Journal of Business Finance & Accounting

WILEY
JBFA

ARTICLE OPEN ACCESS

Retail Investors' Trades Around Comment Letter Disclosures

Ruby Brownen-Trinh[1] | Joe (Joonghi) Cho[2] | Pawel Bilinski[3]

[1]University of Bristol Business School, Bristol, UK | [2]College of Business Administration, Inha University, Incheon, South Korea | [3]Bayes Business School, City St George's, University of London, London, UK

Correspondence: Joe (Joonghi) Cho (j.cho@inha.ac.kr)

Received: 22 December 2023 | **Revised:** 25 October 2024 | **Accepted:** 12 February 2025

Funding: The authors received no specific funding for this work.

Keywords: retail investors | Robinhood investors | SEC comment letter

ABSTRACT

How sophisticated are retail investors in monitoring their holdings? We answer this question by examining Robinhood investors' trades around the US Securities and Exchange Commission (SEC) comment letter (CL) disclosures. We focus on CLs because, 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 index 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.

JEL Classification: G18, M41, M48

1 | Introduction

Retail investors have become important in capital markets, holding 37.6% of US equities in October 2019.[1] However, they are frequently portrayed as naïve, relying on heuristics in decision-making, and hype-driven (Barber and Odean 2008; Seasholes and Wu 2007). Barber et al. (2022, 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, 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 (CL).

We investigate retail investors' attention and their trading activities surrounding the disclosure of CLs issued by the US 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, indicates their sophistication or reflects hype-driven trades based on analyst and news outlets advice and social media sentiment (Barber et al. 2022; Seasholes and 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 fillings. 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 dialogs 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 and Isidro 2013; Lee et al. 2023; Li and 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 with 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 3 years. Moreover, because of their importance, 10-K CLs 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 1, 2018 to August 31, 2020, which provides counts of the number of investors holding a stock through a popular US-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 et al. 2024). 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 et al. 2023; Ozik et al. 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-Rephael et al. 2017). Following Da et al. (2011) and Niessner (2015), we focus on the abnormal Google search volume index (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 et al. 2012). We find significant evidence of an increase in *abnormal* Google searches for the stock's tickers around the disclosure of the CL.

To push the analysis further, we investigate the content of CLs to identify the severity of SEC comments. Dechow et al. (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 are associated 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 et al. (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's (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 SVI 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 et al. 2015; Haw et al. 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 10 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 used the "*busyness*" of the SEC's Division of Corporation Finance as an instrument. Gunny and Hermis (2020, 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 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 CLs 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 (CAR) for the period from Days 31 to 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 et al. 2009; Barber and Odean 2000, 2013; Dahlquist et al. 2017; Kelley and 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 and Leidner 2022; Johnston and Petacchi 2017; Robinson et al. 2011; Ryans 2021). Although 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, 3147) highlight, "*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 3 years. Upon identifying reporting issues, the division issues a CL to the firm. The firm is required to respond within 10 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 and 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 and 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 Petacchi (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 to 50 days after 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 and Odean 2013; Bhattacharya et al. 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 et al. 2011; Battalio and Mendenhall 2005; Malmendier and 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 et al. (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 et al. (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 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 CLs

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 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 CL correspondence rather than use Google search. However, Google searches may (i) partially capture EDGAR access to CLs and (ii) include access to other repositories of information and discussion about the CL. The former reflects that Google searches can link directly to the CL or, at minimum, to the EDGAR repository. The latter statement reflects that Google searches can link to CLs on the companies' Investor Pages and to other discussion forums, articles, or mirror pages for company filings and CLs. This latter effect is particularly important considering the relatively low level of EDGAR downloads of CLs 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 CL.

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 SVI during Days 0–1 from the CL release date and the natural logarithm of the median of Google SVI on the same weekdays over the previous 8 weeks, Abnormal_LogGSVI[0,1]. We focus on SVI on Days 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. Because our analysis is on a daily level, we only keep the last observation when major US exchanges close (4 p.m. EST as the end of the trading day). Following Moss et al. (2023) and to allow for retail investors' delayed reaction, we calculate the 2-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 2-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, 8) highlight, "*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:

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

where $\text{AdjdRI}[0,1]_{i,t}$ denotes adjusted abnormal changes in the number of retail investors holding a stock i in a 2-day window when a CL is released for the company on Day t. $\text{RI}_{i,t+1}$, $\text{RI}_{i,t}$, and $\text{RI}_{i,t-1}$ denote the number of retail investors holding stock i at the end of Days $t+1$, t, and $t-1$, 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 Days $t+1$, t, and $t-1$, 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 CLs

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 and Petacchi 2017). However, research also reports that more severe CLs are associated 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 et al. 2017). Here, the higher the number of issues highlighted by the SEC or the longer the letter, the higher the remediation costs, that is the letter is considered more severe.

The second approach focuses on the content of CLs in which the revenue recognition issue is considered among the most important issues identified by the SEC (e.g., Dechow et al. 2016; Gunny and Hermis 2020; Ryans 2021). This measure has certain predictive power for future financial reporting outcomes such as restatement or write-down. Ryans (2021) highlights that each approach we discussed 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, because the EDGAR log file from July 1, 2017, to May 18, 2020, is not available on the SEC website, for our sample period from May 1, 2018 to August 31, 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 issues classified into Accounting Rule and Accounting Disclosure Issues (except revenue recognition) and all other issues, respectively.

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

$$\begin{aligned}\text{AdjdRI}[0,1]_{i,t} &= \alpha_0 + \alpha_1 \text{RevRecog}_{i,t} + \alpha_2 \text{Acct without RevRecog}_{i,t} \\ &+ \alpha_3 \text{NontAcct}_{i,t} + \text{Controls} + \text{Industry effects} + \text{Year} \\ &\times \text{Quarter effects} + \varepsilon, \end{aligned} \quad (2)$$

where $\text{AdjdRI}[0,1]_{i,t}$ is the adjusted abnormal changes in the number of retail investors holding a stock i in a 2-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 × 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 and Odean 2008; Chi and 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 (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 1-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% 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 May 1, 2018 to August 31, 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 observations 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. With 12 missing Google trend observations, the sample for this analysis contains 614 unique CLs. Table 1 presents the details of our sample construction.

4.2 | Descriptive Statistics

Table 2 reports the summary statistics for variables included in our main regressions. The mean abnormal Google SVI is 0.309, suggesting significant information searchers for the firm around the CL disclosure. The mean value of AdjdRI01 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 and Petacchi 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 four 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 because 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, 2016; Ryans 2021). Appendix 6 presents the Pearson correlation matrix for the variables. The correlations are consistent with previous research.

