and t-values in parentheses. *, **, *** indicate statistical significance (two-tailed) at the 0.1, 0.05 and 0.01 percent levels, respectively.

Appendix 1: Sample of the Initial CL Pertaining Revenue Recognition Issue

This is a brief example of initial CL sent by the SEC to a firm. The CL of eGain Corporation contains two accounting-related issues: 1) Capitalization of expenditures and 2) Revenue recognition. In this study, this CL is classified as revenue recognition CL (*RevRecog* = 1). The letter was issued on February 12, 2020 and was publicly released on April 9, 2020.



DIVISION OF
CORPORATION FINANCE

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

February 12, 2020

Eric Smit
Chief Financial Officer
eGain Corporation
1252 Borregas Avenue
Sunnyvale, California 94089

Re: eGain Corporation
Form 10-K for the Fiscal Year Ended June 30, 2019
Filed September 12, 2019
File No. 001-35314

Dear Mr. Smit:

We have limited our review of your filing to the financial statements and related disclosures and have the following comments. In some of our comments, we may ask you to provide us with information so we may better understand your disclosure.

Please respond to these comments within ten business days by providing the requested information or advise us as soon as possible when you will respond. If you do not believe our comments apply to your facts and circumstances, please tell us why in your response.

After reviewing your response to these comments, we may have additional comments.

Form 10-K for the Fiscal Year Ended June 30, 2019

Consolidated Financial Statements

Note 1 Summary of Business and Significant Accounting Policies

Cost Capitalized to Obtain Revenue Contracts, page 57

1. We note that costs capitalized on new revenue contracts are recognized over the period of benefit. Please explain how you considered the expected duration of customer contracts and whether this contemplates renewals. Also, explain how the expected useful lives of your technologies is considered and how you determined that both subscription and support revenue contracts have the same estimated benefit period. Refer to ASC 340-40-35-1. As part of your response, please explain how you arrived at an estimated period of benefit of five years considering that this is the same period that commissions for contract renewals are amortized.

Appendix 1: Sample of the Initial Comment Letter Pertaining Revenue Recognition Issue (continued)

Eric Smit
eGain Corporation
February 12, 2020
Page 2

2. You disclose that the five year period for amortizing commissions on cloud-based arrangement renewals is the estimated period of benefit; however, on page 62 you refer to this five year period as the related contractual renewal period. Please advise. Tell us whether commissions on renewals are commensurate with the initial contract commissions and how the five year period for amortizing commissions on renewals was determined. Refer to ASC 340-40-35-1.

Revenue Recognition, page 64

3. Please provide us with your analysis of how you determined that your term license and the related cloud functionality are highly interrelated and are therefore accounted for as a single performance obligation. Refer to 606-10-25-21(c). As part of your response, please quantify the amount of revenue recognized from these arrangements.
4. We note that OEM royalty revenue is recognized at the time it is reported and paid by the customer as any estimated variable consideration would have to be fully constrained. Please describe the factors considered when assessing the likelihood and the magnitude of a subsequent revenue reversal of the estimated variable consideration, including your historical experience with the royalty arrangement. Refer to ASC 606-10-32-11 through 32-13. As part of your response, please tell us the amount of revenues recognized related to the OEM royalty arrangement.

In closing, we remind you that the company and its management are responsible for the accuracy and adequacy of their disclosures, notwithstanding any review, comments, action or absence of action by the staff.

You may contact Joyce Sweeney, Staff Accountant, at 202-551-3449 or Christine Dietz, Senior Staff Accountant, at 202-551-3408 with any questions.

Sincerely,

Division of Corporation Finance
Office of Technology

cc: Stan Pierson

Appendix 2: SEC CL Conversation Files of Tesla in the SEC EDGAR Search

This appendix presents the snapshot of search results for filings associated with Tesla from 17th September 2019 to 28th October 2019 on the EDGAR search. The search result presents all types of filings, including CL files (i.e. UPLOAD and CORRESP) between the SEC and the company.

