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Retail Attention, Institutional Attention

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Abstract

We document distinctly different clientele effects on investor attention and return responses to information. Macro news crowds out retail investor attention to firms' earnings news by 49%. For stocks with high retail ownership, macro news dampens earnings announcement returns by 17% and substantially increases post-announcement drift, especially during high VIX periods. In contrast, macro news increases institutional investor attention to scheduled earnings announcements but not their attention to unscheduled analysts' forecast revisions. The findings confirm the implications of rational inattention models and highlight the importance of considering clientele effects in understanding the effect of news on attention and asset prices.

I. Introduction

A crucial question in finance is how information is incorporated into prices. The recent literature provides strong evidence that risk premia accrue around days with important macro news and days with earnings announcements by firms (see, e.g., Savor and Wilson (2013), (2014), (2016)). However, the arrival of information does not guarantee that the information is processed and incorporated into prices. As shown by Ben-Rephael, Da, and Israelsen (2017) and Ben-Rephael, Carlin, Da,

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and Israelsen (2021), institutional investor attention plays an important role in facilitating the incorporation of news and strongly affects risk premia.

Although the conventional wisdom is that retail investors are either inconsequential or contribute to mispricing,[1] several papers find that they may possess value-relevant information about firms. Kelley and Tetlock ((2013), (2017)) find that retail net buying positively predicts stock returns, and retail short selling negatively predicts stock returns, especially in small stocks and those whose trading is dominated by retail investors. Boehmer, Jones, Zhang, and Zhang (2021) also find that retail order imbalance positively predicts future stock returns and firm-level news. These papers therefore suggest that the relative role of retail and institutional investors on asset prices can be more nuanced and depends on the marginal investors of the stock.

Motivated by these studies, this article seeks to shed further light on the respective roles retail and institutional investors play in information processing and price efficiency. We investigate these questions through the way in which retail and institutional investors respond to macro news and news about individual firms.

We find distinctly different attention responses to news across these two types of investors. While both types of investors' attention react strongly to the arrival of macro news and firm news, the patterns differ with the joint arrival of macro news and firm news. For retail investors, macro news triggers a substantial crowding-out effect on their attention to firm news. Further, macro news is associated with a significant dampening of the announcement returns and a large increase in post-announcement drifts for stocks with high retail ownership. In contrast, macro news increases institutional attention to scheduled earnings announcements but not to unscheduled analysts' earnings forecast revisions. For stocks with high institutional ownership, macro news is associated with greater announcement returns and smaller post-announcement drifts. These results thus help to provide a more comprehensive picture of investor attention to news and thereby add new insights into the important questions of how news affects asset prices.

We formulate our empirical hypothesis by drawing key insights from the recent class of rational inattention models that analyze the fundamental question of what determines investors' attention (e.g., Sims (2003), (2006), Peng (2005), Peng and Xiong (2006), Mondria (2010), Van Nieuwerburgh and Veldkamp (2010), Kacperczyk, Van Nieuwerburgh, and Veldkamp (2016), and Gondhi (2021)). These models postulate that investors' attention allocation decisions depend on their attention capacity, the nature of news, and the extent to which investors can adjust their attention capacity in anticipation of the news.[2]

[1] See, for example, Barber and Odean (2008), Da, Engelberg, and Gao (2011), Andrei and Hasler (2015), and Yuan (2015).

[2] The empirical literature that studies investor attention includes Gervais, Kaniel, and Mingelgrin (2001), Huberman and Regev (2001), Hirshleifer and Teoh (2003), Grullon, Kanatas, and Weston (2004), Hirshleifer, Hou, Teoh, and Zhang (2004), Hou and Moskowitz (2005), Hong, Torous, and Valkanov (2007), Peng, Xiong, and Bollerslev (2007), Seasholes and Wu (2007), Barber and Odean (2008), Cohen and Frazzini (2008), Barber, Odean, and Zhu (2009), DellaVigna and Pollet (2009), Hirshleifer, Lim, and Teoh (2009), (2011), Loh (2010), Van Nieuwerburgh and Veldkamp (2010), Da, Engelberg, and Gao (2011), (2015), Hirshleifer, Hsu, and Li (2013), Hou, Peng, and Xiong (2013),

The models predict that, because the information is more valuable when ex ante uncertainty is high, investors prioritize learning by attending more to factors that contribute more to the total uncertainty of their portfolios. When investors' attention is constrained, and, especially when aggregate uncertainty is high, the model predicts a *crowding-out effect*: investors shift more attention to systematic factors, which, in turn, leaves less attention for firm-specific news. The crowding-out effect is expected to be stronger during periods of greater market-wide uncertainty when the marginal benefit of processing macro news is higher. On the other hand, if the attention constraint is not binding and macro information and firm-specific news are complementary to each other, an intuitive extension of the models would predict that macro news could increase the marginal benefit of firm-specific news, therefore triggering more attention to individual firms (i.e., an *enhancement effect*).

Furthermore, the extent to which investors can anticipate news influences their attention decisions. Investors are more apt to allocate their attention to scheduled news, by taking actions such as better planning of their time and effort, delegating tasks, expanding capacity, and getting additional help if needed. For unscheduled news, however, they are less able to timely adjust their attention capacity. This implies that macro news may generate a crowding-out effect for unscheduled firm news, even for investors with ample capacity.

We test these predictions empirically by investigating retail and institutional investors' attention responses to macro news, firm-specific news, and in settings under which both types of information arrive simultaneously. We then evaluate the implications of their attention decisions on asset prices through return responses to firms' earnings announcements.

We use abnormal Google search volume to capture abnormal retail attention and Bloomberg user access data to proxy for institutional investor attention (Da et al. (2011), Ben-Rephael et al. (2017)). We first focus on earnings announcements, one of the most important firm-level information releases. We find that a stock's earnings announcement leads to a 604% increase in retail attention and a 302% increase in institutional attention. Similarly, we find that investors significantly increase their attention to the overall market on macro-news days by 5.8% and 9.1% for retail and institutional investors, respectively.

More importantly, we find that macro news substantially crowds out retail investor attention to earnings announcements, by a substantial 49%, whereas a high volume of earnings news does not affect investor attention to the overall market. The crowding-out effect is particularly strong during periods of high economic uncertainty proxied by the CBOE Volatility Index (VIX), during which macro news reduces the average firm-specific abnormal retail attention by 64%. The findings confirm the theoretical prediction of a crowding-out effect of macro news on firm-level news for retail investors. For institutional attention, we find that macro news triggers more attention from institutional investors to processing firm-level information, consistent with an enhancement effect.

Bali, Peng, Shen, and Tang (2014), Lou (2014), Yuan (2015), Ben-Rephael et al. (2017), Chemmanur and Yan (2019), and Huang, Huang, and Lin (2019). While these papers provide important insights on investor attention in financial markets, they do not provide direct tests of the theories.

Although our results of attention-news patterns are consistent with the aforementioned rational inattention theories, such patterns may also be driven by alternative mechanisms. For example, macroeconomic news may first drive a crowding-out effect in returns, and investor attention may simply react to the return pattern. To address this reverse causality concern, we follow Ben-Rephael et al. (2017) and analyze a subsample of after-hours earnings announcements, to which stock prices (or other trading-related variables) mostly react on the next trading day. We observe similar crowding-out effects for this subsample, therefore confirming that our results are not driven by reverse causality.

Next, we turn our focus to stock price reactions to news. Given our evidence that attention constraints are more binding for retail investors, the effect of limited attention on prices is more likely to be observed for stocks with high retail ownership. Consistent with this, we find that the presence of macro news substantially dampens the earnings announcement return responses, by 17%, and significantly increases the post-announcement drifts for such stocks. Also consistent with the theory, the crowding-out effect is more pronounced during high VIX periods, during which the reduction is 33%.

For stocks with high institutional ownership, macro news increases earnings announcement return responses and reduces post-announcement drifts. This suggests that investors with abundant capacity might be able to devote attention to processing multiple shocks and are thus less susceptible to the crowding-out effect. The distinctly different patterns of price reactions to news across different stocks highlight the importance of considering the investor clientele of a stock and suggest that the degree to which asset prices incorporate information shocks depends on the relative importance of attention-constrained versus less constrained investors.

We further contrast our results for scheduled earnings announcements with those for unscheduled analyst earnings forecast revisions. We document a significant crowding-out effect of macro news on retail investor attention to forecast revisions. We also find that macro news does not significantly affect institutional attention to analyst forecast revisions, a pattern that is distinctly different from institutional investors' attention responses to earnings announcements. Corroborating the attention patterns, the presence of macro news significantly reduces the immediate price responses to forecast revisions and increases the post-revision drift for stocks with high retail ownership.

We consider alternative explanations that may contribute to our findings. First, the findings may be driven by information supply via media coverage (e.g., Fang and Peress (2009)) rather than by investors' attention allocation decisions. We show that controlling for media coverage does not materially affect our key findings. Second, managers may strategically time earnings announcements, and thus earnings announced on macro days may be systematically different from those announced on other days. We rule out this explanation by showing that earnings announced on days with or without macroeconomic announcements share similar characteristics.

Our article provides new insights into the roles retail and institutional investors play in financial markets. The conventional wisdom about retail investors is that retail attention is either associated with mispricing and speculative trading (Barber and Odean (2008), Da et al. (2011), Andrei and Hasler (2015), and Yuan (2015)) or

inconsequential (Ben-Rephael et al. (2017), Ben-Rephael et al. (2021)). Our new results identify settings under which retail inattention is associated with slow incorporation of news into stock prices, hence contributing to the literature on the efficiency-enhancing role of retail investors (Kelley and Tetlock (2013), (2017), Boehmer et al. (2021)). In addition, our article confirms the efficiency-improving role of institutional attention (Ben-Rephael et al. (2017), (2021)).

Our article also joins the emerging literature that tests key implications of rational attention models on how investors react to market-wide news and firm-level news. For example, Kacperczyk, Van Nieuwerburgh, and Veldkamp (2014) find that asset managers' choices to focus on stock picking or market timing depend on the state of the economy, consistent with the predictions of Kacperczyk et al. (2016). In addition, Peng et al. (2007) and Huang et al. (2019) find that the prioritized processing of macro news generates excessive return comovements. Similarly, Kottimukkalur (2019) finds more post-earnings announcement drifts following large market-moving days. While these papers examine important equilibrium outcome variables, they are only able to make indirect inferences about investor attention. Our study uses direct measures of investor attention and provides a microfoundation for the distinctively different attention allocation decisions that retail and institutional investors make.

A contemporaneous paper by Hirshleifer and Sheng (2021) finds that the presence of macro news increases stock return responses to firms' earnings announcements (an enhancement effect). Our findings are more nuanced. We show that the enhancement effect is mainly driven by stocks dominated by institutional investors. In contrast, for stocks with high retail ownership, macro news substantially *reduces* return responsiveness to firms' earnings announcements. We further show that the crowding-out effect of macro news to firm news is especially strong when attention constraints are binding – during periods of large macro uncertainty and for unscheduled news such as analyst forecast revisions. Our findings therefore provide a more comprehensive characterization of the different settings under which enhancement or crowding-out effects occur. In addition, we show that investor attention to the overall market is not affected by the availability of firm news and that our findings of attention patterns are robust to reverse causality concerns.

The remainder of the article is organized as follows: Section II develops the hypotheses. Section III describes the data and examines seasonal patterns in investor attention. Section IV investigates how investor attention responds to scheduled information shocks, and Section V explores the return implications. Section VI studies investors' attention allocation and return responses to unscheduled firm-level information shocks. Section VII discusses alternative explanations. Section VIII concludes.

II. Hypothesis Development

In this section, we formulate our key hypothesis. We first illustrate the intuition with an example of an earnings announcement from American International Group (AIG) and its stock return reactions. We then formally develop the empirical hypotheses on investors' attention allocation choices and asset pricing implications.

On Aug. 2, 2012, at 4:01 PM, AIG announced its strong financial results for the quarter ending on June 30, 2012, which greatly exceeded the market consensus forecast.[3] However, the announcement failed to receive much response: AIG's market-adjusted return was −0.28% the next day. The effect of the announcement only kicked in 2 days later, with a market-adjusted return of 2.39%. A closer look into the macroeconomic environment sheds some light on the lackluster response. On Aug. 3, at 8:30 AM, the Bureau of Labor Statistics released employment data that suggested that 4 years after the financial crisis, recovery was progressing at a modest pace; the S&P index returned 1.9% on that day.

One possible explanation to the puzzle is that the employment news dominated investor attention and distracted their attention away from AIG.[4] This example suggests that investors may have limited attention and how they choose to allocate their attention can have important consequences for asset prices.