5 | Retail Investor's Attention and Trades Around CL Disclosure

5.1 | Retail Investors' Attention to CL 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 SVI for Days 0 and 1 separately, we find that abnormal Google SVI 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 SVI around CL dissemination dates for CLs

TABLE 1 | Sample selection.

Sample selection process	Number of distinct comment letter
All distinct types of CLs with the first letter initiated by the SEC (form_fkey = "UPLOAD") in Audit Analytics between May 1, 2018 and August 31, 2020	4494
Less: missing Robinhood holdings from Days 0 to 1 from the CL release date	(2609)
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., web_grp_fil_ref contains "10-K" or "10-K")	(330)
The final sample for 10-K CLs	**626**
Less: missing values for Google search variable, Abnormal_LogGSVI[0,1]	(12)
Sample for abnormal Google attention (Table 3)	614

Note: The table reports the sample section process.

that include revenue recognition comments. Thus, Robinhood investors seem to engage in more information acquisitions for more severe CLs.

We further investigate retail investors' attention to the release of CL using regression analysis to account for CL characteristics. Panel B of Table 3 shows that the abnormal Google SVI 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' 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 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 12 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.

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 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

TABLE 2 | Descriptive statistics.

Variable	*N*	Mean	Std. Dev.	P25	Median	P75
Google searches and adjusted retail investor holdings						
Abnormal_LogGSVI[0,1]	614	0.309	2.124	−0.223	0.000	0.470
AdjdRI[0,1]	626	0.001	0.079	−0.013	−0.004	0.004
Revenue recognition						
RevRecog	626	0.286	0.452	0.000	0.000	1.000
Accounting topics without revenue recognition vs. non-accounting topics						
Acct without RevRecog	626	0.925	1.107	0.000	1.000	1.000
NonAcct	626	2.853	2.610	1.000	2.000	4.000
Core accounting topics without revenue recognition, non-core, and other accounting topics						
Acct_Core without RevRecog	626	0.211	0.456	0.000	0.000	0.000
Acct_NonCore	626	0.478	0.761	0.000	0.000	1.000
Acct_Others	626	0.235	0.477	0.000	0.000	0.000
Control variables						
Growth	626	0.058	0.414	−0.036	0.020	0.086
Size	626	8.065	1.768	6.936	8.000	9.144
BM	626	0.466	0.425	0.187	0.381	0.689
Lev	626	0.341	0.220	0.181	0.331	0.464
Follow	626	2.062	0.686	1.609	2.079	2.565
Loss	626	0.244	0.430	0.000	0.000	0.000
ROA	626	0.002	0.054	0.000	0.007	0.018
Spread	626	0.145	0.382	0.023	0.050	0.106
Momentum	626	0.073	0.401	−0.155	0.035	0.223
IO	626	0.757	0.251	0.667	0.825	0.922
CLRestatement	626	0.016	0.125	0.000	0.000	0.000
RetPre1D	626	−0.001	0.025	−0.012	0.000	0.011
MomentumPre7D	626	−0.004	0.075	−0.037	−0.001	0.031

Note: 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.

*, **, and *** indicate statistical significance (two-tailed) at the 0.1%, 0.05%, and 0.01% levels, respectively.

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 because a one standard deviation increase in Acct_NonCore associates with stock sales six 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 significant. This evidence suggests a

TABLE 3 | Abnormal Google attention around comment letter (CL) dissemination dates.

Panel A: Univariate analysis

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

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

		Dependent variable = Abnormal_LogGSVI[0,1]			
		Total issues	Accounting	Revenue recognition	
Variable	**Pred Sign**	**(1)**	**(2)**	**(3)**	**(4)**
TotalIssues (=Acct + NonAcct)	+/?	0.137			
		(0.83)			
Acct	+/?		0.140		
			(0.84)		
RevRecog	+			0.731**	0.710**
				(2.09)	(2.03)
Acct without RevRecog	?			−0.045	
				(−0.28)	
Acct_Core without RevRecog	?				0.343
					(0.92)
Acct_NonCore	?				0.010
					(0.05)
Acct_Others	?				−0.169
					(−0.59)
NonAcct	?		0.073	0.126	0.109
			(0.53)	(0.93)	(0.80)
Growth		0.405	0.403	0.369	0.377
		(1.32)	(1.31)	(1.14)	(1.17)
Size		−0.248***	−0.250***	−0.254***	−0.253***
		(−3.36)	(−3.40)	(−3.47)	(−3.45)
BM		−0.193	−0.194	−0.135	−0.108
		(−0.84)	(−0.84)	(−0.59)	(−0.45)
Lev		−0.276	−0.273	−0.218	−0.241
		(−0.65)	(−0.64)	(−0.51)	(−0.57)
Follow		0.142	0.143	0.156	0.158
		(0.74)	(0.75)	(0.82)	(0.83)
Loss		0.429*	0.424*	0.412*	0.404
		(1.72)	(1.70)	(1.66)	(1.62)

(Continues)

TABLE 3 | (Continued)

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

		Dependent variable = Abnormal_LogGSVI[0,1]			
		Total issues	Accounting	Revenue recognition	
Variable	Pred Sign	(1)	(2)	(3)	(4)
ROA		5.169**	5.080**	5.293**	5.190**
		(2.17)	(2.13)	(2.29)	(2.24)
Spread		−0.331	−0.333	−0.347	−0.364
		(−1.51)	(−1.51)	(−1.51)	(−1.54)
Momentum		−0.019	−0.021	−0.026	−0.027
		(−0.07)	(−0.08)	(−0.10)	(−0.10)
IO		0.183	0.193	0.157	0.157
		(0.46)	(0.49)	(0.40)	(0.40)
CLRestatement		0.186	0.182	0.238	0.249
		(0.42)	(0.41)	(0.55)	(0.56)
RetPre1D		1.688	1.658	1.192	0.778
		(0.43)	(0.42)	(0.30)	(0.19)
MomentumPre7D		0.778	0.791	0.848	0.898
		(0.54)	(0.55)	(0.59)	(0.62)
Intercept		0.964	0.946	0.981	0.700
		(0.76)	(0.75)	(0.81)	(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

Note: Panel A presents the results of univariate analysis for the relationship between retail investors' abnormal attention to 10-K comment letters over the subsequent 2 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 0–1 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.

*, **, and *** indicate statistical significance (two-tailed) at the 0.1%, 0.05%, and 0.01% levels, respectively.

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 CLs 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 A2 indicate a negative reaction from Robinhood investors when the CLs on these filings contain more accounting issues, that is, 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 A3.

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." Gunny

TABLE 4 | Retail investor holdings during Securities and Exchange Commission (SEC) comment letter (CL) release.