12 search results

Show Columns

☒ Filed ☒ Reporting for ☐ CIK ☐ Located ☐ Incorporated ☐ File number ☐ Film number

Form & File	Filed ↓	Reporting for	Filing entity/person
UPLOAD (Correspondence) LETTER	2019-10-28		Tesla, Inc. (TSLA)
8-K (Current report)	2019-10-23	2019-10-23	Tesla, Inc. (TSLA)
4 (Insider trading report)	2019-10-21	2019-10-17	Kirkhorn Zachary Tesla, Inc. (TSLA)
4 (Insider trading report)	2019-10-11	2019-06-18	Wilson-Thompson Kathleen Tesla, Inc. (TSLA)
4 (Insider trading report)	2019-10-11	2019-06-18	ELLISON LAWRENCE JOSEPH Tesla, Inc. (TSLA)
3 (Initial insider holdings report)	2019-10-11	2019-10-01	Baglino Andrew D Tesla, Inc. (TSLA)
8-K (Current report)	2019-10-02	2019-09-26	Tesla, Inc. (TSLA)
CORRESP (Correspondence)	2019-09-30		Tesla, Inc. (TSLA)
SEC STAFF LETTER REDACTED EXHIBIT	2019-09-26		Tesla, Inc. (TSLA)
CT ORDER (Confidential order)	2019-09-25		Tesla, Inc. (TSLA)
4 (Insider trading report)	2019-09-19	2019-09-17	Kirkhorn Zachary Tesla, Inc. (TSLA)
UPLOAD (Correspondence) LETTER	2019-09-18		Tesla, Inc. (TSLA)

Appendix 3: The SEC Classification of Comment Letter Issues and the Cassell et al. (2013) Classification

	Issue Content	Variable
1	Accounting Rule and Accounting Disclosure	<i>Acct</i>
2	Disclosure and Internal Control	<i>NonAcct</i>
3	Emerging Issues Task Force (EITF) GAAP Standard Citations	
4	Event Disclosure Matters	
5	Federal Securities Statutes References	
6	FIN (FASB Interpretations) Guidance	
7	FSP (FASB Staff Positions) Guidance	
8	FTB (FASB Technical Bulletins) Guidance	
9	IAS (International Accounting Standards) References	
10	IFRIC (International Financial Reporting Interpretations Committee) References, issued after 2001	
11	IFRS (International Financial Reporting Standards) References, standards issued after 2001	
12	Legal Matters	
13	Management Discussion and Analysis (MD&A)	
14	Other Disclosure Matters	
15	Registration Statement Specific Comments	
16	Regulation M-A References	
17	Regulation S-K References	
18	Regulation S-X References	
19	Risk Factors Disclosure	
20	SEC SAB (Staff Accounting Bulletins) Guidance	
21	SFAS (FASB Statements) GAAP Standards	
22	SIC (Standing Interpretations Committee) References, issued before 2001	
23	AICPA SOP (Statements of Position) Guidance	
24	Tender Offers Specific Comments	
25	Whole Letter Description	
26	FASB Accounting Standards Updates	
27	FASB Concepts Statements	
29	PCAOB Rules	
29	Regulation AB	
30	Securities Act Rules and Regulations	
31	SEC Releases	

Appendix 4: Breakdown of Accounting Issues (i.e., *Acct*) by Type (Cassell et al., 2013)