More formally, a growing body of economics and finance literature has modeled agents' optimal attention allocation decisions given limited time and cognitive resources. For example, Sims (2003) applies information theory to study information-processing constraints in a dynamic control problem. Peng (2005) studies investors' endogenous attention allocation and predicts that investors are likely to pay more attention to large firms. Peng and Xiong (2006) show that limited investor attention leads to category learning behavior such that investors choose to process more market- and sector-wide information than firm-specific information. Kacperczyk et al. (2016) model the attention allocation of fund managers. They show that managers pay more attention to aggregate shocks and less to firm-specific information in recessions, while during booms they attend more to individual stocks. This gives rise to a new measure of manager skill that is evaluated by stock-picking ability in booms and market-timing ability in recessions (Kacperczyk et al. (2014)). Gondhi (2021) models rational inattention of firm managers and shows that an increase in aggregate uncertainty leads managers to allocate more capacity to aggregate productivity shocks and less to idiosyncratic shocks.

The common theme of these works is the notion that agents respond to news by allocating their limited attention to process information and therefore to reduce the uncertainty of their portfolios. Hence our first hypothesis is as follows:

Hypothesis 1. In response to information shocks, investors devote more attention to processing relevant information.

Next, market-wide shocks generate greater impacts on investors' portfolio uncertainty than firm-specific shocks. Hence, we expect that market-wide and industry-wide shocks receive more attention than firm-specific shocks. We refer to this as the *crowding-out effect* of macro news on firm-specific information

[3] AIG's after-tax per-share operating income was $1.06, representing strong year-over-year growth of 58%, which greatly exceeded the market consensus forecast of $0.58.

[4] An examination of Google search activities for the ticker "AIG" show that while the stock's typical earnings announcements increased Google search volume by 31% (relative to the past 1-year average), the increase on Aug. 3, 2012, was substantially lower, at 5.69%.

processing. When investors' attention is more constrained, the crowding-out effect is larger. Such a phenomenon is more likely to occur for stocks dominated by retail investors for whom capacity constraints are more likely to be binding and during periods of large aggregate uncertainty when information processing is more challenging.

On the other hand, institutional investors have greater attention capacity. Intuitively, the model can be extended so that if the macro and firm-specific shocks are information complements, unconstrained investors may respond by increasing their attention to the firm. We summarize our hypothesis regarding sources of information shocks, investor type, and total uncertainty as follows:

Hypothesis 2. When investors' attention constraints are binding, the arrival of market-wide shocks crowd out attention to firm-specific news, especially during periods of high uncertainty. For investors whose attention constraint is not binding, market-wide shocks do not exhibit the crowding-out effect and may even increase firm-specific attention.

Furthermore, given the attention patterns discussed in Section I, the degree to which asset prices incorporate news depends on the relative importance of attention-constrained versus less constrained investors for a stock, the magnitude of macro versus firm-specific shocks, and the aggregate uncertainty in the economy. If the marginal investor of the stock is dominated by investors with limited attention capacity, the crowding-out effect reduces the processing of firm-level news. This results in a price underreaction to firm-level news. On the other hand, if the marginal investor has a large attention capacity, then the crowding-out effect of attention should be minimal, and prices would not underreact. We summarize the return implications in the following hypothesis:

Hypothesis 3. For a stock whose marginal investors are attention constrained, concurrent macro news reduces price responsiveness to earnings news and increases the post-announcement drift, especially during periods of greater aggregate uncertainty, whereas if the marginal investor is unconstrained, the macro news does not distract or it may increase investor attention to the earnings news, resulting in greater return responses.

In addition, we expect that scheduled news and unscheduled news may elicit different responses. For the joint arrival of scheduled firm-level news and macro news, investors are more apt to allocate their attention in advance by taking actions such as expanding their total capacity and delegating tasks. Therefore, investors are relatively more likely to be able to pay attention to such scheduled firm-level news announcements. For unscheduled firm-level news, however, investors, even those with sufficient attention capacity, may be less able to timely adjust their attention. Hence, macro news is more likely to trigger a crowding-out effect for attention to such news.

Hypothesis 4. Compared to scheduled news, unscheduled firm-level news is more likely to be crowded out by macro-news announcements.

III. Data

Our sample consists of all common shares (SHRCD = 10 and 11) traded on the NYSE, Amex, Nasdaq, and Arca exchanges (EXCHCD = 1, 2, 3, and 4). We obtain data from several sources. We construct measures of retail investor attention and institutional investor attention using data from Google Trends and Bloomberg, respectively. Data on macroeconomic announcements are from Bloomberg. Stock prices, returns, and trading volume are from the Center for Research in Security Prices (CRSP) and financial statement information is from the merged CRSP-Compustat database. We obtain firms' earnings announcements and analysts' earnings forecasts from IBES and institutional holdings from the Thompson Reuters Institutional Holdings (13F). Supplementary Material Appendix A provides a full list of the variable definitions.

A. Investor Attention Proxies

We construct a stock-level retail investor attention measure using the daily Search Volume Index (SVI) from Google (Da et al. (2011)).[5] The SVI, available since 2004, is a relative search popularity score, defined on a scale of 0 to 100, based on the number of searches for a term relative to the total number of searches in a specific geographic area and a given period. To capture the variations in retail investor attention to a stock relative to its past mean (and possible time trend), we define abnormal search volume ($RETAIL\_ATTN_i$) as the difference between SVI with its past 1-year mean, divided by the mean. We skip the most recent month in the mean calculation to avoid potential spillover effects in attention due to recent events. We further require firms to have financial information, security information, and earnings announcement data. These data requirements result in a final sample of 2,875,169 daily observations for 2,252 stocks for the period of 2005 to 2014. $RETAIL\_ATTN_i$ is winsorized at 0.1% and 99.9% percentiles.

We capture daily abnormal institutional attention for a stock using daily readership data from Bloomberg (Ben-Rephael et al. (2017)).[6] The Bloomberg data, available since Feb. 2010, records the hourly user activities (including search and readership) for a given stock relative to user activities for the same stock during the previous 30 days. The daily maximum readership score, $INST\_ATTN_i$, equals 0, 1, 2, 3, or 4 if the maximum of the hourly Bloomberg terminal user activities for

[5]We manually screen all tickers to select those that do not have a generic meaning (e.g., "GPS" for GAP Inc., "M" for Macy's) to ensure that the search results we obtain are truly for the stock and not for other generic items or products of the firm. We focus on search activities for the US market on weekdays. The weekend observations are excluded as the markets are closed and investment-related searches are low. Other papers that employ Google search data include Ginsberg, Mohebbi, Patel, Brammer, Smolinski, and Brilliant (2009), Choi and Varian (2012), Drake, Roulstone, and Thornock (2012), and Andrei and Hasler (2015). See https://support.google.com/trends/answer/4365533?hl=en&ref_topic=6248052 for more details.

[6]As of 2017, Bloomberg had approximately 320,000 subscribers with terminal leases ranging between $20,000 and $25,000 per year (https://www.bloomberg.com/professional/collaboration/; http://qz.com/84961/this-is-how-much-a-bloom berg-terminal-costs/). Ben-Rephael et al. (2017) examine Bloomberg terminal users' profiles and show that around 80% of users work in financial industries, with the most common job titles being portfolio/fund/investment manager, analyst, trader, executive, director, president, or managing director.

the day is less than 80%, between 80% and 90%, between 90% and 94%, between 94% and 96%, or greater than 96% of the past sample distribution of the stock. After matching the Bloomberg data with the CRSP sample using the CUSIP variable and adopting the data requirements previously described, we obtain 2,672,631 daily observations for 3,963 stocks from 2010 to 2014.

To measure retail investor attention to the overall stock market, we first compute abnormal Google search volume for each of the major stock indices (using keywords, "DIJA," "Dow Jones," "Dow Today," "Dow," "S&P500," "S&P500 index," and "SP500") and then define the average value as RETAIL_ATTN_m. Similarly, the institutional attention to the overall market (INST_ATTN_m) is defined as the abnormal number of daily news reports on the Bloomberg terminal that mention "Dow Jones" or "S&P 500" (Boguth, Gregoire, and Martineau (2019)) relative to its past 1-year mean.

B. News and Other Variables

Following DellaVigna and Pollet (2009), we obtain the earnings announcement dates from either the IBES or the Merged CRSP-Compustat database, whichever is earlier. We define event day (denoted as day 0) as the earnings announcement day if the announcement is made during regular trading hours, or the next trading day for after-hours or holiday earnings announcements. We define the standardized unexpected earnings (SUE) as the realized basic earnings per share (excluding extraordinary items) minus the median analyst forecast, divided by stock price (Ball and Brown (1968), Kothari (2001)).[7] We match quarterly earnings announcements with daily RETAIL_ATTN_i or INST_ATTN_i measures by firm identifiers and the earnings announcement date. As a result, we obtain 31,697 and 31,292 SUE observations for which RETAIL_ATTN_i and INST_ATTN_i measures are available, respectively.

We follow Ben-Rephael et al. (2021) and obtain five important macroeconomic announcements from Bloomberg (available starting in 1997). They are gross domestic product (GDP), nonfarm payrolls (NFP), the producer price index (PPI), the Federal Open Market Committee rate decision (FOMC), and the Institute for Supply Management manufacturing index (ISM). For the period of 1997 to 2014, there are 803 days with important macro-news announcements. We identify macro news days with an indicator variable, MACRO_t, which equals 1 if at least one of the abovementioned macro announcements is made, and 0 otherwise.

Our study controls for an extensive list of variables following the prior literature (e.g., Da et al. (2011), Ben-Rephael et al. (2017)). Firm size (SIZE) is the product of price per share and the number of shares outstanding (in millions of dollars) at the end of each June. BM is the ratio of the book value to the market value of equity, where the book value of equity is the book value of stockholders' equity, plus deferred taxes and investment tax credit (if available), minus the book value of preferred stock for the fiscal year ending in the calendar year $t-1$. Abnormal share turnover (ATURN) is the daily share turnover minus the average daily share

[7]Following Livnat and Mendenhall (2006), we eliminate observations if the per-share price at the end of the fiscal quarter is less than $1 or if the market value of equity at the fiscal quarter end is less than $5 million.

turnover over the past year, skipping the most recent month. Illiquidity (ILLIQ) is the average daily Amihud illiquidity ratio over the past 1 year, skipping the most recent month. Idiosyncratic volatility (IVOL) is the standard deviation of daily abnormal returns relative to the Fama–French 3-factor model over the past year, skipping the most recent month. Institutional ownership (IO) is the fraction of total shares outstanding that are owned by institutional investors as of the end of the last quarter. The number of analysts following (ANALYST) is the number of forecasts used to calculate earnings surprises. Reporting lag (REPORT_LAG) is the number of days between the fiscal quarter-end and the corresponding earnings announcement date. We also control for the lagged daily DGTW-adjusted (Daniel, Grinblatt, Titman, and Wermers (1997)) individual stock returns (RET) and the lagged daily return of the CRSP value-weighted index (MRET) to account for the possibility that attention could be driven by returns (Yuan (2015)). In addition, we control for economic uncertainty measured by the CBOE Volatility Index (VIX) and its changes (ΔVIX), and abnormal market turnover ($ATURN_m$) defined as the daily value-weighted average of abnormal turnover of CRSP stocks. The additional variables are winsorized at the 1% and 99% percentiles.

C. Some Properties of Retail and Institutional Attention

Table 1 presents the descriptive statistics for the variables used in our analyses. It shows that $RETAIL\_ATTN_i$ has a mean (median) of 0.88% (−0.86%) and a standard deviation of 27.87%, and $INST\_ATTN_i$ has a mean (median) of 0.62

TABLE 1

Descriptive Statistics

Table 1 reports the descriptive statistics for the variables used in the study: daily abnormal retail investor attention to a stock ($RETAIL\_ATTN_i$), daily abnormal retail investor attention to the stock market ($RETAIL\_ATTN_m$), daily abnormal institutional investor attention to a stock ($INST\_ATTN_i$), daily abnormal institutional investor attention to the stock market ($INST\_ATTN_m$), standardized earnings surprises (SUE), stock's market capitalization (SIZE), book-to-market equity ratio (BM), DGTW-adjusted daily stock return (RET), abnormal share turnover (ATURN), Amihud illiquidity measure (ILLIQ), idiosyncratic volatility (IVOL), institutional ownership (IO), number of analysts covering a stock (ANALYST), reporting lag (REPORT_LAG), daily market return (MRET), the daily CBOE Volatility Index (VIX) and its changes (ΔVIX), and daily market abnormal turnover ($ATURN_m$). Variables are defined in Supplementary Material Appendix A. $RETAIL\_ATTN_i$ is winsorized at the 0.1% and 99.9% percentiles. All other variables, except for $INST\_ATTN_i$, are winsorized at the 1% and 99% percentiles.