Panel A: Univariate analysis					
	n	**AdjdRI[0]**		**AdjdRI[0,1]**	
10-K CLs	626	0.00083	(0.626)	0.00073	(0.817)
10-K CLs with RevRecog	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				
		Dependent variable = AdjdRI[0,1]		
Variable	**Pred Sign**	**(1)**	**(2)**	**(3)**
RevRecog	—	−0.027**	−0.029**	−0.030**
		(−2.16)	(−2.20)	(−2.26)
Acct without RevRecog	?		−0.005	
			(−1.10)	
Acct_Core without RevRecog	?			0.008
				(1.00)
Acct_NonCore	?			−0.008*
				(−1.82)
Acct_Others	?			−0.005
				(−0.91)
NonAcct	?		−0.007	−0.007*
			(−1.61)	(−1.68)
Growth			0.003	0.003
			(0.54)	(0.54)
Size			0.001	0.001
			(0.37)	(0.38)
BM			−0.006	−0.005
			(−0.86)	(−0.66)
Lev			−0.016	−0.016
			(−0.56)	(−0.58)
Follow			−0.011**	−0.010**
			(−2.06)	(−2.05)
Loss			0.007	0.008
			(0.70)	(0.71)
ROA			0.006	0.003
			(0.22)	(0.11)
Spread			−0.003	−0.004
			(−0.43)	(−0.56)
Momentum			0.005	0.005
			(0.89)	(0.91)
IO			0.015	0.014
			(1.01)	(0.94)
CLRestatement			−0.002	−0.000
			(−0.21)	(−0.00)
RetPre1D			−0.020	−0.033
			(−0.13)	(−0.22)

(Continues)

TABLE 4 | (Continued)

Panel B: Multivariate regression analysis for the effect of revenue recognition issues on retail investor holdings				
		Dependent variable = AdjdRI[0,1]		
Variable	**Pred Sign**	**(1)**	**(2)**	**(3)**
MomentumPre7D			0.004	0.005
			(0.11)	(0.12)
Intercept		−0.013	−0.011	−0.011
		(−0.43)	(−0.32)	(−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

Note: This table illustrates the effect of SEC CLs on the abnormal retail investor holding (AdjdRI[0,1]) during Days 0–1 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 0–1 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 the 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 issues (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 1st percentile and 99th percentile levels. Standard errors are clustered at the firm level, and *t* values are in parentheses.
*, **, and *** indicate statistical significance (two-tailed) at the 0.1%, 0.05%, and 0.01% levels, respectively.

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 has 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, 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).

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 outcome variables that have been commonly used in prior research (Cassell et al. 2013; Ege et al. 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 et al. 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,

TABLE 5 | Retail investor reaction to revenue recognition comment letters (CLs): two-stage least-square (2SLS) regression.

		Dependent variable = RevRecog	Dependent variable = AdjdRI[0,1]
		1st stage	2nd stage
Variable	**Pred Sign**	**(1)**	**(2)**
RevRecog	−		−0.230**
			(−2.03)
Acct without RevRecog			−0.004
			(−0.49)
NonAcct			−0.208**
			(−2.23)
ADO_Busyness	+	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**

Note: 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 has 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 are in parentheses. *, **, and *** indicate statistical significance (two-tailed) at the 0.1%, 0.05%, and 0.01% levels, respectively.

which suggests that Robinhood investors look beyond heuristic measures of CL complexity when deciding to trade on CL release.

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 2 business days of a trade. We control for insider sales in three windows: from Days −5 to −1 before the CL release, from Days −10 to −6, and a 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 Days −5 to −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.

5.5.2 | High Short Interest Before CL Disclosure

Lee et al. (2023, 375) find that short sellers front-run CL disclosures and take a position based on the economic consequence of

TABLE 6 | Regression results of Securities and Exchange Commission (SEC) comment letter (CL) outcomes and readability on retail investor portfolios.

		Dependent variable = AdjdRI[0,1]		
Variable	**Pred Sign**	**(1)**	**(2)**	**(3)**
TotalIssues	−/?	−0.004		
		(−0.86)		
RevRecog	−		−0.031**	−0.031**
			(−1.96)	(−1.97)
TotalIssues without RevRecog	?		−0.003	
			(−0.54)	
Acct without RevRecog	?			−0.002
				(−0.36)
NonAcct	?			−0.003
				(−0.65)
TotalRounds	?	−0.006	−0.006	−0.006
		(−0.24)	(−0.28)	(−0.27)
TotalDays	?	0.007	0.008	0.008
		(0.94)	(1.06)	(1.03)
TotalWords	−/?	−0.022*	−0.019*	−0.019
		(−1.75)	(−1.67)	(−1.56)
FogIndex	?	0.001	0.001	0.001
		(0.64)	(0.65)	(0.59)
Negative	−/?	0.001	−0.001	−0.001
		(0.23)	(−0.45)	(−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

Note: 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 words (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% and 99% levels. Standard errors are clustered at the firm level, and *t* values are in parentheses.
*, **, and *** indicate statistical significance (two-tailed) at the 0.1%, 0.05%, and 0.01% levels, respectively.

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, ΔRatio_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, ΔRatio_TwitterCount[0,1].

TABLE 7 | Retail investors and comment letters (CLs) in consideration of confounding effect.

	Dependent variable = AdjdRI[0,1]						
	Insider sales	**High short interest**	**Media coverage**	**Friday**	**Analyst**	**Other CLs &Refer files**	**All**
Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
RevRecog	−0.030**	−0.028**	−0.021***	−0.029**	−0.028**	−0.028**	−0.020***
	(−2.14)	(−2.17)	(−2.84)	(−2.20)	(−2.19)	(−2.23)	(−2.64)
Acct without RevRecog	−0.006	−0.005	−0.007	−0.005	−0.005	−0.005	−0.007
	(−1.16)	(−1.07)	(−1.11)	(−1.09)	(−1.18)	(−1.04)	(−1.18)
NonAcct	−0.006	−0.007	−0.006	−0.007	−0.007*	−0.007*	−0.007
	(−1.61)	(−1.62)	(−1.38)	(−1.62)	(−1.67)	(−1.67)	(−1.58)
InsiderSales[−1,−5]	−0.006						−0.001
	(−0.34)						(−0.09)
InsiderSales[−6,−10]	0.005						0.001
	(0.47)						(0.22)
Insidersales[<−11]	0.028						−0.006
	(0.81)						(−0.44)
High_ShortInterest		−0.004					−0.003
		(−0.75)					(−0.37)
ΔRatio_NewsCount[0,1]			−0.000				−0.000
			(−0.36)				(−0.25)