Type (Variable)	Topic Description
Core (<i>Acct_Core</i>)	- Revenue recognition (incl. deferred revenue) (<i>RevRecog</i>)
	- Accounts receivable and cash reporting
	- Depreciation, depletion, or amortization reporting
	- Expense (payroll, SG&A, and other) recording
	- Inventory, vendor, and/or cost of sales
	- Lease, leasehold improvements (SFAS 13 and SFAS 98)
	- Liabilities, payables, and accrual estimate
Non-Core (<i>Acct_NonCore</i>)	- Research and development
	- Acquisitions, mergers, and business combinations
	- Asset sales, disposals, divestitures, reorganization
	- Capitalization of expenditures
	- Comprehensive income (equity section)
	- Consolidation (FIN 46, variable interest, structured investment vehicles, special purpose entities, and off-balance sheet arrangements)
	- Consolidation, foreign currency/inflation
	- Debt, quasi-debt, warrants, and equity (beneficial conversion feature) security
	- Deferred, stock-based, and/or executive compensation
	- Deferred, stock-based options backdating only
	- Deferred, stock-based compensation SFAS 123 only (subcategory)
	- Financial derivatives/hedging (SFAS 133) accounting
	- Foreign (affiliate or subsidiary)
	- Subsidiary, U.S. or foreign (subcategory)
	- Investment in subsidiary/affiliate
	- Intercompany accounting
	- Contingencies and commitments, legal (SFAS 5) accounting
	- Pension and related employee plan
	- Property, plant, and equipment fixed asset (value/diminution)
	- Intangible assets and goodwill
	- Tax expense/benefit/deferral/other (SFAS 109)
	- Asset retirement obligation (SFAS 143)
	- Loans receivable, valuation, and allowances
	- Loss reserves (loss adjustment expense, reinsurance) disclosure
	- Tax rate disclosure
	- Non-monetary exchange (APB 29, EITF 01-2)
	- Gain or loss recognition
	- Dividend and/or distribution
Others (<i>Acct_Others</i>)	- Balance sheet classification of assets
	- Cash flow statement (SFAS 95) errors
	- Debt and/or equity
	- Earnings per share ratio and of income statement
	- Financial statement segment reporting (SFAS 131 subcategory)
	- Investments (SFAS 115) and cash and cash equivalents
	- Changes in accounting principles and interpretation
	- Fair value measurement, estimates, use (incl. vendor-specific objective evidence)

Panel A presents 31 CL categories provided by Audit Analytics. The total number of issues (*TotalIssues*) is defined as the sum of *Acct* and *NonAcct*. Panel B reports the breakdown of accounting issues using the approach from Cassell et al. (2013)

Appendix 5: Variable Definitions

Variable	Definition
Google Search Volume Index	
<i>Abnormal_LogGSVI[0,1]</i>	The difference between the natural logarithm of Google Search Volume Index during days 0 to 1 from the comment letter release date and the natural logarithm of the median Google Search Volume Index on the same weekdays of previous 8 weeks (Google Trends)
Retail Investor Holdings (Dependent Variable)	
<i>AdjdRI[0,1]</i>	Adjusted change in retail investor holding from days 0 to 1 surrounding the comment letter release date. Following Moss et al. (2023), we subtract the expected change in retail investor holding (i.e., controlling an underlying growth) from the actual change in retail investor holding (Robinhood)
Main Independent Variables	
<i>RevRecog</i>	Natural logarithm of the number of issues classified into revenue recognition (including deferred revenue) issues — codes 212 by Audit Analytics
<i>Acct</i>	Natural logarithm of the total number of issues classified into Accounting Rule and Accounting Disclosure Issues (Audit Analytics). <i>Acct without RevRecog</i> is defined as a natural logarithm of the total number of issues classified into Accounting Rule and Accounting Disclosure Issues, except the number of revenue recognition issues.
<i>NonAcct</i>	Natural logarithm of the total number of issues which are not classified into Accounting Rule and Accounting Disclosure Issues (Audit Analytics)
<i>Acct_Core</i>	Following Cassell et al. (2013), natural logarithm of the number of issues relating to core earnings such as accounts receivable, expense, inventory, revenue recognition, etc. (Audit Analytics). <i>Acct_Core without RevRecog</i> is defined as a natural logarithm of the number of issues relating to core earnings, except revenue recognition issues.
<i>Acct_NonCore</i>	Following Cassell et al. (2013), natural logarithm of the number of issues relating to noncore earnings such as capitalization of expenditure issues, consolidation, tax expense, etc. (Audit Analytics)
<i>Acct_Others</i>	Following Cassell et al. (2013), natural logarithm of the number of issues relating to classification issues (e.g., balance sheet classification of assets issues) and fair value issues (Audit Analytics)
Comment Letter Heuristic	
<i>TotalIssues</i>	Natural logarithm of the total number of issues identified in the originating comment letter (Audit Analytics) <i>TotalIssues without RevRecog</i> is defined as a natural logarithm of the total number of issues, except revenue recognition issues.
<i>TotalRounds</i>	Natural logarithm of the number of letters exchanged between the SEC and the firm before the filing review is closed (Audit Analytics)
<i>TotalDays</i>	Natural logarithm of the number of days between the date of the originating comment letter and the date of the filing review closure (Audit Analytics)
Comment Letter Readability	
<i>TotalWords</i>	Natural logarithm of the number of words in the originating comment letter (e.g., UPLOAD) (WRDS SEC Analytics Suite)
<i>FogIndex</i>	Gunning (1969) fog index for the originating comment letter (e.g., UPLOAD) (WRDS SEC Analytics Suite)
<i>Negative</i>	The percentage of average negative word portion which is measured as the average of the Loughran-McDonald and Harvard negative tone indices (Finterms_Negative and HarvardIV_Negative from the WRDS SEC Analytics Suite) of the originating letter
Control Variables	
<i>Growth</i>	Quarter-to-quarter changes in sales (RECTQ) divided by beginning total assets (ATQ) (Compustat)
<i>Size</i>	Natural logarithm of market capitalization as of the most recent fiscal quarter end date (PRCCQ*CSHOQ) (Compustat)
<i>BM</i>	Book value of comment equity divided by market value of equity as of the most recent fiscal quarter end date (CEQQ/(PRCCQ*CSHOQ)) (Compustat)
<i>Lev</i>	The ratio of total debt (DLTTQ+DLCQ) to total assets (ATQ) as of the most recent fiscal quarter end date (Compustat)