Variable	Mean	P25	Median	P75	Std. Dev.
Attention Variables					
$RETAIL\_ATTN_i$ (%)	0.88	−12.60	−0.86	11.56	27.87
$RETAIL\_ATTN_m$ (%)	4.82	−31.30	−7.14	26.57	56.38
$INST\_ATTN_i$	0.62	0.00	0.00	1.00	1.21
$INST\_ATTN_m$	−0.09	−0.28	−0.11	0.07	0.29
Firm-Level Control Variables					
SUE (%)	−0.02	−0.05	0.04	0.21	1.10
SIZE (billion)	4.07	0.23	0.71	2.48	11.1
BM	0.59	0.27	0.47	0.77	0.48
RET (%)	−0.01	−1.04	−0.06	0.95	2.26
ATURN (%)	0.16	−0.19	−0.02	0.28	0.83
ILLIQ (%)	15.81	0.09	0.52	3.67	63.94
IVOL (%)	2.72	1.61	2.34	3.46	1.51
IO (%)	65.7	46.29	72.39	87.64	29.35
ANALYST	5.82	2.00	4.00	8.00	5.49
REPORT_LAG	35.14	26.00	33.00	40.00	13.74
Market-Level Control Variables					
MRET (%)	0.06	−0.42	0.10	0.58	1.04
VIX	20.01	13.31	17.00	23.21	9.97
ΔVIX	0.00	−0.68	−0.09	0.54	1.85
$ATURN_m$ (%)	−0.05	−0.23	−0.06	0.10	0.35

(0.00) and a standard deviation of 1.21. These results suggest that retail and institutional abnormal attention measures have substantial variations.

We first describe the time-series properties of the attention proxies. For example, DellaVigna and Pollet (2009) and Hong and Yu (2009) document low trading activities during summer months and more price underreactions to earnings announcements made on Fridays; they attribute the results to the lack of investor attention during those periods. Hence we directly examine their hypotheses with the attention proxies.

We compare the average RETAIL_ATTN$_i$ and INST_ATTN$_i$ for each weekday and find that abnormal retail attention on Fridays is (in %) −1.18, significantly lower than the levels for the other 4 weekdays (1.30, 1.91, 1.44, and 0.92). Similarly, the average INST_ATTN$_i$ on Fridays is 0.48, significantly lower than the level over the other 4 weekdays (0.69, 0.69, 0.65, and 0.62). To further control for the fact that there are fewer earnings announcements on Fridays,[8] we examine investor attention at the earnings-announcement level. Graph A of Figure 1 shows that Friday announcements receive significantly less retail attention relative to other weekdays: the average RETAIL_ATTN$_i$ is 2.45% for Friday announcements and 5.6% for non-Friday ones. For institutional investors, the average INST_ATTN$_i$ for Friday announcements is 0.20 lower than that on other weekdays. Both differences are statistically significant with date clustering. These results therefore provide direct support to DellaVigna and Pollet (2009). The figure also shows that Monday announcements, while attracting a significant amount of attention from retail investors, attract the least attention from institutional investors.[9]

Next, we examine the monthly seasonality in investor attention. Graph B of Figure 1 shows that retail attention to earnings news is significantly lower in July and August than in other months: the average RETAIL_ATTN$_i$ (in %) for July and August is 3.79, a level that is 35% lower relative to the average RETAIL_ATTN$_i$ of 5.83 for other months. For institutional attention, the mean INST_ATTN$_i$ is significantly lower in August and December – it is 2.36 in August and 2.26 in December, which is 14.8% and 18.4% lower relative to the average INST_ATTN$_i$ of 2.77 for the other months. These month-of-the-year patterns in retail and institutional investor attention provide direct support for the "gone fishin'" hypothesis of Hong and Yu (2009). We further document that similar low-attention patterns also exist for December, which marks one of the longest holiday periods.[10]

IV. News and Investor Attention

In this section, we formally investigate investors' attention responses to news. We compare retail and institutional investors' attention responses to macro news and firm-level news when the new is released in insolation or simultaneously.

[8]The total number of quarterly earnings announcements in our sample (with valid RETAIL_ATTN$_i$ measures) is 5,561, 9,497, 10,619, and 13,828 for Mondays to Thursdays and drops to 3,310 for Fridays.

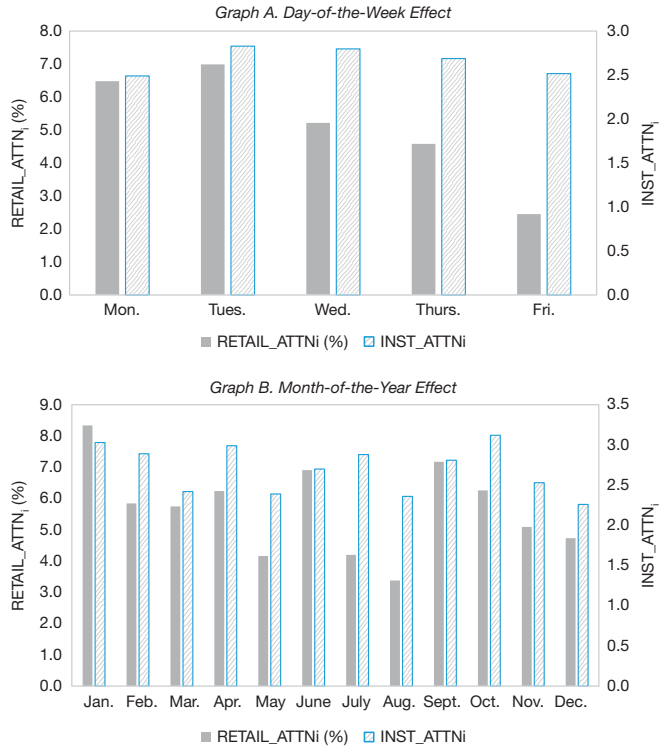
[9]This might be because institutional investors often hold important meetings on Mondays, which takes time away from paying attention to individual firms' announcements.

[10]In addition to the difference-in-mean test, we perform a rank-sum test for the medians (Mann and Whitney (1947)). The results are qualitatively similar and are available upon request.

FIGURE 1

Investor Attention: Seasonal Patterns

Figure 1 presents seasonal patterns for the daily average of retail investor attention and institutional attention for earnings announcements. Graph A plots attention measures for each day of the week and Graph B plots the attention measures for each month of the year. For earnings announcements that are issued after hours or during holidays, we measure attention on the next trading day.



A. Attention to Firm-Level News

We first examine retail and institutional investors' attention patterns around firms' earnings announcements. We estimate the following regressions for all firm-day observations:

$$\text{ATTENTION}_{i,t} = \alpha_0 + \alpha_1 \times \text{EADAY}_{i,t} + \gamma \times Z_{i,t-1} + \varepsilon_{i,t}. \quad (1)$$

The dependent variable ATTENTION is the log abnormal retail attention (LN_RETAIL_ATTN$_i$) or institutional attention (INST_ATTN$_i$) to the firm. For each stock i and for a given trading day t, we consider three definitions of the earning-day indicator (EADAY$_t$): i) equals 1 if day t is the day proceeding an announcement, and 0 otherwise (which we label as -1); ii) equals 1 if day t is the announcement day, and 0 otherwise (labeled 0); and iii) equals 1 if day t is within the $[-1,0]$ window of an announcement, and 0 otherwise (labeled $[-1,0]$). The first two definitions correspond to attention on the day prior to and the day of the

TABLE 2

Investor Attention to Individual Stocks

Table 2 presents panel regression analyses of investor attention to individual stocks. Columns 1–3 examine retail attention and columns 4–6 examine institutional investor attention. The dependent variable is the log abnormal retail ($LN\_RETAIL\_ATTN_i$) or institutional attention ($INST\_ATTN_i$) to a firm. Columns 1–3 correspond to three definitions of the earnings announcement indicator, EADAY, which equals 1 for the day prior to ("−1") or on the day of ("0") an announcement, or within the [−1,0] window of an announcement, and 0 otherwise. Columns 4–6 are similarly arranged. The following lagged control variables measured as of $t-1$: firm size (LN_SIZE), book-to-market equity ratio (BM), DGTW-adjusted daily stock return (RET), abnormal turnover (ATURN), idiosyncratic volatility (IVOL), CRSP value-weighted market return (MRET), institutional ownership (IO), number of analysts covering a stock (ANALYST), and the day-of-the-week and month-of-the-year fixed effects. The *t*-statistics (in parentheses) are calculated from the standard errors clustered by date. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

	$LN\_RETAIL\_ATTN_i$			$INST\_ATTN_i$		
	1	2	3	4	5	6
	[−1]	[0]	[−1,0]	[−1]	[0]	[−1,0]
$EADAY_{i,t}$	0.042***	0.050***	0.048***	1.310***	2.252***	1.786***
	(7.98)	(8.92)	(9.09)	(44.13)	(74.06)	(72.36)
$ln(SIZE)_{i,t-1}$	0.004	0.004	0.004	0.233***	0.235***	0.232***
	(1.13)	(1.07)	(1.09)	(38.04)	(38.15)	(38.51)
$BM_{i,t-1}$	0.001	0.000	0.001	0.062***	0.067***	0.063***
	(0.06)	(0.06)	(0.06)	(6.33)	(6.75)	(6.49)
$RET_{i,t-1}$	0.021	0.022	0.007	0.527***	0.551***	0.361***
	(0.78)	(0.82)	(0.27)	(7.21)	(7.49)	(6.18)
$ATURN_{i,t-1}$	3.534***	3.486***	3.287***	12.458***	11.652***	7.582***
	(9.33)	(9.22)	(9.14)	(33.27)	(32.29)	(23.46)
$IVOL_{i,t-1}$	−0.983**	−0.991**	−1.007***	16.984***	16.767***	16.555***
	(−2.53)	(−2.55)	(−2.59)	(29.67)	(29.39)	(29.70)
$MRET_{t-1}$	−0.221	−0.180	−0.145	0.081	0.329	−0.147
	(−1.37)	(−1.08)	(−0.98)	(0.13)	(0.54)	(−0.26)
$IO_{i,t-1}$	0.014	0.016	0.015	−0.048*	−0.065***	−0.059**
	(0.86)	(0.94)	(0.89)	(−1.94)	(−2.65)	(−2.40)
$ANALYST_{i,t-1}$	−0.002**	−0.002**	−0.002**	0.017***	0.017***	0.017***
	(−2.46)	(−2.48)	(−2.47)	(16.81)	(16.83)	(16.82)
Fixed effects	Day-of-Week, Month-of-Year					
Adj. R^2	0.005	0.006	0.006	0.127	0.168	0.194
N	2,285,629	2,284,290	2,285,629	2,074,210	2,072,641	2,074,210

earnings announcement, whereas the third definition corresponds to the 2-day average attention.

We include the following lagged control variables, measured as of $t-1$ (Da et al. (2011), Ben-Rephael et al. (2017)): the logarithm of market capitalization (LN_SIZE), book-to-market equity ratio (BM), DGTW-adjusted daily stock return (RET), abnormal turnover (ATURN), idiosyncratic volatility (IVOL), CRSP value-weighted market return (MRET), institutional ownership (IO), and the number of analysts covering a stock (ANALYST). In addition, we account for seasonal patterns in attention with day-of-the-week and month-of-the-year fixed effects. We estimate equation (1) with panel regression analysis and cluster standard errors by date.

Table 2 presents the results, with retail and institutional attention as the dependent variables in columns 1–3 and columns 4–6, respectively. Columns 1–3 correspond to the three definitions of EADAY. We find that the coefficients of EADAY are all positive and highly significant for retail attention, with values of 0.042 and 0.050 for the day prior to and the day of the announcement, and 0.048 for the 2-day average. Economically, these coefficients imply that the earnings news

increases the levels of abnormal retail attention to 5.14% and 5.99% for the upcoming and contemporaneous announcements, respectively.[11] The average 2-day attention goes up to 5.78%, which is a whooping increase of 604% relative to the unconditional mean of 0.82%.

For institutional attention, columns 4–6 show that the coefficients on EADAY are highly significant, at 1.310 and 2.252 for the day prior to and the day of the announcement. The 2-day average attention increase around an earnings announcement is 1.786, or equivalent to an increase of 302% relative to its mean of 0.59 for no-earnings days.

In terms of the other determinants of investor attention, columns 1–3 show that retail investors pay more attention to stocks following their high abnormal share turnover. For institutional attention, columns 4–6 show that institutional investors generally pay more attention to larger firms, firms with higher book-to-market equity ratios, and more analyst coverage. In addition, they direct more attention to stocks that have experienced higher daily returns, higher turnover, and higher idiosyncratic volatility.