(Continues)

TABLE 7 | (Continued)

	Dependent variable = AdjdRI[0,1]						
	Insider sales	**High short interest**	**Media coverage**	**Friday**	**Analyst**	**Other CLs &Refer files**	**All**
Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
ΔRatio_TwitterCount[0,1]			0.005***				0.005***
			(24.80)				(24.84)
Friday				−0.004			0.008
				(−0.75)			(1.20)
AnalystRecommend					−0.000		−0.001
					(−0.16)		(−0.20)
AnalystRevision					−0.027**		−0.028**
					(−2.09)		(−2.36)
Other_CLs						−0.022	−0.042**
						(−1.08)	(−2.24)
Num_Refer_Filings						−0.002	0.003
						(−0.30)	(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

Note: 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. ΔRatio_NewsCount[0,1] and ΔRatio_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 10-K CL releasing date. Num_Refer_Filings is defined as the number of filings referenced in the 10-K 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% and 99% levels. Standard errors are clustered at the firm level, and *t* values are in parentheses.

*, **, and *** indicate statistical significance (two-tailed) at the 0.1%, 0.05%, and 0.01% levels, respectively.

Column 3 of Table 7 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 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 prompts 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 2 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

Because our sample period spans from May 1, 2018 to August 31, 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 and Leidner 2022). Including Year × 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 with CL release dates on or after March 1, 2020. We present the results in Table A5. 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:

$$\begin{aligned} \mathrm{CAR}_{i,t} &= \alpha_0 + \alpha_1 \mathrm{AdjdRI}[0,1]_{i,t} + \alpha_2 \mathrm{RevRecog}_{i,t} \\ &+ \alpha_3 \mathrm{AdjdRI}[0,1]_{i,t} \times \mathrm{RevRecog}_{i,t} + \mathrm{Controls} \\ &+ \mathrm{Industry\ effects} + \mathrm{Year} \times \mathrm{Quarter\ effects} + \varepsilon, \end{aligned} \tag{3}$$

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 Days 31 to 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] × RevRecog.

6 | Conclusions

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

TABLE 8 | Cumulative abnormal returns following Securities and Exchange Commission (SEC) comment letter (CL) dissemination.

	Dependent variable = CAR[+2, +30]		Dependent variable = CAR[+31, +60]		Dependent variable = CAR[+61, +90]	
Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
AdjdRI[0,1] (a)	−0.048	−0.031	0.098**	0.079	−0.037	−0.032
	(−0.85)	(−0.51)	(2.33)	(1.58)	(−0.48)	(−0.39)
RevRecog		0.012		0.043**		−0.011
		(0.77)		(2.35)		(−0.77)
AdjdRI[0,1] × RevRecog (b)		−0.386		1.432**		−0.358
		(0.88)		(2.47)		(−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

Note: 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 Days +2 to +30 following the dissemination date. CAR[+31, +60] denotes cumulative abnormal returns for the period from Days +31 to +60 following the dissemination date. CAR[+61, +90] denotes cumulative abnormal returns for the period from Days +61 to +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% and 99% levels. Standard errors are clustered at the firm level, and *t* values are in parentheses.

*, **, and *** indicate statistical significance (two-tailed) at the 0.1%, 0.05%, and 0.01% levels, respectively.

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.

Acknowledgments

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.

Data Availability Statement

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

Endnotes

[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 includes Lee (1992), Bhattacharya (2001), Battalio and Mendenhall (2005), Barber and Odean (2008), Ayers et al. (2011), and Malmendier and Shanthikumar (2007).

[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.

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

[5] No other comparable data exist to identify retail investors directly. Barber and Odean (2000) and Grinblatt and Keloharju (2001) use retail investor data from the 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*."

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

[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 September 17, 2019 to October 28, 2019. There are three individual SEC letters and corresponding response letters between the SEC and Tesla from September 17, 2019 (FIRST_LETTER_DATE) to October 28, 2019 (LAST_LETTER_DATE) associated with a unique number (CL_CON_ID) assigned by Audit Analytics, 152541. These CLs and correspondences were disseminated on November 26, 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.

[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).

[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 comment, implying that resolving accounting issues is important to both reviewers and firms.

[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 classifications (results untabulated).

[12] Ryans (2021) shows trends in CLs' topics. To illustrate, he highlights, "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" (54).

[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.

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

[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 2 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 the previous 10 weeks (untabulated), which suggests that the choice of the "normal" period for capturing Google searches for a firm does not alter our conclusions.

[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 10-K 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.

[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 et al. 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].

[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 2-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.

[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 A1. Our main finding that Robinhood investors reduce holdings in stocks that receive more severe CLs is unchanged.

[24] Although 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).

[25] We also use other measures of familiarity and media attention bias advertising expenses in 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.

[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 Days −1 to +1 centered on the CL release date, and 0 otherwise. We then include this variable in the regression. Panel A of Table A4 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 A4 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 et al. (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.

[28] We calculate the CAR as the cumulation of daily stock returns less the CRSP capitalization-weighted market return.

References

Alfonso, E., C. S. A. Cheng, and S. Pan. 2015. "Income Classification Shifting and Mispricing of Core Earnings." *Journal of Accounting, Auditing & Finance* 1–32.

Anderson, K. L., and T. L. Yohn. 2002. "The Effect of 10K Restatements on Firm Value, Information Asymmetries, and Investors' Reliance on

Earnings." SSRN. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=332380.

Ayers, B. C., O. Z. Li, and P. E. Yeung. 2011. "Investor Trading and the Post-Earnings Announcement Drift." *Accounting Review* 86, no. 2: 385–416.

Barber, B. M., X. Huang, P. Jorion, T. Odean, and C. Schwarz. 2024. "A (Sub)penny for Your Thoughts: Tracking Retail Investor Activity in TAQ." *Journal of Finance* 79, no. 4: 2403–2427. https://doi.org/10.1111/jofi.13334.

Barber, B. M., X. Huang, T. Odean, and C. Schwarz. 2022. "Attention Induced Trading and Returns: Evidence From Robinhood Users." *Journal of Finance* 77, no. 6: 3141–3190.

Barber, B. M., Y. T. Lee, Y. J. Liu, and T. Odean. 2009. "Just How Much do Individual Investors Lose by Trading?" *Review of Financial Studies* 22, no. 2: 609–632.

Barber, B. M., A. Morse, and A. Yasuda. 2021. "Impact Investing." *Journal of Financial Economics* 139, no. 1: 162–185.

Barber, B. M., and T. Odean. 2000. "Trading Is Hazardous to Your Wealth: The Common Stock Investment Performance of Individual Investors." *Journal of Finance* 55, no. 2: 773–806.