Variable Definitions (Continued)

Variable	Definition
Control Variables (Continued)	
<i>Follow</i>	Natural logarithm of the number of analyst following the firm as of the most recent fiscal quarter end date (IBES)
<i>Loss</i>	Indicator variable equal to 1 if the firm had negative income before extraordinary items (IB), and 0 otherwise, as of the most recent fiscal quarter end date (Compustat)
<i>ROA</i>	Income before extraordinary items (IBQ) divided by average total assets (ATQ) as of the most recent fiscal quarter end date (Compustat)
<i>Spread</i>	Daily bid-ask spread for the given stock, defined as the difference between the offer price and bid price divided by the midpoint of the offer and bid price (and multiplied by 100), calculated using closing bid and offer prices. (CRSP)
<i>Momentum</i>	The compounded monthly return for the months -12 through -1 relative to the month of the trading date (i.e., comment letter release date) (CRSP)
<i>IO</i>	Percent of shares owned by institutions as of the most recent fiscal quarter end date. (Thomson Reuters 13F)
<i>CL_Restatement</i>	Indicator variable equal to 1 if the firm makes a restatement from the first comment letter date to the closing comment letter date (i.e., the SEC filing review process), and 0 otherwise (Audit Analytics)
<i>RetPre1D</i>	The daily return for the day before the comment letter release date (CRSP)
<i>MomentumPre7D</i>	The compounded daily return for 7 business days prior to the comment letter release date (CRSP)
Additional Variables	
<i>InsiderSales[-1,-5]</i>	Following Dechow et al. (2016), average daily insider sales divided by the number of shares outstanding during days -1 to -5 from the comment letter release date (Thomson Reuters and CRSP)
<i>InsiderSales[-6,-10]</i>	Following Dechow et al. (2016), average daily insider sales divided by the number of shares outstanding during days -6 to -10 from the comment letter release date (Thomson Reuters and CRSP)
<i>Insidersales[<-11]</i>	Following Dechow et al. (2016), average daily insider sales divided by the number of shares outstanding during days -11 to the closing comment letter date from the comment letter release date (Thomson Reuters and CRSP)
<i>High_ShortInt</i>	Indicator variable equal to 1 if short interest is in the top median of short interest during a year. Short interest, as a percentage of shares outstanding, is calculated based on the number of shares sold at the last available measurement prior to the comment letter release date, and 0 otherwise (Compustat)
<i>ΔRatio_NewsCount[0,1]</i>	Change in news article counts from the day before the CL dissemination date to the day after the CL dissemination date which equals the news count of the day after the CL dissemination date minus the news count of the day before the CL dissemination date, scaled by the news count of the day before the CL dissemination date
<i>ΔRatio_TwitterCount[0,1]</i>	Change in Twitter post counts from the day before the CL dissemination date to the day after the CL dissemination date which equals the Twitter count of the day after the CL dissemination date minus the Twitter count of the day before the CL dissemination date, scaled by the Twitter count of the day before the CL dissemination date
<i>Friday</i>	Indicator variable equal to 1 if the day of comment letter release is Friday, and 0 otherwise, and 0 otherwise (Audit Analytics)
<i>AnalystsRecommend</i>	The latest median consensus analyst recommendations that are available prior to the dissemination of comment letters (I/B/E/S)
<i>AnalystRevision</i>	Indicator variable equal to 1 if there is an analyst recommendation revision issued during days 0 to 1 from the comment letter release dates (I/B/E/S)
<i>Other_CLs</i>	Indicator variable equal to 1 if any CL related to other transactional filings is disclosed at the 10K CL releasing date, and 0 otherwise (Audit Analytics)
<i>Num_Refer_Filings</i>	Number of filings referenced in the 10K CL (Audit Analytics)
Instrumental Variable used in 2SLS	
<i>ADO_Busyness</i>	indicator for the busyness of the review department which equals 1 if the firm with a fiscal year-end in December, and 0 otherwise (Compustat)