Overall, the results show that both retail and institutional investors are substantially more attentive to individual stocks around the stocks' earnings announcements, consistent with Hypothesis 1. The finding that investor attention responds to news is in line with Ben-Rephael et al. (2017), who also note that the daily regression R^2 for retail attention is substantially smaller compared to the regression R^2 for institutional attention. This suggests that, while macroeconomic conditions and stock characteristics explain a sizable portion of institutional attention variations, retail attention is noisier and contains more random variations.

B. Attention to Macroeconomic News

We next analyze investor attention to the overall stock market by examining retail and institutional investors' attention patterns around macro-news announcements by estimating the following daily time-series regression:

$$\text{(2)} \quad \text{ATTENTION}_{m,t} = \alpha_0 + \alpha_1 \times \text{MACRO}_t + \alpha_2 \times I_t^{\text{HIGH\_EA}} + \gamma \times Z_{t-1} + \varepsilon_{m,t}.$$

The dependent variable ATTENTION_m is the log abnormal retail attention (LN_RETAIL_ATTN_m) or the log institutional attention (LN_INST_ATTN_m) to the overall stock market.[12] MACRO_t is the macro news indicator. Similar to equation (1), we consider three definitions of MACRO: equals 1 for the day prior to or the day of a macro announcement, or within the [−1,0] window of an announcement, and 0 otherwise. To account for the number of firm-specific news releases that may compete with investors' attention to the market, we identify

[11] The numbers are calculated as follows based on the mean RETAIL_ATTN of 0.82% (for no-earnings days). For day −1 attention, the level is $(1 + 0.82\%) \times e^{0.042} - 1 = 5.14\%$. For day 0 attention, the corresponding number is $(1 + 0.82\%) \times e^{0.050} - 1 = 5.99\%$. For the 2-day average attention, the corresponding number is $(1 + 0.82\%) \times e^{0.048} - 1 = 5.78\%$.

[12] We examine investor attention on the day before the macro-news announcement to test whether investors time their attention allocation decisions to scheduled events (see, e.g., Ben-Rephael et al. (2021)).

HIGH_EA days as days for which the number of earnings announcements falls in the top quintile of its distribution. We then similarly define I^{High_EA} in three ways, as one for the day prior to, the day of, or within the [−1, 0] window of the High_EA day, respectively, and 0 otherwise. The following control variables are measured as of $t - 1$: the value-weighted market return (MRET), VIX and its daily changes (ΔVIX), abnormal market turnover ($ATURN_m$), and day-of-the week and month-of-the-year fixed effects. We compute *t*-statistics with Newey-West standard errors with 10 lags.

Columns 1–3 in Table 3 present results for retail attention, corresponding to the three definitions of MACRO and I^{HIGH_EA}, respectively. The results show that the coefficient on MACRO is positive and significant on the day of macro announcements, suggesting that retail investors significantly increase their market-related search activities on the macro-news release day. The economic magnitude is also large: a coefficient of 0.039 in column 2 suggests that the presence of macro news results in a $RETAIL\_ATTN_m$ level of 5.9%, which is 212% higher than its mean of 1.89% for no-macro news days.[13]

On the other hand, the coefficients on I^{HIGH_EA} are generally insignificant, suggesting that the amount of firm-specific news does not significantly distract retail investors' attention away from the overall stock market, consistent with the theoretical prediction that these investors prioritize the processing of macro news over firm-specific news. In addition, retail attention to the overall stock market tends to be high following days with large increases in aggregate turnover ($ATURN_m$) and economic uncertainty (ΔVIX).

Columns 4–6 in Table 3 present the corresponding results of institutional attention to the overall stock market. We find that institutional investors substantially increase their attention to the overall stock market on the day of the announcement: when compared to the unconditional mean, the presence of macro news is associated with an increase in the $INST\_ATTN_m$ level by 7.6%.[14] Regarding other independent variables, similar to retail attention, institutional attention is high following high market turnover. In addition, I^{HIGH_EA} is positive and marginally significant for day 0, indicating that, distinctly different from the inattentive retail investors, institutional investors increase their attention to the overall stock market on days when a large number of firms announce earnings.

Taken together, the results show that the arrival of firms' earnings announcements and macro news trigger substantial attention to the announcing firms and to the overall market, respectively, from both retail and institutional investors, consistent with Hypothesis 1. Furthermore, a large number of earnings announcements from firms does not distract retail investor attention from the overall market, and a large number of such announcements actually increases institutional investors' attention to the overall market.

[13]The mean of $RETAIL\_ATTN_m$ on no-macro days is 1.89%; the presence of macro news increases $RETAIL\_ATTN_m$ to 5.9% (=$(1 + 1.89\%) \times e^{0.039} - 1$).

[14]The unconditional mean of $INST\_ATTN_m$ on no-macro days is −10.3% due to the decreasing trend in the number of index-related news reports in the Bloomberg database. Therefore the increases are obtained as $((1 - 10.3\%) \times e^{0.081} - 1) - (-10.3\%)$.

TABLE 3

Investor Attention to the Overall Stock Market

Table 3 presents daily time-series regression analyses of investor attention to the overall stock market. Columns 1–3 examine retail attention and columns 4–6 examine institutional investor attention. The dependent variable is the log abnormal retail attention ($LN\_RETAIL\_ATTN_m$) or the log institutional attention ($LN\_INST\_ATTN_m$) to the market. Columns 1–3 correspond to three definitions of the macro announcement indicator, MACRO, which equals 1 for the day prior to ("−1") or on the day of an announcement ("0"), or within the [−1,0] window of an announcement, and 0 otherwise. Columns 4–6 are similarly arranged. We identify HIGH_EA days as days for which the number of earnings announcements falls in the top quintile of its distribution. We then define I^{HIGH_EA} as one for the day prior to, on the day of, of within the [−1,0] window of the HIGH_EA day, respectively, and 0 otherwise. The following lagged control variables measured as of $t-1$ are: the CRSP value-weighted return (MRET), the implied volatility of the S&P 500 index options and their daily changes (VIX and ΔVIX), the market abnormal turnover (ATURN), and day-of-week and month-of-year fixed effects. The *t*-statistics (in parentheses) are calculated using Newey-West standard errors with 10 lags. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

	$LN\_RETAIL\_ATTN_m$			$LN\_INST\_ATTN_m$		
	1	2	3	4	5	6
	[−1]	[0]	[−1,0]	[−1]	[0]	[−1,0]
$MACRO_t$	−0.013	0.039*	0.017	−0.028	0.081***	0.032*
	(−0.60)	(1.78)	(0.99)	(−1.55)	(3.49)	(1.84)
$I^{HIGH\_EA}_t$	0.010	0.023	0.040	0.023	0.055*	0.044
	(0.32)	(0.74)	(1.34)	(0.78)	(1.70)	(1.48)
$MRET_{t-1}$	0.007	0.009	0.001	0.020	0.023	0.013
	(0.63)	(0.73)	(0.05)	(1.40)	(1.08)	(0.86)
VIX_{t-1}	0.002	0.001	0.002	0.002	−0.000	0.002
	(1.44)	(0.71)	(1.12)	(0.76)	(−0.11)	(0.69)
ΔVIX_{t-1}	0.017*	0.019**	0.015*	0.006	0.008	0.008
	(1.86)	(2.04)	(1.79)	(0.67)	(0.58)	(0.88)
$ATURN_{m,\,t-1}$	0.428***	0.488***	0.401***	0.336***	0.514***	0.339***
	(8.34)	(9.48)	(7.97)	(5.05)	(7.84)	(4.97)
Fixed effects	Day-of-Week, Month-of-Year					
Adj. R^2	0.098	0.112	0.143	0.134	0.164	0.143
N	2607	2608	2607	1261	1262	1261

C. The Joint Arrival of Macro News and Firms' Earnings News

In this subsection, we investigate a key implication of the aforementioned rational attention models – how investors allocate their attention when faced with multiple sources of information shocks. As discussed in Hypothesis 2 in Section II, attention-constrained investors follow a pecking order in processing stock-related information – macro-level information first followed by firm-specific information – whereas unconstrained investors' attention to a stock can increase in the presence of macro news.

We empirically test the hypothesis by examining retail and institutional investors' attention allocation decisions when macroeconomic shocks coincide with firm-specific information shocks. We first present the baseline results, and then we investigate heterogeneities associated with macroeconomic uncertainty.

1. Baseline Results

We estimate the following equation, focusing on stock-day observations around earnings announcements:

$$\text{ATTENTION}_{i,t} = \alpha_0 + \alpha_1 \times \text{MACRO}_t + \gamma \times Z_{i,t-1} + \varepsilon_{i,t}. \tag{3}$$

Similar to equations (1) and (2), the dependent variable is retail ($LN\_RETAIL\_ATTN_i$) or institutional attention ($INST\_ATTN_i$) to stock *i* on days [−1, 0] around an announcement. $MACRO_t$ equals 1 if the earnings announcement

TABLE 4

Investor Attention to Earnings Announcements: The Role of Macro News

Table 4 presents panel regression analyses of investor attention to individual stocks around its earnings announcements. Columns 1–3 examine retail attention ($LN\_RETAIL\_ATTN_i$) on the day before ("−1"), the day of ("0") an announcement, and the 2-day average ([−1,0]), respectively. Columns 4–6 examine institutional investor attention ($INST\_ATTN_i$) on days −1, 0, and [−1,0] of an announcement, respectively. $MACRO_t$ equals 1 if the earnings announcement coincides with macro announcements, and 0 otherwise. The following control variables are measured as of $t-1$: firm size (LN_SIZE), book-to-market (BM), DGTW-adjusted daily stock return (RET), abnormal turnover (ATURN), idiosyncratic volatility (IVOL), institutional ownership (IO), number of analysts covering a stock (ANALYST), reporting lag (REPORT_LAG), absolute value of standardized earnings surprises (|SUE|), CRSP value-weighted market return (MRET), and the day-of-the-week and month-of-the-year fixed effects. The *t*-statistics (in parentheses) are calculated from the standard errors clustered by date. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

	$LN\_RETAIL\_ATTN_i$			$INST\_ATTN_i$		
	1	2	3	4	5	6
	[−1]	[0]	[−1,0]	[−1]	[0]	[−1,0]
$MACRO_t$	−0.021*	−0.026**	−0.023**	0.420***	−0.145***	0.133***
	(−1.88)	(−2.18)	(−2.11)	(4.11)	(−2.67)	(2.68)
$ln(SIZE)_{i,t-1}$	0.021***	0.032***	0.027***	0.239***	0.375***	0.305***
	(4.25)	(6.27)	(5.53)	(12.60)	(22.06)	(20.79)
$BM_{i,t-1}$	−0.007	−0.009	−0.008	−0.199***	−0.045	−0.123***
	(−0.73)	(−1.01)	(−0.89)	(−4.57)	(−1.35)	(−4.00)
$RET_{i,t-11}$	−0.194	0.291	−0.130	1.050	0.001	0.387
	(−0.77)	(1.26)	(−0.54)	(1.64)	0.00	(0.81)
$ATURN_{i,t-11}$	1.618**	0.418	1.105	8.582***	9.549***	4.824***
	(2.22)	(0.56)	(1.54)	(4.70)	(6.07)	(3.57)
$IVOL_{i,t-1}$	0.438	1.103*	0.789	28.795***	19.091***	23.734***
	(0.72)	(1.84)	(1.39)	(12.30)	(9.83)	(13.24)
$IO_{i,t-1}$	−0.005	−0.039	−0.022	0.742***	1.082***	0.915***
	(−0.19)	(−1.49)	(−0.86)	(7.50)	(13.30)	(12.87)
$ANALYST_{i,t-1}$	0.002	0.003***	0.002**	0.033***	0.007**	0.021***
	(1.48)	(2.58)	(2.07)	(8.83)	(2.34)	(7.00)
$REPORT\_LAG_{i,t}$	−0.000	0.00	−0.000	−0.002	0.006***	0.002
	(−0.58)	(−0.22)	(−0.44)	(−0.90)	(2.64)	(0.88)
$\|SUE\|_{i,t}$	0.290	−0.488	−0.072	−2.768	5.407**	1.211
	(0.36)	(−0.53)	(−0.09)	(−0.99)	(2.34)	(0.58)
$MRET_{t-1}$	0.234	−0.610*	0.113	−0.929	2.109	0.954
	(0.79)	(−1.82)	(0.41)	(−0.21)	(0.86)	(0.43)
Fixed effects	Day-of-Week, Month-of-Year					
Adj. R^2	0.005	0.012	0.009	0.133	0.178	0.197
N	29,836	29,914	29,836	27,825	27,879	27,825

coincides with macro announcements, and 0 otherwise. Z_i consists of the list of 1-day lagged control variables used in equation (2). In addition, we control for the reporting lag ($REPORT\_LAG_i$) and the absolute value of standardized unexpected earnings ($|SUE|_i$).[15]

We summarize the panel regression results in Table 4. Columns 1–3 present the results for retail attention for the day prior to (day −1), the day of the announcement (day 0), and the 2-day average attention ([−1,0]). The results show that the coefficients on MACRO range from −0.021 to −0.026 and are statistically significant. Column 3 shows a coefficient of MACRO of −0.023 that is

[15]Our results are robust to alternative definitions of attention variables. Specifically, following deHaan, Lawrence, and Litjens (2019), retail attention is measured only for stocks whose tickers have three or more letters to reduce measurement errors. Following Ben-Rephael et al. (2017), we measure abnormal institutional attention (AIA_i) as a dummy variable, equal to 1 if $INST\_ATTN_i$ equals 3 or 4, and 0 otherwise. The results are presented in Supplementary Material Appendix B.

significantly negative. Economically, the coefficient of MACRO in column 3 shows macro news is associated with a substantial 49% decline in retail attention compared to its unconditional mean,[16] suggesting that macro news has a substantial crowding-out effect on retail attention to firm-level news. Together with the finding that clustered earnings announcements do not crowd out retail attention to the overall market (Table 3), our results are consistent with Hypothesis 2 that retail investors prioritize their information processing of macro news over firm-specific news.