Barber, B. M., and T. Odean. 2008. "All That Glitters: The Effect of Attention and News on the Buying Behavior of Individual and Institutional Investors." *Review of Financial Studies* 21, no. 2: 785–818.

Barber, B. M., and T. Odean. 2013. "The Behavior of Individual Investors." In *Handbook of the Economics of Finance*, 1533–1570. Elsevier.

Barberis, N., and R. Thaler. 2003. "A Survey of Behavioral Finance." *Handbook of the Economics of Finance* 1: 1053–1128.

Battalio, R. H., and R. R. Mendenhall. 2005. "Earnings Expectations, Investor Trade Size, and Anomalous Returns Around Earnings Announcements." *Journal of Financial Economics* 77, no. 2: 289–319.

Ben-Rephael, A., Z. Da, and R. D. Israelsen. 2017. "It Depends on Where You Search: Institutional Investor Attention and Underreaction to News." *Review of Financial Studies* 30, no. 9: 3009–3047.

Bhattacharya, N. 2001. "Investors' Trade Size and Trading Responses Around Earnings Announcements: An Empirical Investigation." *Accounting Review* 76, no. 2: 221–244.

Bhattacharya, N., F. Ecker, P. M. Olsson, and K. Schipper. 2012. "Direct and Mediated Associations Among Earnings Quality, Information Asymmetry, and the Cost of Equity." *Accounting Review* 87, no. 2: 449–482.

Boehmer, E., C. M. Jones, X. Zhang, and X. Zhang. 2021. "Tracking Retail Investor Activity." *Journal of Finance* 76, no. 5: 2249–2305.

Bozanic, Z., J. R. Dietrich, and B. A. Johnson. 2017. "SEC Comment Letters and Firm Disclosure." *Journal of Accounting and Public Policy* 36, no. 5: 337–357.

Brown, S. V., X. (Shaolee) Tian, and J. Wu Tucker. 2018. "The Spillover Effect of SEC Comment Letters on Qualitative Corporate Disclosure: Evidence From the Risk Factor Disclosure." *Contemporary Accounting Research* 35, no. 2: 622–656.

Cao, N., P. B. Mcguinness, and C. Xi. 2021. "Does Securities Enforcement Improve Disclosure Quality? An Examination of Chinese Listed Companies' Restatement Activities." *Journal of Corporate Finance* 67: 101877.

Cassell, C. A., L. M. Cunningham, and L. L. Lisic. 2019. "The Readability of Company Responses to SEC Comment Letters and SEC 10-K Filing Review Outcomes." *Review of Accounting Studies* 24: 1252–1276.

Cassell, C. A., L. M. Dreher, and L. A. Myers. 2013. "Reviewing the SEC's Review Process: 10-K Comment Letters and the Cost of Remediation." *Accounting Review* 88, no. 6: 1875–1908.

Chi, S. S., and D. M. Shanthikumar. 2017. "Local Bias in Google Search and the Market Response Around Earnings Announcements." *Accounting Review* 92, no. 4: 115–143.

Cunningham, L. M., and J. J. Leidner. 2022. "The SEC Filing Review Process: A Survey and Future Research Opportunities." *Contemporary Accounting Research* 39, no. 3: 1653–1688.

Cunningham, L. M., R. Schmardebeck, and W. Wang. 2017. "SEC Comment Letters and Bank Lending." SSRN. https://ssrn.com/abstract=2727860.

Da, Z., J. Engelberg, and P. Gao. 2011. "In Search of Attention." *Journal of Finance* 66, no. 5: 1461–1499.

Dahlquist, M., J. V. Martinez, and P. Söderlind. 2017. "Individual Investor Activity and Performance." *Review of Financial Studies* 30, no. 3: 866–899.

Dechow, P. M., A. Lawrence, and J. P. Ryans. 2016. "SEC Comment Letters and Insider Sales." *Accounting Review* 91, no. 2: 401–439.

Dechow, P. M., W. Ge, C. R. Larson, and R. G. Sloan. 2011. "Predicting Material Accounting Misstatements." *Contemporary Accounting Research* 28, no. 1: 17–82.

Drake, M. S., D. T. Roulstone, and J. R. Thornock. 2012. "Investor Information Demand: Evidence From Google Searches Around Earnings Announcements." *Journal of Accounting Research* 50, no. 4: 1001–1040.

Eaton, G. W., T. C. Green, B. Roseman, and Y. Wu. 2023. "Retail Option Traders and the Implied Volatility Surface." SSRN. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4104788.

Ege, M., J. L. Glenn, and J. R. Robinson. 2020. "Unexpected SEC Resource Constraints and Comment Letter Quality." *Contemporary Accounting Research* 37, no. 1: 33–67.

Francis, J., D. Philbrick, and K. Schipper. 1994. "Shareholder Litigation and Corporate Disclosures." *Journal of Accounting Research* 32, no. 2: 137–164.

Gao, Z., J. J. Leidner, J. N. Myers, and L. A. Myers. 2023. "Transparency and Attention-Driven Retail Investments: Evidence from Robinhood Investors." SSRN. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4155321&__cf_chl_tk=nxYpw5qM60ZAxItLw6BzCqfNlvpCqSkrGyH6w8Y1gEY-1702946107-0-gaNycGzNE9A.

Gietzmann, M. B., and H. Isidro. 2013. "Institutional Investors' Reaction to SEC Concerns About IFRS and US GAAP Reporting." *Journal of Business Finance & Accounting* 40, no. 7–8: 796–841.

Gietzmann, M. B., and A. K. Pettinicchio. 2014. "External Auditor Reassessment of Client Business Risk Following the Issuance of a Comment Letter by the SEC." *European Accounting Review* 23, no. 1: 57–85.

Graham, J. R., C. R. Harvey, and S. Rajgopal. 2005. "The Economic Implications of Corporate Financial Reporting." *Journal of Accounting and Economics* 40, no. 1–3: 3–73.

Grinblatt, M., and M. Keloharju. 2001. "What Makes Investors Trade?" *Journal of Finance* 56, no. 2: 589–616.

Grinblatt, M., and M. Keloharju. 2009. "Sensation Seeking, Overconfidence, and Trading Activity." *Journal of Finance* 64, no. 2: 549–578.

Grove, H., T. Johnsen, and P. Lung. 2016. "SEC Comment Letters: An Unlikely Secret Weapon for Forensic Accountants, Short Sellers, and Other Financial Statement Users." *Journal of Forensic and Investigative Accounting* 8, no. 2: 179–197.

Gunning, R. 1969. "The Fog Index After Twenty Years." *Journal of Business Communication* 6, no. 2: 3–13.