Appendix 6: Pearson Correlation Matrix

		1	2	3	4	5	6	7	8	9	10	11
1	<i>AdjdRI[0,1]</i>	1.000										
2	<i>Abnormal_LogGSVI[0,1]</i>	0.084*	1.000									
3	<i>RevRecog</i>	-0.064	0.090*	1.000								
4	<i>Acct without RevRecog</i>	-0.063	-0.020	-0.070	1.000							
5	<i>Acct_Core without RevRecog</i>	0.004	0.038	0.046	0.460***	1.000						
6	<i>Acct_NonCore</i>	-0.068	-0.007	-0.111**	0.775***	0.020	1.000					
7	<i>Acct_Others</i>	-0.037	-0.023	-0.040	0.587***	0.042	0.231***	1.000				
8	<i>NonAcct</i>	-0.041	0.018	-0.233***	0.168***	0.118**	0.117**	0.114**	1.000			
9	<i>Growth</i>	0.019	0.102*	0.085*	-0.063	-0.015	-0.069	-0.013	-0.072	1.000		
10	<i>Size</i>	-0.024	-0.118**	0.036	0.011	-0.051	0.003	0.021	-0.088*	-0.039	1.000	
11	<i>BM</i>	-0.021	-0.005	-0.201***	0.074	-0.069	0.130**	0.060	0.081*	-0.095*	-0.245***	1.000
12	<i>Lev</i>	-0.030	-0.013	-0.097*	0.047	0.067	0.010	0.033	0.075	-0.140***	-0.027	-0.086*
13	<i>Follow</i>	-0.042	-0.060	0.039	0.016	-0.014	-0.010	0.044	-0.022	0.011	0.687***	-0.176***
14	<i>Loss</i>	0.023	0.055	0.042	-0.039	-0.003	0.019	-0.090*	0.026	-0.075	-0.318***	-0.013
15	<i>ROA</i>	0.000	0.028	-0.002	0.034	0.012	-0.019	0.060	-0.061	0.069	0.288***	0.027
16	<i>Spread</i>	-0.005	0.003	-0.006	-0.011	0.065	-0.035	-0.011	0.003	-0.034	-0.504***	0.179***
17	<i>Momentum</i>	0.027	0.001	0.072	-0.023	0.002	-0.014	-0.028	-0.067	0.117**	0.150***	-0.295***
18	<i>IO</i>	0.003	0.034	0.023	-0.022	-0.003	-0.049	0.013	-0.014	0.033	0.217***	-0.057
19	<i>CLRestatement</i>	-0.007	0.003	-0.017	0.010	-0.026	0.045	-0.031	0.001	0.008	-0.077	0.007
20	<i>RetPre1D</i>	-0.022	0.017	0.056	0.020	0.058	-0.014	-0.029	0.015	0.020	-0.031	0.043
21	<i>MomentumPre7D</i>	-0.012	0.020	-0.032	0.039	0.002	0.006	0.048	0.087*	0.024	0.026	0.061