The coefficient estimates on the control variables in columns 1–3 in Table 4 shed light on the other determinants of retail attention to earnings news. The coefficients on firm size (LN_SIZE) and analyst coverage (ANALYST) are positive and significant, implying that earnings announcements of larger firms and firms with a greater analyst following attract a greater attention increase than the announcements of smaller and less-covered firms. Similarly, announcements from stocks with higher idiosyncratic volatility (IVOL) also experience greater increases in attention, consistent with Hypothesis 1 that investors allocate more attention to stocks for which the marginal value of information processing is greater.

Columns 4–6 in Table 4 present results for institutional attention. The coefficient on MACRO is significantly positive on day -1, at 0.420, but becomes -0.145 on date *t*. Our results suggest that, in anticipation of the joint arrival of macro news and earnings announcements, institutional investors allocate significantly more attention to the announcing firm prior to the information arrival, and such allocation leaves less remaining uncertainty to be processed on the announcement day. The increased attention on day -1 dominates the reduction of attention on day 0, resulting in a positive and significant average net effect over days $[-1, 0]$, as shown in column 6. Economically, column 6 shows that macro news increases institutional attention to firms' earning announcements by 0.133, relative to its average level of 2.31 without concurrent macro news.

As for the other determinants, columns 4–6 in Table 4 show that institutional investors pay more attention to announcements from larger firms (LN_SIZE), growth firms (BM), firms that have greater recent increases in trading volume (ATURN), firms with greater idiosyncratic volatility (IVOL) or higher institutional ownership (IO), those with more analyst coverage (ANALYST), firms with more delayed announcements (REPORT_LAG), and when the absolute value of the earnings surprise (|SUE|) is higher. The results suggest that institutional attention is more responsive to a larger number of stimuli compared to retail attention.

2. After-Hours Earnings Announcements

The attention allocation patterns that we document so far are consistent with the implications of rational inattention models. However, an alternative explanation is that the attention patterns are merely responses to returns or other trading-related

[16]Without concurrent macro news, the average daily retail attention over the $[-1, 0]$ window is 4.86%. With macro news, the 2-day average retail attention is 2.48% ($=(1 + 4.86\%)\times e^{-0.023} - 1$), a 49% decline relative to the level without macro news.

variables. To address this reverse causality concern, we follow Ben-Rephael et al. (2017) and employ a subsample of after-hours earnings announcements. Past studies show that after market-close price discovery is limited and a majority of price discoveries occur on the next day.[17] Hence, the attention patterns we observe on days −1 and 0 are less likely to be caused by the announcement returns.

We reestimate equation (3) for this subsample and present results in Supplementary Material Appendix C. Columns 1–3 correspond to retail investor attention on day −1, day 0, and over days [−1, 0] of the announcement, respectively.[18] The coefficients on MACRO range from −0.034 to −0.037 and are statistically significant, consistent with the results from the full sample. We therefore conclude that macro news' crowding-out effect on retail attention to firm news is unlikely to be driven by reverse causality.

Turning to institutional investor attention, columns 4–6 show that macro news does not significantly affect institutional attention to the after-hours earnings announcement for day −1, but causes a significant reduction in institutional attention for day 0. The average effect across the 2-day window is insignificant.

3. Market-Wide Uncertainty

Next, we investigate the effect of market-wide uncertainty on investors' attention allocation across earnings news and macro news. As stated in Hypothesis 2, it is optimal for attention-constrained investors to pay more attention to systematic news and less to firm-specific news, especially during periods of greater market-wide uncertainty. We measure market-wide uncertainty with the implied volatility of the S&P 500 index options, VIX,[19] and define a high (low) VIX period as days on which the closing VIX value is greater (lower) than the sample median. We focus on the 2-day average attention around the earnings announcements and estimate equation (3) separately for high and low VIX periods. Table 5 presents the results, with columns 1 and 2 corresponding to retail attention and columns 3 and 4 corresponding to institutional attention.

Column 1 of Table 5 shows that during high VIX periods, the coefficient on MACRO is −0.030, which is more negative than the corresponding coefficient of −0.023 in Table 4. This suggests that during periods of high market-wide uncertainty, the crowding-out effect of macro news on firm-specific attention is even more pronounced. In terms of economic magnitude, the presence of macro news reduces the average earnings-related RETAIL_ATTN_i by 64% relative to its mean value during high VIX periods.[20] In contrast, column 2 shows that the coefficient on MACRO is insignificant, suggesting that macro news' impacts are

[17]Past studies (see, e.g., Berkman and Truong (2009), Aboody, Lehavy, and Trueman (2010)) show that for after-hours earnings announcements, new earnings information is not reflected in the price until the following trading day. Similarly, Jiang, Likitapiwat, and McInish (2012) find that the majority of price discovery for the S&P 500 stocks occurs on the next day.

[18]As mentioned earlier, for after-hour announcements, we define day 0 as the day after the announcement. Hence attention on days −1 and 0 of the after-hours announcements corresponds to attention on the day of and the day after the announcement, respectively.

[19]See, for example, Bloom (2009), (2014), Drechsler (2013), and Basu and Bundick (2017).

[20]The 2-day average retail attention is reduced to 1.76% (=$(1 + 4.86\%) \times e^{-0.030} - 1$) relative to the unconditional mean of 4.86%.

TABLE 5

Investor Attention to Earnings Announcements, by Market Uncertainty

Table 5 presents panel regression analyses of investor attention to individual stocks around its earnings announcements, by market uncertainty as measured by the CBOE Volatility Index (VIX). The high (low) VIX period corresponds to days on which VIX is higher than (lower than) its median value for the sample period. Columns 1–2 examine average retail attention ($LN\_RETAIL\_ATTN_i$) over the 2-day period ([−1,0]) of an announcement and columns 3–4 examine the corresponding measure for institutional investor attention ($INST\_ATTN_i$). $MACRO_t$ equals 1 if the earnings announcement coincides with macro announcements, and 0 otherwise. The following control variables are measured as of $t-1$: firm size (LN_SIZE), book-to-market (BM), DGTW-adjusted daily stock return (RET), abnormal turnover (ATURN), idiosyncratic volatility (IVOL), institutional ownership (IO), number of analysts covering a stock (ANALYST), reporting lag (REPORT_LAG), absolute value of standardized earnings surprises (|SUE|), CRSP value-weighted market return (MRET), and the day-of-the-week and month-of-the-year fixed effects. The *t*-statistics (in parentheses) are calculated from the standard errors clustered by date. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

	$LN\_RETAIL\_ATTN_{i,t}$		$INST\_ATTN_{i,t}$	
	High VIX	Low VIX	High VIX	Low VIX
	1	2	3	4
$MACRO_t$	−0.030*	−0.016	0.153**	0.120*
	(−1.82)	(−1.23)	(2.24)	(1.74)
$ln(SIZE)_{i,t-1}$	0.021***	0.037***	0.325***	0.260***
	(3.64)	(5.81)	(16.49)	(17.13)
$BM_{i,t-1}$	−0.002	−0.013	−0.122***	−0.098**
	(−0.18)	(−1.05)	(−3.62)	(−2.55)
$RET_{i,t-1}$	−0.199	0.007	−0.496	1.817***
	(−0.74)	(0.01)	(−0.77)	(2.78)
$ATURN_{i,t-1}$	1.606**	0.601	5.472***	3.230**
	(2.21)	(0.42)	(2.81)	(1.98)
$IVOL_{i,t-1}$	0.368	2.379**	23.817***	23.695***
	(0.57)	(2.26)	(9.95)	(11.65)
$IO_{i,t-1}$	−0.004	−0.039	1.009***	0.824***
	(−0.11)	(−1.59)	(11.95)	(9.64)
$ANALYST_{i,t-1}$	0.002	0.002	0.021***	0.021***
	(1.64)	(1.48)	(5.30)	(7.58)
$REPORT\_LAG_{i,t}$	0.000	−0.001	0.004*	−0.002
	(0.23)	(−1.02)	(1.66)	(−1.01)
$\|SUE\|_{i,t}$	−0.385	0.761	1.555	2.758
	(−0.41)	(0.51)	(0.57)	(1.10)
$MRET_{t-1}$	−0.002	0.500	−1.187	−5.379
	(−0.01)	(0.57)	(−0.47)	(−1.23)
Fixed effects	Day-of-Week, Month-of-Year			
Adj. R^2	0.007	0.013	0.211	0.176
N	15,533	14,222	13,662	14,053

insignificant during low VIX periods. The results are consistent with Hypothesis 2 that capacity-constrained investors are more likely to shift their attention from firm news to macro news during periods of high market-wide uncertainty because the marginal value of information processing is greater for macro news during such times.

For institutional attention, columns 3 and 4 show that the presence of macro news increases institutional attention to individual firms' earnings announcements across both high and low VIX periods, consistent with the attention-enhancement effect documented in the full sample.

Together, results in Tables 4 and 5 are consistent with the rational attention models' implications that retail attention follows a pecking order (i.e., macro news crowds out attention to firms' earnings announcements), especially during periods of greater macroeconomic uncertainty, while institutional attention to earnings news increases in the presence of macro news.

V. Market Reactions to Earnings Announcements

A very important asset price anomaly is that prices underreact to earnings announcements in the short term, followed by post-announcement price drifts (e.g., Ball and Brown (1968), Livnat and Mendenhall (2006)). In this section, we explore how retail and institutional investor attention contributes to this anomaly. By building in Section IV results that the arrival of macro news affects investor attention to earnings news, we investigate the impacts of macro news on earnings announcement returns and post-announcement drifts, both for the full sample and for subperiods with differential macroeconomic uncertainty.[21]

A. Baseline Regression Analysis

Given that macro news is associated with distinctly different patterns in retail and institutional attention to earnings news, we expect that the degree to which asset prices incorporate earnings surprises depends on the relative importance of these two types of investors. We estimate the following panel regression:

$$\begin{aligned}(4)\ \mathrm{CAR}_{i,t} = {} & \alpha_0 + \alpha_1 \times \mathrm{SUE\_TOP}_{i,t} \times \mathrm{MACRO}_t \times \mathrm{RETL}_{i,t-1} + \alpha_2 \times \mathrm{SUE\_TOP}_{i,t} \\ & + \alpha_3 \times \mathrm{SUE\_TOP}_{i,t} \times \mathrm{RETL}_{i,t-1} + \alpha_4 \times \mathrm{SUE\_TOP}_{i,t} \times \mathrm{MACRO}_t \\ & + \alpha_5 \times \mathrm{RETL}_{i,t-1} + \alpha_6 \times \mathrm{MACRO}_t + \alpha_7 \times \mathrm{MACRO}_t \times \mathrm{RETL}_{i,t-1} \\ & + \gamma \times Z_{i,t-1} + \varepsilon_{i,t}.\end{aligned}$$

CAR is the DGTW-adjusted abnormal return for different windows associated with earnings announcements. For each quarter, we sort stocks into deciles based on ascending order of SUE. We define $\mathrm{SUE\_TOP}_{i,t}$ as 1 if stock i's SUE is in the top decile and 0 if it is in the bottom decile (DellaVigna and Pollet (2009)). MACRO_t equals 1 for earnings announcements that coincide with macro news, and 0 otherwise. $\mathrm{RETL}_{i,t-1}$ equals 1 if a firm's institutional ownership is in the bottom quartile based on quarterly sorts with NYSE breakpoints, and 0 otherwise. We further control for a set of lagged variables (Ben-Rephael et al. (2017)): firm size (LN_SIZE), book-to-market equity ratio (BM), abnormal turnover (ATURN), Amihud illiquidity (ILLIQ), idiosyncratic volatility (IVOL), and the number of analysts following (ANALYST).