Gunny, K. A., and J. M. Hermis. 2020. "How Busyness Influences SEC Compliance Activities: Evidence From the Filing Review Process and Comment Letters." *Contemporary Accounting Research* 37, no. 1: 7–32.

Haw, I. M., S. S. Ho, and A. Y. Li. 2011. "Corporate Governance and Earnings Management by Classification Shifting." *Contemporary Accounting Research* 28, no. 2: 517–553.

Heese, J., M. Khan, and K. Ramanna. 2017. "Is the SEC Captured? Evidence From Comment-Letter Reviews." *Journal of Accounting and Economics* 64, no. 1: 98–122.

Hirshleifer, D., and S. H. Teoh. 2003. "Limited Attention, Information Disclosure, and Financial Reporting." *Journal of Accounting and Economics* 36, no. 1–3: 337–386.

Hong, H., and J. C. Stein. 2003. "Differences of Opinion, Short-Sales Constraints, and Market Crashes." *Review of Financial Studies* 16, no. 2: 487–525.

Johnston, R., and R. Petacchi. 2017. "Regulatory Oversight of Financial Reporting: Securities and Exchange Commission Comment Letters." *Contemporary Accounting Research* 34, no. 2: 1128–1155.

Kelley, E. K., and P. C. Tetlock. 2013. "How Wise Are Crowds? Insights From Retail Orders and Stock Returns." *Journal of Finance* 68, no. 3: 1229–1265.

Kelley, E. K., and P. C. Tetlock. 2017. "Retail Short Selling and Stock Prices." *Review of Financial Studies* 30, no. 3: 801–834.

Kellogg, R. L. 1984. "Accounting Activities, Security Prices, and Class Action Lawsuits." *Journal of Accounting and Economics* 6, no. 3: 185–204.

Lee, C. M. 1992. "Earnings News and Small Traders: An Intraday Analysis." *Journal of Accounting and Economics* 15, no. 2–3: 265–302.

Lee, S. S., Z. Ling, and Z. Rezaee. 2023. "SEC Comment Letter Disclosures and Short Sellers' Front-Running." *Accounting Review* 98, no. 5: 375–400.

Li, B., and Z. Liu. 2017. "The Oversight Role of Regulators: Evidence From SEC Comment Letters in the IPO Process." *Review of Accounting Studies* 22: 1229–1260.

Lowry, M., R. Michaely, and E. Volkova. 2020. "Information Revealed Through the Regulatory Process: Interactions Between the SEC and Companies Ahead of Their IPO." *Review of Financial Studies* 33, no. 12: 5510–5554.

Malmendier, U., and D. Shanthikumar. 2007. "Are Small Investors Naive About Incentives?." *Journal of Financial Economics* 85, no. 2: 457–489.

Moss, A., J. P. Naughton, and C. Wang. 2023. "The Irrelevance of Environmental, Social, and Governance Disclosure to Retail Investors." *Management Science* 70: 2626–2644.

Niessner, M. 2015. "Strategic Disclosure Timing and Insider Trading." SSRN. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2439040.

Ozik, G., R. Sadka, and S. Shen. 2021. "Flattening the Illiquidity Curve: Retail Trading During the COVID-19 Lockdown." *Journal of Financial and Quantitative Analysis* 56, no. 7: 2356–2388.

Palmrose, Z. V., V. J. Richardson, and S. Scholz. 2004. "Determinants of Market Reactions to Restatement Announcements." *Journal of Accounting and Economics* 37, no. 1: 59–89.

Robinson, J. R., Y. Xue, and Y. Yu. 2011. "Determinants of Disclosure Noncompliance and the Effect of the SEC Review: Evidence From the 2006 Mandated Compensation Disclosure Regulations." *Accounting Review* 86, no. 4: 1415–1444.

Ryans, J. P. 2021. "Textual Classification of SEC Comment Letters." *Review of Accounting Studies* 26, no. 1: 37–80.

Sandler, L. 2013. "Muddy Waters Secret China Weapon Is on SEC Website." Bloomberg News. https://www.bloomberg.com/news/articles/2013-02-19/muddy-waters-secret-china-weapon-is-on-sec-website.

Seasholes, M. S., and G. Wu. 2007. "Predictable Behavior, Profits, and Attention." *Journal of Empirical Finance* 14, no. 5: 590–610.

SEC. 2017. "Fiscal Year 2017 Agency Financial Report." SEC. https://www.sec.gov/files/sec-2017-agency-financial-report.pdf.

Welch, I. 2022. "The Wisdom of the Robinhood Crowd." *Journal of Finance* 77, no. 3: 1489–1527.

Appendix 1: Sample of the Initial CL Pertaining to the 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.

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

DIVISION OF
CORPORATION FINANCE

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.

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.

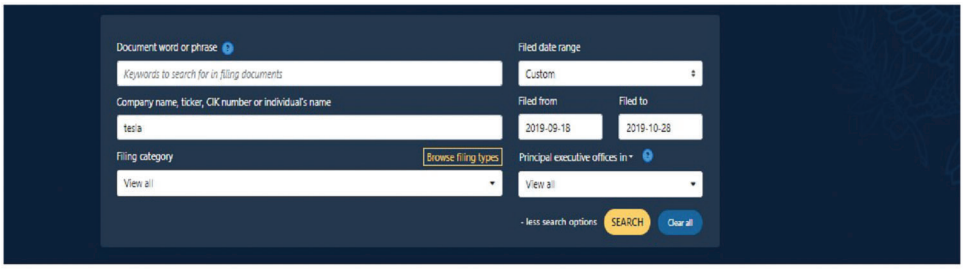
Sincerely,

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 September 17, 2019 to October 28, 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	**Acct**
2	Disclosure and internal control	**NonAcct**
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	

(Continues)

	Issue content	Variable
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 concept 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 (**Acct_Core**)	– Revenue recognition (incl. deferred revenue) (**RevRecog**)
	– 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
	– Research and development
Non-core (**Acct_NonCore**)	– 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

(Continues)

Type (variable)	Topic description
	– 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, United States 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 (**Acct_Others**)	– 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)

Note: This table reports the breakdown of accounting issues using the approach from Cassell et al. (2013).