		12	13	14	15	16	17	18	19	20	21
12	<i>Lev</i>	1.000									
13	<i>Follow</i>	-0.024	1.000								
14	<i>Loss</i>	0.014	-0.137***	1.000							
15	<i>ROA</i>	-0.014	0.145***	-0.541***	1.000						
16	<i>Spread</i>	-0.040	-0.398***	0.163***	-0.169***	1.000					
17	<i>Momentum</i>	-0.128**	0.026	-0.076	0.116**	-0.131**	1.000				
18	<i>IO</i>	0.036	0.303***	-0.100*	0.181***	-0.417***	0.087*	1.000			
19	<i>CLRestatement</i>	0.092*	0.022	0.088*	-0.043	0.092*	-0.123**	-0.033	1.000		
20	<i>RetPre1D</i>	-0.063	-0.008	-0.060	0.007	-0.056	-0.045	0.008	0.011	1.000	
21	<i>MomentumPre7D</i>	0.014	0.007	-0.075	0.060	-0.032	0.014	0.007	-0.083*	0.252***	1.000

The table presents correlations between the variables that are used in the regression analyses in our study.

Appendix 7. Additional Tests

Table A7.1. Retail investors and revenue recognition CLs: Alternative choices of clustering and fixed effects

Variable	Dependent Variable = <i>AdjdRI</i> [0,1]			
	Independent year and quarter fixed effects		Two-way clustering on firm and year	
	(1)	(2)	(3)	(4)
<i>RevRecog</i>	-0.029** (-2.23)	-0.030** (-2.29)	-0.029** (-2.21)	-0.030** (-2.27)
<i>Acct without RevRecog</i>		0.006 (0.80)		0.008 (1.02)
<i>Acct_Core without RevRecog</i>		-0.008* (-1.96)		-0.008* (-1.76)
<i>Acct_NonCore</i>		-0.003 (-0.71)		-0.005 (-0.93)
<i>Acct_Others</i>	-0.007 (-1.56)	-0.007 (-1.61)	-0.007 (-1.61)	-0.007* (-1.68)
<i>NonAcct</i>	-0.006 (-1.23)		-0.005 (-1.07)	
Controls		Yes		Yes
SEC Ind-Office FE		Yes		Yes
Year*Quarter FE		No		Yes
Year FE		Yes		No
Quarter FE		Yes		No
Clustered SE by		Firm		Firm and Year
Number of Obs	626	626	626	626
Adjusted R ²	0.005	0.003	0.025	0.024

This table presents the regression results of retail investor holdings on revenue recognition CLs, considering alternative choices of clustering and fixed effects. Columns 1 and 2 report the regression results with an inclusion of year and quarter fixed effects, independently. Columns 3 and 4 present the regression results with two-way clustering standard errors by firm and year. Appendix 5 defines the variables. All continuous variables are winsorized at the 1st percentile and 99th percentile levels. t-values in parentheses. *, **, *** indicate statistical significance (two-tailed) at the 0.1, 0.05 and 0.01 percent levels, respectively.

Table A7.2 Retail investors and non-10K CLs

Variable	Pred Sign	Dependent Variable = $AdjdRI[0,1]$	
		Non-10K CL (incl. 10Q)	Non-10K CL (excl. 10Q)
		(1)	(2)
<i>Acct</i>	-	-0.010** (-2.17)	-0.017** (-2.27)
<i>NonAcct</i>	?	0.002 (0.33)	0.005 (0.69)
Controls		Yes	Yes
SEC Ind-Office FE		Yes	Yes
Year*Quarter FE		Yes	Yes
Number of Obs		330	305
Adjusted R ²		0.038	0.040

This table presents the effect of non-10K CL on retail investor holdings during days 0 to 1 from the CL release date. In column 1, the sample includes all types of CLs, except 10K CL. In column 2, the sample includes all types of CLs, except both 10K and 10Q CLs. Appendix 5 defines the variables. All continuous variables are winsorized at the 1st percentile and 99th percentile levels. t-values in parentheses. *, **, *** indicate statistical significance (two-tailed) at the 0.1, 0.05 and 0.01 percent levels, respectively.