We summarize the results in Table 6, where Panel A focuses on the top and bottom SUE groups and Panel B provides robustness checks using all SUE deciles in the regression. Column 1 corresponds to the day 0 DGTW risk-adjusted return, columns 2–6 correspond to day 1 to day 60 risk-adjusted cumulative returns, and column 7 presents the day 2 to day 60 adjusted cumulative return.

[21] In Section IV, by examining the sample of after-hours earnings announcements, we address the reverse causality concern that some unobservable features of the earnings announcements may influence announcement returns, which then affect investor attention on the announcement day. As pointed out by Ben-Rephael et al. (2017), while reverse causality may explain the positive association between attention and announcement returns, it does not explain the lead–lag relation between attention and post-announcement drift. Therefore, comparing the results of the return response to earnings news on days with and without macro announcements can further alleviate the reverse causality concern.

For Panel A of Table 6, the variables of interest are the interaction variables. SUE_TOP ·MACRO·RETL captures the effect of macro news on the SUE-return relation for stocks with high retail ownership, whereas SUE_TOP ·MACRO captures the effect for stocks with medium to low retail ownership. In addition, SUE_TOP·RETL reflects the incremental price responsiveness of stocks with high retail ownership relative to those with medium to low retail ownership.

The coefficient on SUE_TOP in column 1 establishes the baseline effect of immediate return reactions on earnings surprises: a value of 6.196 indicating that stocks in the top SUE decile outperform those in the bottom SUE decile by a return

TABLE 6

Macro News and Earnings Announcement Returns

Table 6 presents panel regression analyses of return responses for quarterly earnings announcements. In Panel A, the observations include earnings announcements whose SUE fall into the top or bottom decile. In Panel B, the observations include all earnings announcements in the sample period. CAR[0] and CAR [i,j] are the percentage DGTW (Daniel et al. (1997)) abnormal returns on the announcement day (day 0), and cumulative abnormal return from the ith to the jth trading day after the announcements. $SUE\_DECILE_{i,t}$ is the earnings surprise decile, with 1 being the most negative and 10 being the most positive. $SUE\_TOP_{i,t}$ equals 1 if SUE is in the top SUE decile or 0 if it is in the bottom SUE decile. $RETL_{i,t-1}$ equals 1 if a firm's institutional ownership is in the lowest quartile based on NYSE breakpoints, and 0 otherwise as of the trading day prior to the earnings announcements; $MACRO_t$ equals 1 if the earnings announcement coincides with macro announcements, and 0 otherwise. Control variables include a set of variables measured on the trading day prior to the earnings announcements: the natural logarithm of size (LN_SIZE), book-to-market equity ratio (BM), abnormal turnover (ATURN), Amihud illiquidity (ILLIQ), idiosyncratic volatility (IVOL), and number of analysts following (ANALYST). All control variables are winsorized at the 1% and 99% levels. The regressions are estimated with the day-of-the-week and the month-of-the-year fixed effects. The t-statistics (in parentheses) are calculated based on robust standard errors clustered by date. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Top and Bottom Deciles

	CAR						
	[0]	[1]	[1,10]	[1,20]	[1,40]	[1,60]	[2,60]
	1	2	3	4	5	6	7
$SUE\_TOP_{i,t} \times MACRO_t \times RETL_{i,t-1}$	−1.616**	0.382	1.126	1.194	3.375*	5.401**	5.047**
	(−2.30)	(0.96)	(1.16)	(0.87)	(1.79)	(2.18)	(2.11)
$SUE\_TOP_{i,t}$	6.196***	1.098***	2.766***	3.464***	4.618***	5.433***	4.168***
	(55.53)	(18.90)	(19.09)	(17.17)	(15.98)	(15.10)	(12.01)
$SUE\_TOP_{i,t} \times RETL_{i,t-1}$	−1.558***	−0.476**	−1.497***	−1.304**	−2.469***	−2.356**	−1.866*
	(−5.02)	(−2.41)	(−3.49)	(−2.12)	(−2.79)	(−2.16)	(−1.74)
$SUE\_TOP_{i,t} \times MACRO_t$	0.571**	−0.047	−0.465	−0.553	−1.247**	−1.332*	−1.188*
	(2.40)	(−0.39)	(−1.52)	(−1.33)	(−2.11)	(−1.88)	(−1.72)
$RETL_{i,t-1}$	−0.177	−0.129	−0.654**	−1.990***	−3.112***	−3.296***	−3.132***
	(−0.82)	(−0.94)	(−2.07)	(−4.53)	(−5.01)	(−4.35)	(−4.18)
$MACRO_t$	−0.426**	0.009	0.226	0.257	0.405	0.409	0.329
	(−2.56)	(0.10)	(0.97)	(0.83)	(0.92)	(0.76)	(0.62)
$MACRO_t \times RETL_{i,t-1}$	0.732	−0.034	−0.547	0.016	−2.222*	−2.878*	−2.897*
	(1.52)	(−0.12)	(−0.87)	(0.02)	(−1.77)	(−1.87)	(−1.91)
$ln(SIZE)_{i,t-1}$	0.015	−0.027	−0.073	−0.014	−0.051	0.049	0.069
	(0.34)	(−1.11)	(−1.12)	(−0.16)	(−0.40)	(0.32)	(0.46)
$BM_{i,t-1}$	0.420***	0.031	0.122	0.085	0.103	0.284	0.291
	(5.85)	(0.76)	(1.11)	(0.58)	(0.51)	(1.14)	(1.20)
$ATURN_{i,t-1}$	−0.229***	0.047	0.278***	0.381***	0.460***	0.413**	0.331*
	(−3.71)	(1.45)	(3.34)	(3.39)	(2.95)	(2.28)	(1.87)
$ILLIQ_{i,t-1}$	0.003***	0.001***	0.001	0.000	−0.000	0.000	−0.001
	(6.63)	(2.81)	(0.78)	(0.06)	(−0.12)	(0.01)	(−0.33)
$IVOL_{i,t-1}$	−0.172***	−0.101***	−0.282***	−0.241***	−0.391***	−0.362**	−0.295**
	(−5.43)	(−5.04)	(−5.03)	(−2.84)	(−3.24)	(−2.56)	(−2.14)
$ANALYST_{i,t-1}$	−0.025*	−0.004	0.013	−0.016	−0.041	−0.074*	−0.059
	(−1.77)	(−0.50)	(0.69)	(−0.61)	(−1.14)	(−1.66)	(−1.35)
Fixed effects	Day-of-Week, Month-of-Year						
Adj. R^2	0.139	0.017	0.019	0.019	0.019	0.018	0.013
N	33,997	33,996	33,873	33,996	33,996	33,996	33,995

(continued on next page)

TABLE 6 (continued)
Macro News and Earnings Announcement Returns

Panel B. Full Sample

	CAR						
	[0]	[1]	[1,10]	[1,20]	[1,40]	[1,60]	[2,60]
	1	2	3	4	5	6	7
$SUE\_DECILE_{i,t} \times MACRO_t \times RETL_{i,t-1}$	−0.121**	0.030	0.115	0.101	0.345**	0.446**	0.413**
	(−2.00)	(0.92)	(1.34)	(0.84)	(2.16)	(2.06)	(1.98)
$SUE\_DECILE_{i,t}$	0.709***	0.112***	0.248***	0.302***	0.388***	0.477***	0.352***
	(72.26)	(26.63)	(24.34)	(21.99)	(19.52)	(18.86)	(14.40)
$SUE\_DECILE_{i,t} \times RETL_{i,t-1}$	−0.215***	−0.036**	−0.119***	−0.074	−0.148**	−0.109	−0.069
	(−7.95)	(−2.19)	(−3.24)	(−1.41)	(−1.98)	(−1.15)	(−0.75)
$SUE\_DECILE_{i,t} \times MACRO_t$	0.053**	−0.015*	−0.046**	−0.035	−0.084**	−0.098**	−0.075
	(2.57)	(−1.74)	(−2.15)	(−1.26)	(−2.07)	(−1.96)	(−1.51)
$RETL_{i,t-1}$	0.520***	−0.060	−0.207	−1.245***	−1.884***	−1.997***	−1.948***
	(3.06)	(−0.59)	(−0.89)	(−3.72)	(−3.94)	(−3.34)	(−3.30)
$MACRO_t$	−0.333***	0.068	0.230*	0.241	0.703***	0.775**	0.640**
	(−2.78)	(1.22)	(1.73)	(1.42)	(2.85)	(2.51)	(2.09)
$MACRO_t \times RETL_{i,t-1}$	0.658*	0.078	−0.343	−0.122	−2.209**	−2.881**	−2.954**
	(1.71)	(0.37)	(−0.64)	(−0.16)	(−2.17)	(−2.19)	(−2.31)
$ln(SIZE)_{i,t-1}$	0.002	0.001	−0.036	−0.040	−0.128***	−0.073	−0.071
	(0.16)	(0.12)	(−1.62)	(−1.25)	(−2.70)	(−1.28)	(−1.27)
$BM_{i,t-1}$	−0.014	−0.054**	0.004	−0.180**	−0.120	−0.034	0.026
	(−0.37)	(−2.55)	(0.08)	(−2.44)	(−1.14)	(−0.25)	(0.20)
$ATURN_{i,t-1}$	−0.189***	0.012	0.066*	0.064	0.083	0.092	0.053
	(−6.73)	(0.85)	(1.87)	(1.30)	(1.22)	(1.12)	(0.66)
$ILLIQ_{i,t-1}$	0.003***	0.001***	0.001	0.001	−0.001	0.000	−0.001
	(10.11)	(4.53)	(1.34)	(1.09)	(−0.52)	(0.19)	(−0.50)
$IVOL_{i,t-1}$	−0.201***	−0.091***	−0.245***	−0.207***	−0.377***	−0.328***	−0.250**
	(−10.29)	(−8.20)	(−6.96)	(−3.59)	(−4.23)	(−3.14)	(−2.43)
$ANALYST_{i,t-1}$	−0.003	−0.003*	0.003	−0.000	0.017	0.015	0.018
	(−0.67)	(−1.71)	(0.50)	(−0.06)	(1.48)	(1.10)	(1.30)
Fixed effects	Day-of-Week, Month-of-Year						
Adj. R^2	0.089	0.009	0.009	0.008	0.008	0.007	0.005
N	171,651	171,650	170,816	171,638	171,638	171,638	171,649

of 6.196% on the earnings announcement day. Our key variable of interest, SUE_TOP·MACRO·RETL, has a coefficient of −1.616 and is significant at the 5% level. Compared to the coefficient on SUE_TOP, this suggests that, for stocks with high retail ownership, the presence of macro news results in a substantial reduction in the return responses, by 26.1% (= −1.616/6.196).

This reduction is also substantially larger in magnitude and more than offsets the enhancement effect of macro news for average stocks, which is captured by the positive coefficient on SUE_TOP·MACRO. The net effect of macro news on return responsiveness for stocks with high retail ownership, measured by $\alpha_1 + \alpha_4$, is −1.045. Economically, this implies that macro news significantly reduces the announcement responses of retail-dominated stocks, by 17% (= −1.045/6.196). In addition, the coefficient on SUE_TOP·RETL is −1.558 and highly significant, suggesting that stocks that are largely owned by retail investors experience significant price underreactions, by an average of 25.1% (= − 1.558/6.196).[22]

Column 2 of Table 6 presents an analysis for CAR[1], the abnormal return for the day after the earnings announcement. It shows that the coefficient on SUE_TOP

[22]This result is consistent with past studies (e.g., Ayers, Li, and Yeung (2011)) that show that retail investors tend to underreact to earnings news.

is 1.098; although still significant, the magnitude is only 17.7% of the response for day 0. This indicates that most of the announcement return reactions occur on day 0, with a small drift starting on day 1. Similarly, the coefficient on SUE_TOP·RETL is substantially smaller, and the coefficients on SUE_TOP·MACRO·RETL and SUE_TOP·MACRO are insignificant.

Turning to cumulative abnormal returns after the earnings announcement, columns 3–7 show that the coefficients on SUE_TOP are positive and significant up to 60 days after the earnings announcement, consistent with the existence of a post-announcement drift in our sample. Moreover, the coefficients on SUE_TOP·MACRO·RETL are positive and significant for CAR[1,40], CAR[1,60], and CAR[2,60]. The magnitude of SUE_TOP·MACRO·RETL also dominates that of SUE_TOP·MACRO in that $\alpha_1 + \alpha_4$ is positive for these return windows. These results show that, for stocks with higher retail ownership, earnings announcements with concurrent macro news are associated with more-pronounced post-earnings announcement drifts than announcements without concurrent macro news.