Appendix 5: Variable Definitions

Variable	Definition
Google search volume index	
Abnormal_LogGSVI[0,1]	The difference between the natural logarithm of Google search volume index during Days 0–1 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)

(Continues)

Variable	Definition
Retail investor holdings (dependent variable)	
AdjdRI[0,1]	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	
RevRecog	Natural logarithm of the number of issues classified into revenue recognition (including deferred revenue) issues—codes 212 by Audit Analytics
Acct	Natural logarithm of the total number of issues classified into Accounting Rule and Accounting Disclosure Issues (Audit Analytics)Acct without RevRecog 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
NonAcct	Natural logarithm of the total number of issues that are not classified into Accounting Rule and Accounting Disclosure Issues (Audit Analytics)
Acct_Core	Following Cassell et al. (2013), the natural logarithm of the number of issues relating to core earnings, such as accounts receivable, expense, inventory, and revenue recognition (Audit Analytics)Acct_Core without RevRecog is defined as a natural logarithm of the number of issues relating to core earnings, except revenue recognition issues
Acct_NonCore	Following Cassell et al. (2013), the natural logarithm of the number of issues relating to noncore earnings, such as capitalization of expenditure issues, consolidation, and tax expense (Audit Analytics)
Acct_Others	Following Cassell et al. (2013), natural logarithm of the number of issues relating to classification issues (e.g., balance sheet classification of asset issues) and fair value issues (Audit Analytics)
Comment letter heuristic	
TotalIssues	Natural logarithm of the total number of issues identified in the originating comment letter (Audit Analytics)TotalIssues without RevRecog is defined as a natural logarithm of the total number of issues, except revenue recognition issues
TotalRounds	Natural logarithm of the number of letters exchanged between the SEC and the firm before the filing review is closed (Audit Analytics)
TotalDays	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	
TotalWords	Natural logarithm of the number of words in the originating comment letter (e.g., UPLOAD) (WRDS SEC Analytics Suite)
FogIndex	Gunning (1969) fog index for the originating comment letter (e.g., UPLOAD) (WRDS SEC Analytics Suite)
Negative	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	
Growth	Quarter-to-quarter changes in sales (RECTQ) divided by beginning total assets (ATQ) (Compustat)
Size	Natural logarithm of market capitalization as of the most recent fiscal quarter end date (PRCCQ × CSHOQ) (Compustat)
BM	Book value of comment equity divided by market value of equity as of the most recent fiscal quarter end date (CEQQ/(PRCCQ × CSHOQ)) (Compustat)
Lev	The ratio of total debt (DLTTQ + DLCQ) to total assets (ATQ) as of the most recent fiscal quarter end date (Compustat)
Follow	Natural logarithm of the number of analysts following the firm as of the most recent fiscal quarter-end date (IBES)

(Continues)

Variable	Definition
Loss	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)
ROA	Income before extraordinary items (IBQ) divided by average total assets (ATQ) as of the most recent fiscal quarter end date (Compustat)
Spread	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)
Momentum	The compounded monthly return for the months −12 to −1 relative to the month of the trading date (i.e., comment letter release date) (CRSP)
IO	Percent of shares owned by institutions as of the most recent fiscal quarter end date. (Thomson Reuters 13F)
CL_Restatement	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)
RetPre1D	The daily return for the day before the comment letter release date (CRSP)
MomentumPre7D	The compounded daily return for 7 business days prior to the comment letter release date (CRSP)
Additional variables	
InsiderSales[−1,−5]	Following Dechow et al. (2016), average daily insider sales are divided by the number of shares outstanding during Days −1 to −5 from the comment letter release date (Thomson Reuters and CRSP)
InsiderSales[−6,−10]	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)
Insidersales[<−11]	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)
High_ShortInt	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)
ΔRatio_NewsCount[0,1]	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
ΔRatio_TwitterCount[0,1]	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
Friday	Indicator variable equal to 1 if the day of comment letter release is Friday, and 0 otherwise (Audit Analytics)
AnalystsRecommend	The latest median consensus analyst recommendations that are available prior to the dissemination of comment letters (I/B/E/S)
AnalystRevision	Indicator variable equal to 1 if there is an analyst recommendation revision issued during Days 0–1 from the comment letter release dates (I/B/E/S)
Other_CLs	Indicator variable equal to 1 if any CL related to other transactional filings is disclosed at the 10-K CL releasing date, and 0 otherwise (Audit Analytics)
Num_Refer_Filings	Number of filings referenced in the 10-K CL (Audit Analytics)
Instrumental variable used in 2SLS	
ADO_Busyness	indicator for the busyness of the review department, which equals 1 if the firm has 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	AdjdRI[0,1]	1.000										
2	Abnormal_LogGSVI[0,1]	0.084*	1.000									
3	RevRecog	−0.064	0.090*	1.000								
4	Acct without RevRecog	−0.063	−0.020	−0.070	1.000							
5	Acct_Core without RevRecog	0.004	0.038	0.046	0.460***	1.000						
6	Acct_NonCore	−0.068	−0.007	−0.111**	0.775***	0.020	1.000					
7	Acct_Others	−0.037	−0.023	−0.040	0.587***	0.042	0.231***	1.000				
8	NonAcct	−0.041	0.018	−0.233***	0.168***	0.118**	0.117**	0.114**	1.000			
9	Growth	0.019	0.102*	0.085*	−0.063	−0.015	−0.069	−0.013	−0.072	1.000		
10	Size	−0.024	−0.118**	0.036	0.011	−0.051	0.003	0.021	−0.088*	−0.039	1.000	
11	BM	−0.021	−0.005	−0.201***	0.074	−0.069	0.130**	0.060	0.081*	−0.095*	−0.245***	1.000
12	Lev	−0.030	−0.013	−0.097*	0.047	0.067	0.010	0.033	0.075	−0.140***	−0.027	−0.086*
13	Follow	−0.042	−0.060	0.039	0.016	−0.014	−0.010	0.044	−0.022	0.011	0.687***	−0.176***
14	Loss	0.023	0.055	0.042	−0.039	−0.003	0.019	−0.090*	0.026	−0.075	−0.318***	−0.013
15	ROA	0.000	0.028	−0.002	0.034	0.012	−0.019	0.060	−0.061	0.069	0.288***	0.027
16	Spread	−0.005	0.003	−0.006	−0.011	0.065	−0.035	−0.011	0.003	−0.034	−0.504***	0.179***
17	Momentum	0.027	0.001	0.072	−0.023	0.002	−0.014	−0.028	−0.067	0.117**	0.150***	−0.295***
18	IO	0.003	0.034	0.023	−0.022	−0.003	−0.049	0.013	−0.014	0.033	0.217***	−0.057
19	CLRestatement	−0.007	0.003	−0.017	0.010	−0.026	0.045	−0.031	0.001	0.008	−0.077	0.007
20	RetPre1D	−0.022	0.017	0.056	0.020	0.058	−0.014	−0.029	0.015	0.020	−0.031	0.043
21	MomentumPre7D	−0.012	0.020	−0.032	0.039	0.002	0.006	0.048	0.087*	0.024	0.026	0.061

(Continues)

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

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

Appendix 7: Additional Tests

TABLE A1 | Retail investors and revenue recognition CLs: Alternative choices of clustering and fixed effects.