Table A7.3. Placebo test – Retail investors and SEC CL dissemination**Panel A: Accounting vs non-Accounting topics**

Variable	Dependent Variable = daily adjusted retail investor holdings					
	<i>AdjdRI</i> [-15]	<i>AdjdRI</i> [-10]	<i>AdjdRI</i> [-5]	<i>AdjdRI</i> [5]	<i>AdjdRI</i> [10]	<i>AdjdRI</i> [15]
	(1)	(2)	(3)	(4)	(5)	(6)
<i>RevRecog</i>	-0.003 (-0.90)	-0.009 (-0.94)	-0.009 (-1.23)	-0.004 (-1.56)	0.001 (0.19)	-0.001 (-0.43)
<i>Acct without RevRecog</i>	-0.000 (-0.01)	-0.001 (-0.32)	0.005 (1.53)	0.005 (1.52)	0.001 (0.57)	-0.001 (-0.37)
<i>NonAcct</i>	0.004 (1.28)	-0.006 (-1.17)	-0.009 (-0.91)	-0.002 (-1.22)	0.000 (0.24)	0.000 (0.32)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
SEC Ind-Office FE	Yes	Yes	Yes	Yes	Yes	Yes
Year*Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Number of Obs	602	610	619	626	626	626
Adjusted R ²	0.004	0.166	-0.004	0.003	-0.013	-0.010

Panel B: Type of accounting topics

Variable	Dependent Variable = daily adjusted retail investor holdings					
	<i>AdjdRI</i> [-15]	<i>AdjdRI</i> [-10]	<i>AdjdRI</i> [-5]	<i>AdjdRI</i> [5]	<i>AdjdRI</i> [10]	<i>AdjdRI</i> [15]
	(1)	(2)	(3)	(4)	(5)	(6)
<i>RevRecog</i>	-0.003 (-0.80)	-0.008 (-0.89)	-0.008 (-1.25)	-0.004 (-1.53)	0.001 (0.24)	-0.001 (-0.44)
<i>Acct_Core without RevRecog</i>	0.002 (0.19)	-0.010 (-0.92)	0.002 (0.17)	0.001 (0.33)	-0.002 (-0.87)	-0.000 (-0.01)
<i>Acct_NonCore</i>	0.004 (1.35)	0.004 (1.13)	0.009 (1.16)	0.004* (1.91)	0.000 (0.14)	-0.000 (-0.03)
<i>Acct_Others</i>	-0.009* (-1.75)	-0.004 (-0.66)	-0.008 (-1.08)	0.007 (0.80)	0.004 (1.55)	-0.001 (-0.49)
<i>NonAcct</i>	0.004 (1.36)	-0.006 (-1.16)	-0.009 (-0.92)	-0.002 (-1.25)	0.000 (0.30)	0.000 (0.30)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
SEC Ind-Office FE	Yes	Yes	Yes	Yes	Yes	Yes
Year*Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Number of Obs	602	610	619	626	626	626
Adjusted R ²	0.005	0.167	-0.006	0.003	-0.013	-0.013

This table presents the regression results of retail investor holdings on revenue recognition CLs, using alternative periods surrounding the SEC CLs release date, rather than days 0 to 1 (i.e., *AdjdRI*[0,1]). In Panels A and B, columns 1-6 present the regression results, with the daily adjusted retail investor holdings on 15, 10, and 5 days before/after the CL release date as the dependent variables, respectively. Appendix 5 defines the variables. All continuous variables are winsorized at the 1 percent and 99 percent levels. Standard errors are clustered at the firm level, and t-values in parentheses. *, **, *** indicate statistical significance (two-tailed) at the 0.1, 0.05 and 0.01 percent levels, respectively.