Together, the results show that the arrival of macro news creates distinctly different announcement return responses across stocks with different marginal investors. While macro news lowers announcement returns and increases post-announcement drifts for stocks with high retail ownership, the news increases announcement returns and reduces the post-announcement drifts for those with lower retail ownership. The findings are consistent with Hypothesis 3 that the effect of macro news on price reactions to firm-specific news depends on a stock's investor clientele: macro news generates a crowding-out effect for the returns of stocks with high retail ownership, whereas the enhancement effect dominates for stocks with low retail ownership.

Robustness

In Panel B of Table 6, we replicate the above regression analysis using the full sample. All variables in equation (4) remain the same except that we replace SUE_TOP with SUE_DECILE, the SUE decile portfolio ranks.

Consistent with Panel A of Table 6, the coefficient on SUE_DECILE·MACRO·RETL, the primary variable of interest, is −0.121 and significant for CAR[0]. Compared to the coefficients on SUE_DECILE and SUE_DECILE_MACRO, this result suggests that for stocks with high retail ownership, the presence of macro news is associated with a significant reduction in the return response. Economically, a one decile increase in SUE reduces day 0 return by 17.1% (= −0.121/0.709) and a net reduction by 9.6% (= (−0.121 + 0.053)/0.709), respectively. Furthermore, the coefficients on SUE_DECILE·MACRO·RETL for CAR[1,40], CAR[1,60] and CAR[2,60] are positive and significant, with values that are several times larger than those on SUE_DECILE·MACRO. These numbers confirm that macro news arrival is associated with more-pronounced post-earnings announcement drifts for stocks with higher retail ownership.

B. Conditioning on Attention

We further corroborate our findings by performing return analysis while directly conditioning on attention proxies, as motivated by Ben-Rephael et al.

(2017). We focus on days with the joint arrival of macro news and earnings announcements and investigate whether variations in attention on such days are associated with different return responses. We estimate the following panel regression:

$$\begin{aligned}(5)\quad \mathrm{CAR}_{i,t} = {} & \alpha_0 + \alpha_1 \times \mathrm{SUE}_{i,t} \times \mathrm{LOW\_RETAIL\_ATTN}_{i,t} \times \mathrm{RETL}_{i,t-1} \\ & + \alpha_2 \mathrm{SUE}_{i,t} + \alpha_3 \times \mathrm{SUE}_{i,t} \times \mathrm{RETL}_{i,t-1} + \alpha_4 \times \mathrm{SUE}_{i,t} \\ & \times \mathrm{LOW\_RETAIL\_ATTN}_{i,t} + \alpha_5 \times \mathrm{SUE}_{i,t} \times \mathrm{LOW\_INST\_ATTN}_{i,t} \\ & + \alpha_6 \times \mathrm{RETL}_{i,t-1} + \alpha_7 \times \mathrm{LOW\_RETAIL\_ATTN}_{i,t} + \alpha_8 \\ & \times \mathrm{LOW\_INST\_ATTN}_{i,t} + \alpha_9 \times \mathrm{LOW\_RETAIL\_ATTN}_{i,t} \\ & \times \mathrm{RETL}_{i,t-1} \quad + \gamma \times Z_{i,t-1} + \varepsilon_{i,t}.\end{aligned}$$

We construct indicator variables for retail and institutional investor attention. $\mathrm{LOW\_INST\_ATTN}_{i,t}$ equals 1 if $\mathrm{INST\_ATTN}_{i,t}$ is lower than or equal to 2, and 0 otherwise; $\mathrm{LOW\_RETAIL\_ATTN}_{i,t}$ equals 1 if $\mathrm{RETAIL\_ATTN}_{i,t}$ is below the sample median, and 0 otherwise. $\mathrm{RETL}_{i,t\ -\ 1}$ equals 1 if a firm's institutional ownership is in the bottom quartile based on quarterly sorts with NYSE breakpoints, and 0 otherwise. $Z_{i,t-1}$ denotes the same set of control variables as in equation (4).

We present the results in Supplementary Material Appendix D. The key variable of interest is the interaction term SUE·LOW_RETAIL_ATTN·RETL. The term's coefficient for CAR[0] is −0.485 with a *t*-statistic of −2.40, suggesting that, for retail-dominated stocks, a lack of retail attention lowers return responses to earnings news by 146% (= −0.485/0.332) relative to the baseline case. Similarly, the coefficient of SUE· LOW_RETAIL_ATTN·RETL for CAR[1,30] is 0.438 and significant at the 10% level, suggesting that the initial underreaction is almost fully corrected with a higher post-announcement drift in the next 30 days. Overall, our results confirm that retail attention is associated with the speed at which firm-level news is incorporated into prices of retail-dominated stocks.

C. The Effects of Economic Uncertainty

Next, we examine how the impact of macro announcements on earnings announcement returns depends on economic uncertainty. Hypothesis 3 further postulates that the crowding-out effect of macro news on firm-specific news should be more pronounced during periods of greater economic uncertainty, when investors' attention constraints are more likely to be binding. Therefore, we estimate equation (4) separately for high and low VIX periods and present results in Table 7 for the announcement day returns (CAR[0]) and the post-announcement drift (CAR[1,60]).[23]

Column 1 in Table 7 shows that, for high VIX periods, the coefficient on SUE_TOP·MACRO·RETL is highly significant, at −2.886 and substantially more negative than its unconditional counterpart (column 1 in Panel A of Table 6). The net effect of macro news on return responsiveness for stocks with high retail

[23]For a robustness check, we replicate the regression analysis using the full sample. As shown in Supplementary Material Appendix E, the results are qualitatively similar.

TABLE 7

Macro News and Earnings Announcement Returns, by Market-Wide Uncertainty

Table 7 presents panel regression analyses of return responses for quarterly earnings announcements in subperiods with different levels of market uncertainty as measured by the CBOE Volatility Index (VIX). The observations include earnings announcements whose SUE fall into the top or bottom decile. The high (low) VIX period corresponds to days on which VIX is higher than (lower than) its median value for the sample period. CAR [0] and CAR[1,60] are the percentage cumulative DGTW (Daniel et al. (1997)) abnormal returns for dates 0 and dates 1 to 60, respectively. $SUE\_DECILE_{i,t}$ is the earnings surprise decile, with 1 being the most negative and 10 being the most positive. $SUE\_TOP_{i,t}$ equals 1 if SUE is in the top SUE decile or 0 if it is in the bottom SUE decile. $RETL_{i,t}$ equals 1 if a firm's institutional ownership is below 25% based on NYSE breakpoints, and 0 otherwise; $MACRO_t$ equals 1 if the earnings announcement coincides with macro announcements, and 0 otherwise. Control variables include a set of control variables measured on the trading day prior to the earnings announcements: the natural logarithm of size (LN_SIZE), book-to-market equity ratio (BM), abnormal turnover (ATURN), Amihud illiquidity (ILLIQ), idiosyncratic volatility (IVOL), and number of analysts following (ANALYST). All control variables are winsorized at the 1% and 99% levels. The regressions are estimated with the day-of-the-week and the month-of-the-year fixed effects. The *t*-statistics (in parentheses) are calculated based on robust standard errors clustered by date. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

	CAR[0]		CAR[1,60]	
	High VIX	Low VIX	High VIX	Low VIX
	1	2	3	4
$SUE\_TOP_{i,t} \times MACRO_t \times RETL_{i,t-1}$	−2.886***	−0.360	8.378**	2.209
	(−2.88)	(−0.38)	(2.32)	(0.67)
$SUE\_TOP_{i,t}$	5.877***	6.520***	6.426***	4.457***
	(34.51)	(45.85)	(11.29)	(10.51)
$SUE\_TOP_{i,t} \times RETL_{i,t-1}$	−1.737***	−1.306***	−3.423**	−1.393
	(−4.13)	(−2.83)	(−2.18)	(−0.93)
$SUE\_TOP_{i,t} \times MACRO_t$	0.947***	0.215	−3.283***	0.702
	(2.62)	(0.68)	(−2.96)	(0.80)
$RETL_{i,t-1}$	−0.322	−0.014	−2.132*	−4.132***
	(−1.06)	(−0.05)	(−1.95)	(−3.97)
$MACRO_t$	−0.691***	−0.173	0.925	−0.057
	(−2.80)	(−0.76)	(1.07)	(−0.09)
$MACRO_t \times RETL_{i,t-1}$	1.300*	0.049	−5.116**	−0.350
	(1.95)	(0.07)	(−2.24)	(−0.18)
Fixed effects	Day-of-Week, Month-of-year			
Controls	+	+	+	+
Adj. R^2	0.120	0.165	0.021	0.024
N	17,230	16,767	17,229	16,767

ownership, measured by $\alpha_1 + \alpha_4$, is −1.939. Economically, this suggests that relative to the unconditional mean (i.e., compared to the coefficient on SUE_TOP at 5.877), the presence of macro news reduces the announcement responses of retail-dominated stocks by 33.0% (= −1.939/5.877) during periods of high economic uncertainty. In contrast, column 2 shows that during low VIX periods, both coefficients are insignificant.

Turning to the post-announcement drift, column 3 shows that the coefficient on SUE_TOP·MACRO·RETL is 8.378 (*t*-stat = 2.32), which is again substantially larger than its unconditional counterpart (column 6 in Panel A of Table 6). Similarly, column 4 shows that the coefficient is insignificant for the low VIX sample.

In addition, the coefficient on SUE_TOP·MACRO for CAR[0] is also significantly more positive during high VIX periods than during low VIX periods, whereas the coefficient for CAR[1,60] is more negative during high VIX periods. The results suggest that macro news's enhancement effect for stocks with mid- and low-retail ownership is mostly present during periods of greater market-wide uncertainty.

Together with the results in Section IV, our evidence suggests that, during periods of high uncertainty and in the presence of macro news, attention-constrained retail investors pay less attention to firm news, resulting in more underreaction to earnings news and greater post- announcement drift for stocks dominated by retail investors. On the other hand, during such times, the arrival of potentially complementary macro news increases institutional investors' incentives to digest firm-level information, leading to greater announcement return responses and weaker post-announcement drifts for stocks dominated by institutional investors.

VI. Unscheduled Firm News

So far, we have focused on scheduled firm news, showing that the arrival of macro news crowds out retail attention to scheduled firm news, but enhances institutional attention to scheduled firm news. This is likely because institutional investors are less attention constrained and are better at planning their time and effort, delegating tasks, or expanding capacity. For unscheduled news, however, institutional investors may be less able to adjust their attention capacity in a timely manner to exploit the information complementarity.

In this section, we explore a type of unscheduled news, analysts' earnings forecast revisions, which is a vital source of corporate information given their frequency and timeliness. Past studies have documented a strong drift after analyst earnings revisions and have attributed the revision-based drift to initial market underreaction (see, e.g., Stickel (1991), Chan, Jegadeesh, and Lakonishok (1996), and Gleason and Lee (2003)). Unlike earnings announcements, analysts' forecast revisions are not scheduled and therefore investors may not be able to adjust ahead of time to reserve sufficient attention to digest such news.

A. Attention Responses

Using data from the IBES database, we define |REVISION| as the absolute percentage change in an analyst's quarterly earnings forecast relative to the analyst's most recent forecast issued within the past 90 days.[24] We analyze investor attention to analyst earnings forecast revisions by estimating an equation similar to equation (3), replacing |SUE| with |REVISION|.[25]

Column 1 of Table 8 presents the baseline regression results for retail attention. It shows that the coefficient on MACRO is −0.024 and is highly significant. Column 2 presents the results after controlling for other lagged explanatory variables. The coefficient on MACRO remains the same and statistically significant.

[24]Supplementary Material Appendix F shows that analyst forecast revisions are concentrated on the earnings announcement day and the subsequent three trading days. Therefore, we exclude revisions made on an earnings announcement day and the subsequent three trading days as these revisions are likely to be anticipated by investors. We further remove revisions on days when more than one analyst has issued a revision for the same stock to avoid their confounding effects on investor attention and return responses. Finally, we require at least two analysts to have active quarterly earnings forecasts for the stock (i.e., the earnings forecasts are issued within 90 days as of the day before the revision).

[25]We exclude REPORT_LAG, which is unique to earnings announcements. We focus on investor attention on the revision date because investors are not likely to respond to unscheduled events ahead of time.