	Dependent variable = AdjdRI[0,1]			
	Independent year and quarter fixed effects		Two-way clustering on firm and year	
Variable	**(1)**	**(2)**	**(3)**	**(4)**
RevRecog	−0.029**	−0.030**	−0.029**	−0.030**
	(−2.23)	(−2.29)	(−2.21)	(−2.27)
Acct without RevRecog		0.006		0.008
		(0.80)		(1.02)
Acct_Core without RevRecog		−0.008*		−0.008*
		(−1.96)		(−1.76)
Acct_NonCore		−0.003		−0.005
		(−0.71)		(−0.93)
Acct_Others	−0.007	−0.007	−0.007	−0.007*
	(−1.56)	(−1.61)	(−1.61)	(−1.68)
NonAcct	−0.006		−0.005	
	(−1.23)		(−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

Note: 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 are in parentheses.

*, **, and *** indicate statistical significance (two-tailed) at the 0.1%, 0.05%, and 0.01% levels, respectively.

TABLE A2 | Retail investors and non-10-K CLs.

		Dependent variable = AdjdRI[0,1]	
		Non-10-K CL (incl. 10-Q)	Non-10-K CL (excl. 10-Q)
Variable	**Pred Sign**	**(1)**	**(2)**
Acct	−	−0.010**	−0.017**
		(−2.17)	(−2.27)
NonAcct	?	0.002	0.005
		(0.33)	(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

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

TABLE A3 | Placebo test—retail investors and SEC CL dissemination.

Panel A: Accounting vs. non-accounting topics

	Dependent variable = daily adjusted retail investor holdings					
	AdjdRI[−15]	AdjdRI[−10]	AdjdRI[−5]	AdjdRI[5]	AdjdRI[10]	AdjdRI[15]
Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
RevRecog	−0.003	−0.009	−0.009	−0.004	0.001	−0.001
	(−0.90)	(−0.94)	(−1.23)	(−1.56)	(0.19)	(−0.43)
Acct without RevRecog	−0.000	−0.001	0.005	0.005	0.001	−0.001
	(−0.01)	(−0.32)	(1.53)	(1.52)	(0.57)	(−0.37)
NonAcct	0.004	−0.006	−0.009	−0.002	0.000	0.000
	(1.28)	(−1.17)	(−0.91)	(−1.22)	(0.24)	(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

	Dependent variable = daily adjusted retail investor holdings					
	AdjdRI[−15]	AdjdRI[−10]	AdjdRI[−5]	AdjdRI[5]	AdjdRI[10]	AdjdRI[15]
Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
RevRecog	−0.003	−0.008	−0.008	−0.004	0.001	−0.001
	(−0.80)	(−0.89)	(−1.25)	(−1.53)	(0.24)	(−0.44)
Acct_Core without RevRecog	0.002	−0.010	0.002	0.001	−0.002	−0.000
	(0.19)	(−0.92)	(0.17)	(0.33)	(−0.87)	(−0.01)
Acct_NonCore	0.004	0.004	0.009	0.004*	0.000	−0.000
	(1.35)	(1.13)	(1.16)	(1.91)	(0.14)	(−0.03)
Acct_Others	−0.009*	−0.004	−0.008	0.007	0.004	−0.001
	(−1.75)	(−0.66)	(−1.08)	(0.80)	(1.55)	(−0.49)
NonAcct	0.004	−0.006	−0.009	−0.002	0.000	0.000
	(1.36)	(−1.16)	(−0.92)	(−1.25)	(0.30)	(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

Note: 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 0–1 (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% and 99% levels. Standard errors are clustered at the firm level, and *t* values are in parentheses.

*, **, and *** indicate statistical significance (two-tailed) at the 0.1%, 0.05%, and 0.01% levels, respectively.

TABLE A4 | Confounding corporate events and filings, and excluding other contemporaneous disclosures.

Panel A: Controlling for confounding corporate events and filings		
	Dependent variable = AdjdRI[0,1]	
Variable	**(1)**	**(2)**
RevRecog	−0.028**	−0.029**
	(−2.19)	(−2.25)
Acct without RevRecog	−0.005	
	(−1.17)	
Acct_Core without RevRecog		0.007
		−0.87
Acct_NonCore		−0.009*
		(−1.97)
Acct_Others		−0.004
		(−0.71)
NonAcct	−0.007	−0.007
	(−1.56)	(−1.62)
OtherFilings	0.009	0.009
	−1.52	−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		
	Dependent variable = AdjdRI[0,1]	
Variable	**(1)**	**(2)**
RevRecog	−0.012*	−0.013*
	(−1.83)	(−1.92)
Acct without RevRecog	−0.005	
	(−1.02)	
Acct_Core without RevRecog		0.008
		−0.99
Acct_NonCore		−0.009**
		(−2.01)
Acct_Others		−0.004
		(−0.67)
NonAcct	−0.003	−0.004
	(−0.85)	(−0.91)
Controls	Yes	Yes
SEC Ind-Office FE	Yes	Yes
Year × Quarter FE	Yes	Yes

(Continues)

TABLE A4 | (Continued)

Panel B: Excluding other contemporaneous disclosures		
	Dependent variable = AdjdRI[0,1]	
Variable	**(1)**	**(2)**
Clustered SE by	Firm	Firm
Number of Obs	435	435
Adjusted R^2	−0.015	−0.014

Note: 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 observations with 8-K filings or other filings occurring during the 3-day window centered on the 10-K CL release date. Appendix 5 defines the other variables. All continuous variables are winsorized at the 1% and 99% levels. *t* values are in parentheses.
*, **, and *** indicate statistical significance (two-tailed) at the 0.1%, 0.05%, and 0.01% levels, respectively.

TABLE A5 | Retail investors and SEC CL dissemination: pre-Covid period.

	Dependent variable = AdjdRI[0,1]	
	Pre-Covid period	
Variable	**(1)**	**(2)**
RevRecog	−0.021**	−0.022**
	(−2.02)	(−2.08)
Acct without RevRecog	−0.005	
	(−1.06)	
Acct_Core without RevRecog		0.002
		(0.29)
Acct_NonCore		−0.006
		(−1.27)
Acct_Others		−0.006
		(−1.01)
NonAcct	−0.009**	−0.009**
	(−2.17)	(−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

Note: 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% and 99% levels. Standard errors are clustered at the firm level, and *t* values are in parentheses.
*, **, and *** indicate statistical significance (two-tailed) at the 0.1%, 0.05%, and 0.01% levels, respectively.