Table A7.4 Confounding corporate events and filings, and excluding other contemporaneous disclosures

Panel A: Controlling for confounding corporate events and filings

Variable	Dependent Variable = <i>AdjdRI</i> [0,1]	
	(1)	(2)
<i>RevRecog</i>	-0.028** (-2.19)	-0.029** (-2.25)
<i>Acct without RevRecog</i>	-0.005 (-1.17)	
<i>Acct_Core without RevRecog</i>		0.007 -0.87
<i>Acct_NonCore</i>		-0.009* (-1.97)
<i>Acct_Others</i>		-0.004 (-0.71)
<i>NonAcct</i>	-0.007 (-1.56)	-0.007 (-1.62)
<i>OtherFilings</i>	0.009 -1.52	0.009 -1.46
Controls	Yes	Yes
SEC Ind-Office FE	Yes	Yes
Year*Quarter FE	Yes	Yes
Number of Obs	626	626
Adjusted R ²	0.026	0.025

Panel B: Excluding other contemporaneous disclosures

Variable	Dependent Variable = <i>AdjdRI</i> [0,1]	
	(1)	(2)
<i>RevRecog</i>	-0.012* (-1.83)	-0.013* (-1.92)
<i>Acct without RevRecog</i>	-0.005 (-1.02)	
<i>Acct_Core without RevRecog</i>		0.008 -0.99
<i>Acct_NonCore</i>		-0.009** (-2.01)
<i>Acct_Others</i>		-0.004 (-0.67)
<i>NonAcct</i>	-0.003 (-0.85)	-0.004 (-0.91)
Controls	Yes	Yes
SEC Ind-Office FE	Yes	Yes
Year*Quarter FE	Yes	Yes
Clustered SE by	Firm	Firm
Number of Obs	435	435
Adjusted R ²	-0.015	-0.014

Panel A presents the regression results of retail investor holdings on revenue recognition CLs and an indicator of cofounding corporate events/filings (*OtherFiling*). *OtherFiling* takes the value of 1 if corporate announcements/filings such as 8-K filings or other filings are disclosed during the period from day -1 to +1 centered on the CLs release date, and 0 otherwise. Panel B reports regression results of retail investor holdings on revenue recognition CLs and other variables when we exclude observation with 8-K filings or other filings occurring during the 3-day window centered on the 10K CL release date. Appendix 5 defines the other variables. All continuous variables are winsorized at the 1 percent and 99 percent levels. t-values in parentheses. *, **, *** indicate statistical significance (two-tailed) at the 0.1, 0.05 and 0.01 percent levels, respectively.

Table A7.5 Retail investors and SEC CL dissemination: Pre-Covid period

Variable	Dependent Variable = <i>AdjdRI</i> [0,1]	
	Pre-Covid period	
	(1)	(2)
<i>RevRecog</i>	-0.021** (-2.02)	-0.022** (-2.08)
<i>Acct without RevRecog</i>	-0.005 (-1.06)	
<i>Acct_Core without RevRecog</i>		0.002 (0.29)
<i>Acct_NonCore</i>		-0.006 (-1.27)
<i>Acct_Others</i>		-0.006 (-1.01)
<i>NonAcct</i>	-0.009** (-2.17)	-0.009** (-2.19)
Controls	Yes	Yes
SEC Ind-Office FE	Yes	Yes
Year*Quarter FE	Yes	Yes
Clustered SE by	Firm	Firm
Number of Obs	587	587
Adjusted R ²	0.070	0.067

This table presents the regression results of retail investor holdings on revenue recognition CLs by splitting the full sample into two subsamples before and after March 2020, when the Covid pandemic began. Appendix 5 defines the variables. All continuous variables are winsorized at the 1 percent and 99 percent levels. Standard errors are clustered at the firm level, and t-values in parentheses. *, **, *** indicate statistical significance (two-tailed) at the 0.1, 0.05, and 0.01 percent levels, respectively.