TABLE 8

Investor Attention to Analysts' Earnings Forecast Revisions

Table 8 presents panel regression analyses of investor attention to individual stocks on days with analysts' earnings forecast revisions. Columns 1–2 examine retail attention, $LN\_RETAIL\_ATTN_{i,t}$, and columns 3–4 examine institutional investor attention, $INST\_ATTN_{i,t}$. $MACRO_t$ equals 1 if the forecast revision coincides with macro announcements, and 0 otherwise. REVISION is the percentage change in an analyst's quarterly earnings forecast relative to the analyst' most recent forecast issued within the past 90 days. |REVISION| is the absolute value of REVISION. $MACRO_t$ equals 1 if the revision coincides with macro announcements, and 0 otherwise. The control variables are measured as of the day before the forecast and include firm size (LN_SIZE), book-to-market equity ratio (BM), DGTW-adjusted daily stock return (RET), abnormal turnover (ATURN), idiosyncratic volatility (IVOL), institutional ownership (IO), number of analysts covering a stock (ANALYST), CRSP value-weighted market return ($MRET_{t-1}$), and the day-of-the-week and month-of-the-year fixed effects. The *t*-statistics (in parentheses) are calculated from the standard errors clustered by date. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

	$LN\_RETAIL\_ATTN_i$		$INST\_ATTN_i$	
	1	2	3	4
$MACRO_t$	−0.024***	−0.024***	−0.019	−0.012
	(−2.86)	(−2.75)	(−1.02)	(−0.69)
$\ln(SIZE)_{i,t-1}$	0.000	0.008***	0.229***	0.301***
	(−0.08)	(3.06)	(57.23)	(48.89)
$BM_{i,t-1}$	−0.009	−0.004	0.105***	0.103***
	(−1.55)	(−0.73)	(8.89)	(9.11)
$RET_{i,t-1}$		0.001		0.015***
		(1.02)		(4.53)
$ATURN_{i,t-1}$		3.524***		38.963***
		(11.34)		(60.18)
$IVOL_{i,t-1}$		−0.016***		0.282***
		(−4.86)		(32.24)
$IO_{i,t-1}$		−0.008		−0.010
		(−0.62)		(−0.43)
$ANALYST_{i,t-1}$		−0.004***		0.010***
		(−7.66)		(10.18)
$\lvert REVISION_{i,t}\rvert$		0.0001*		0.0003**
		(1.70)		(2.18)
$MRET_{i,t-1}$		−0.0023		0.0226***
		(−0.93)		(3.54)
Fixed effects	Day-of-Week, Month-of-Year			
Adj. R^2	0.001	0.004	0.089	0.183
N	80,861	80,453	75,266	74,820

Economically, the result indicates that macro news substantially reduces retail investor attention to analysts' earnings forecast revisions, by 172% relative to its mean.[26] The results show that there is a significant distraction effect of macro news on retail attention to both scheduled and unscheduled firm news.

Columns 3 and 4 focus on institutional attention and show that the coefficients on MACRO are negative, at −0.019 and −0.012, but statistically insignificant. In sharp contrast to the enhancement effect for scheduled earnings news, there is no evidence that macro news enhances institutional attention to unanticipated firm-level news.

B. Return Responses

Next, we investigate stock return responses to analysts' earnings forecast revisions. For each month, we sort stocks into decile portfolios based on the variable

[26]The mean abnormal retail attention is 1.40% when revisions are not accompanied by macro announcements, implying that macro news reduces revision-day abnormal retail attention to −1.00% $(=(1+1.40\%)\times e^{-0.024}-1)$, or a 172% reduction relative to the mean.

TABLE 9

Return Response to Analysts' Revision and Macro News Announcements

Table 9 presents panel regression analyses of return responses for analysts' revisions. CAR[0] and CAR [i,j] are the percentage DGTW (Daniel et al. (1997)) abnormal returns on the announcement day (day 0) and cumulative abnormal return from the i^{th} to the j^{th} trading days after the revision announcement day. REVISION_DECILE is the decile rank of analysts' earnings forecast revisions, which is the percentage change in an analyst's quarterly earnings forecast relative to the analyst' most recent forecast issued within the past 90 days. $RETL_{i,t-1}$ equals 1 if a firm's institutional ownership is in the lowest quartile based on NYSE breakpoints as of the trading day prior to the revision announcement, and 0 otherwise; $MACRO_t$ equals 1 if the revision announcement coincides with macro announcements, and 0 otherwise. Control variables include a set of control variables measured on the trading day prior to the revision announcements: the natural logarithm of size (LN_SIZE), book-to-market equity ratio (BM), abnormal turnover (ATURN), Amihud illiquidity (ILLIQ), idiosyncratic volatility (IVOL), and number of analysts following (ANALYST). All control variables are winsorized at the 1% and 99% levels. The regressions are estimated with the day-of-the-week and the month-of-the-year fixed effects. The t-statistics (in parentheses) are calculated based on robust standard errors clustered by date. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

	CAR						
	[0]	[1]	[0,1]	[2,10]	[2,20]	[2,40]	[2,60]
	1	2	3	4	5	6	7
$REVISION\_DECILE_{i,t} \times MACRO_t \times RETL_{i,t-1}$	−0.020	−0.035***	−0.049**	0.002	0.043	0.084	0.106**
	(−1.28)	(−2.78)	(−2.47)	(0.08)	(0.57)	(1.41)	(2.06)
$REVISION\_DECILE_{i,t}$	0.075***	0.039***	0.115***	0.054***	0.069***	0.081***	0.101***
	(23.15)	(14.82)	(27.33)	(7.40)	(5.52)	(5.03)	(5.75)
$REVISION\_DECILE_{i,t} \times RETL_{i,t-1}$	−0.003	−0.001	−0.005	0.022	0.100***	0.204***	0.203***
	(−0.54)	(−0.12)	(−0.64)	(1.61)	(4.34)	(6.87)	(6.25)
$REVISION\_DECILE_{i,t} \times MACRO_t$	0.027***	0.001	0.024**	−0.001	0.003	0.006	0.041
	(3.23)	(0.13)	(2.24)	(−0.05)	(0.10)	(0.15)	(0.90)
$RETL_{i,t-1}$	0.058	0.040	0.100**	−0.216**	−0.677***	−1.361***	−1.432***
	(1.52)	(1.33)	(2.05)	(−2.54)	(−4.68)	(−7.30)	(−7.03)
$MACRO_t$	−0.147***	−0.012	−0.131*	0.141	−0.010	−0.034	−0.275
	(−2.82)	(−0.29)	(−1.95)	(1.21)	(−0.05)	(−0.13)	(−0.98)
$MACRO_t \times RETL_{i,t-1}$	0.062	0.116	0.142	−0.725***	−0.369	0.387	0.228
	(0.64)	(1.49)	(1.14)	(−3.35)	(−1.00)	(0.81)	(0.44)
Fixed effect	Day-of-Week, Month-of-Year						
Controls	+	+	+	+	+	+	+
Adj. R^2	0.004	0.001	0.005	0.002	0.002	0.003	0.003
N	306,958	306,958	306,958	305,377	305,377	305,377	305,377

REVISION. We then estimate equation (4), replacing SUE_DECILE with revision portfolio ranks (REVISION_DECILE).

Table 9 presents the panel regression results. Columns 1–3 present the results using the abnormal returns for the revision day (CAR[0]), the 1-day ahead (CAR[1]), and the 2-days (CAR[0,1]) as the dependent variable, respectively. Consistent with past studies, the coefficient on REVISION_DECILE is significantly positive on the announcement day and remains significantly positive for the subsequent 60 trading days, indicating a strong post-revision price drift.

The key variable of interest is the interaction term REVISION_DECILE·MACRO·RETL. The term's coefficient is −0.020 (t-stat = −1.28) on day 0 and −0.035 (t-stat = −2.78) on day 1. This result suggests that the dampening effect of macro news on responses of retail-dominated stocks to analyst forecast revisions is more pronounced for revisions. Column 3 shows that when the 2-day cumulative abnormal return is used as the dependent variable, the coefficient of the interaction term is −0.049 and statistically significant at the 5% level, which implies that the presence of macro news reduces the 2-day announcement response by 43% (−0.049/−0.115) for stocks with high retail ownership.

Next, we examine the post-revision drift by estimating equation (4) with the dependent variables measured by the cumulative abnormal returns for the post-revision windows. Columns 3–6 of Table 9 show that the coefficients on REVISION·MACRO·RETL increase monotonically from 0.002 from the [2,10] window to 0.106 for the [2,60] window, suggesting that macro news substantially increases the post-forecast drift for retail-dominated stocks.

Overall, the results of return responses show that the presence of macro news significantly dampens the immediate price responses to individual analyst earnings forecast revisions and increases the long-term price drift for high-retail ownership stocks.

VII. Alternative Mechanisms

So far, we have presented evidence on investor attention and security market dynamics that is consistent with theories of rational inattention. In this section, we consider whether the results can be attributed to alternative explanations: the news supply effect and strategic disclosure timing.

A. Media Coverage

The first alternative explanation is that the observed attention patterns are driven by patterns of media coverage instead of investor choice. For example, firms generally receive more media coverage around earnings announcements. If there is concurrent macroeconomic news, the coverage may be affected. The macro news can either increase media coverage of specific firms as the media tries to gauge the implications of macro news on markets via analyzing specific firms, or decrease media coverage if the media has limited capacity to provide coverage for both macro and firm-specific news. The variation in the amount of information supplied around earnings announcements could affect investor attention, especially retail investors' attention.

To test whether our results on attention allocation are driven by the information-supply channel, we obtain news coverage data from Ravenpack News Analytics. We measure abnormal information supply, denoted $ANEWS_i$, by the abnormal number of relevant news reports (measured in hundreds) from credible sources as defined by Ravenpack.[27]

We then examine the determinants of investor attention while formally controlling for information supply and present the results in Supplementary Material Appendix G. The results show that while the abnormal news supply is significantly and positively related to attention, particularly institutional attention, the coefficients on MACRO are very similar to those presented in Table 4. Therefore, we conclude that variations in media coverage do not explain the crowding-out pattern of retail attention and the triggering pattern of institutional attention.

[27]Ravenpack News Analytics (RPNA) assigns each news story a relevance score on a scale of 0–100. The score determines how relevant a news story is to the firm mentioned in the story. Scores above 75 are considered significantly relevant. RPNA also assigns each news source a credibility score on a scale of 1–10, with a score no more than 3 considered trustworthy. Therefore, we include news items with relevance scores higher than 75 from news sources with credibility scores no more than 3.

B. Strategic Disclosure Timing

The other alternative hypothesis is that the attention patterns are driven by patterns of firms' strategic disclosure decisions. Prior studies (e.g., Patell and Wolfson (1982), Michaely, Rubin, and Vedrashko (2014), deHaan, Shevlin, and Thornock (2015), Segal and Segal (2016), and Johnson and So (2018)) have documented that managers strategically time corporate disclosures to highlight or hide certain information. Therefore, it is possible that firms choose to disclose or avoid certain types of earnings announcements on macro news days. Such strategic disclosure decisions may result in differences in investor attention.

To test the disclosure-timing hypothesis, we compare earnings surprises (SUE) on earnings days with at least one of the five macro announcements (YES) and no-macro news (NO) for the attention sample and the earnings sample. Supplementary Material Appendix H shows that the cross-sectional distributions of SUE among the two groups are very similar. The mean SUE of the YES and NO groups in the attention sample are 0.07. The mean SUE of the YES and NO groups in the earnings sample are -0.03 and -0.02, respectively. Their difference is statistically insignificant. Therefore, the strategic timing of earnings announcements cannot explain our findings.

Therefore, we conclude that our findings are not attributable to the effects of media coverage or strategic managerial disclosure.

VIII. Conclusions

Motivated by rational inattention theories, we investigate how retail and institutional investors process macro news and firm news and influence asset prices. We show that retail investors allocate their attention following a pecking order and prioritize their information process toward macro news (crowding-out effect). When macro and earnings news are both present, retail investors substantially reduce their attention to firms' earnings announcements by 49%. The crowding-out effect is more pronounced during periods of greater market-wide uncertainty. In contrast, institutional investors' attention to firm news increases with the arrival of macro news, suggesting an attention-enhancement effect.

We further show that for stocks with a greater retail investor presence, the arrival of macro news lowers the earnings-announcement return responses by 17% and substantially increases the post-announcement drift. The crowding-out pattern on returns is especially strong when VIX is high. In contrast, for stocks with higher institutional ownership, the arrival of macro news increases the announcement return responses and decreases post-earnings announcement drifts. The results are robust to alternative attention measures, the information supply effect, and firms' strategic timing of earnings announcements.

Together, our article provides strong evidence for the distinctively different attention constraints that retail and institutional investors face and the allocation decisions they make. Our findings suggest that attention constraints are more likely to be binding for retail investors, who therefore prioritize information processing to focus on macroeconomic news over firm-specific news. Institutional investors, on the other hand, have a greater attention capacity and increase their attention to a firm

in anticipation of the joint arrival of both macro and earnings information, but such effect does not hold for unscheduled forecast revisions. Our article provides direct support for the key implications of rational inattention models and offers new insights on how news is incorporated into equilibrium prices.

Supplementary Material

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