Macro News and Micro News: Complements or Substitutes?

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Abstract

We study how the arrival of macro-news affects the stock market's ability to incorporate the information in firm-level earnings announcements. Existing theories suggest that macro and firm-level earnings news are attention substitutes; macro-news announcements crowd out firm-level attention, causing less efficient processing of firm-level earnings announcements. We find the opposite: the sensitivity of announcement returns to earnings news is 17% stronger, and post-earnings announcement drift 71% weaker, on macro-news days. This suggests a complementary relationship between macro and micro news that is consistent with either investor attention or information transmission channels.

JEL Classification: E44, G12, G14, G04

Keywords: macro news, earnings announcements, market efficiency, investor attention, complementary relationship

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1. Introduction

To understand how the market processes multiple signals that are relevant for pricing a security, there are possible informational and attentional interactions. For example, investors often face both economy-wide (macro) and firm-specific (micro) news. To provide insight into interactions between information signals, we study here how the arrival of macro news affects the stock market's ability to incorporate the information in firm-level earnings announcements.

Existing theories suggest that macro news will impede the processing of earnings news. In theories of optimal attention allocation, investors with limited attention face a tradeoff between allocating time or cognitive resources to macro versus firm-level news. For instance, in the model of Peng and Xiong (2006), investors tend to process market- and sector-wide information before processing firm-specific information owing to economies of scale in processing the market- and sector-wide information.

This theory emphasizes the *substitution* between attention to macro versus firm-level news. The arrival of macro news distracts investors, reducing the attentional resources available to process firm-level earnings news. Theoretical models have shown that limited investor attention induces firm-level mispricing, including underreaction to earnings surprises (Hirshleifer and Teoh, 2003; Peng and Xiong, 2006; Hirshleifer, Lim, and Teoh, 2011), consistent with evidence from empirical studies suggesting that investor inattention delays the incorporation of earnings news into stock prices.[1] So if investor attention is limited, macro news that causes investors to shift attention from the firm level to the aggregate level will make the market less efficient in processing

[1] It is well-documented that market prices incorporate the information in earnings surprises sluggishly, post-earnings announcements drift, or PEAD (Ball and Brown, 1968; Bernard and Thomas, 1989, 1990). Other studies find that prices react more sluggishly when there is greater distraction from other firms' same-day earnings announcements (Hirshleifer, Lim, and Teoh, 2009), and when the earnings news is released on a Friday (DellaVigna and Pollet, 2009).

firm-level earnings news. Specifically, the market will react more sluggishly, increasing underreaction.

Motivated by the limited attention theory, we examine the sensitivity of stock market reactions to earnings news on days either with or without major macroeconomic announcements. We test for the effects of macro news on both the initial stock price reaction to earning news, and the subsequent post-earnings announcement drift (PEAD). Specifically, we study whether macroeconomic announcements on a given day causes weaker incorporation by the stock market of firm-specific earnings news on that day.

Surprisingly, we find that the effects of macro news are opposite to the theoretical prediction: macro news is associated with greater incorporation of firm-level news into stock prices. We find that the immediate price reaction to a firm's earnings surprise is stronger and the drift is weaker when the macro news is released on the same day. This suggests that earnings information released on macro-news days is incorporated into stock prices faster, leading to more efficient stock valuation. In other words, our findings suggest a *complementary relationship* between macro news and firm-level news. The complementary relationship remains after controlling for existing determinants of market reactions to earnings news, such as the number of earnings news, the day of the week, and the level of market returns. The magnitude of the complementary relationship is economically large. Firms with the largest earnings surprises on macro-news days experience a 17% higher immediate price reaction and a 71% lower post-earnings announcement drift compared to reactions to earnings surprises on other days.

The complementary relationship between macro and micro news can be exploited to form a profitable trading strategy. In general, a trading strategy based upon PEAD buys firms that have positive earnings surprises and sells firms with negative surprises. Consistent with past research

on the PEAD anomaly, in our sample a PEAD trading strategy generates about 1% abnormal returns per month among earnings announcements released on non-macro-news days. However, we further find that the abnormal returns to a PEAD strategy are small and statistically insignificant for earnings released on macro-news days. This finding is consistent with the conclusion that on macro-news days, earnings information is incorporated more rapidly, eliminating the opportunity to profit by trading based on earnings surprises.

Why is the processing of earnings news more efficient on macro-news days? We explore four potential explanations, which are not mutually exclusive. The first possible explanation derives from the fact that investors allocate attention across more than just the two margins of macro and micro news about stocks, and that macro news draws attention away from other activities to analysis of stocks. Investors, in their daily lives, must devote time and effort to activities unrelated to the immediate processing of stock market news. For retail investors, this includes their leisure and work activities. For institutional investors such as fund managers, in addition to leisure activities, this also includes a major portion of their work activities.[2] Investment managers have administrative and human resource tasks, marketing and client-networking tasks, and general investment management tasks such as research about possible trading strategies.

It follows that on a given day an investor can potentially devote more or less attention to *both* macro- and firm-level news, trading off against the other targets of investor attention. The arrival of important macro news, such as a Federal Open Market Committee (FOMC) decision, can trigger a shift in investor attention simultaneously toward studying macroeconomic implications and the implications for the fundamentals of individual firms. If so, at such times the market may incorporate firm-specific news more efficiently as well. Although this third margin for attention

[2] There is evidence that even institutional investors are distracted by competing information (e.g., Corwin and Coughenour, 2008; Kempf, Manconi, and Spalt, 2017).

allocation is economically intuitive and compelling, it has received much less emphasis in the existing literature.[3]

A possible objection to this argument is that only trivial firm-specific analysis is needed in response to a macro event, so that there is no reason for such an event to trigger extra firm-level attention.[4] However, the incorporation of macro information is complicated by the fact that firms' betas and factor loadings continually evolve over time.[5] So incorporating major macro-news accurately requires examination of firms' evolving fundamentals. Such a reexamination is likely to be complementary with incorporating the information in earnings news.

To test whether macro-news does indeed trigger greater investor attention to firm-specific news, we use a measure of abnormal institutional investor attention (AIA) from Bloomberg (Ben-Rephael, Da, and Israelsen 2017). We find that AIA is higher on macro-news days in general and that AIA to firms with earnings announcements is higher when macro news is released on the same day. Furthermore, attentional tradeoffs seem to be important for institutional investors; we find that the effect of macro-news on AIA is concentrated among firms with high institutional ownership. These results are consistent with the attention explanation that the effect of macro news on market reactions to earnings announcements derives from investor attention.

An alternative possible explanation for the complementary relationship is that macro news may contain information that affects rational interpretations of firm-level earnings news. In

[3] Goldstein and Yang (2015) provide theoretical evidence that the presence of complementarities between two firm-level signals facilitates information acquisition and improves price informativeness.

[4] If firm and macro fundamentals were multivariate normal, then a firm would inherit any fundamental consequences of macro news in proportion to its loading on the relevant fundamental factor. So if, in addition, investors perfectly knew beta and loadings, they would be able to calculate in a straightforward way the implications of macro news for firm fundamentals.

[5] This is in part due to leverage, which shifts loadings in response to fluctuations in firm value and borrowing. It is in part due to fluctuations in the value and moneyness of firms' real options. Furthermore, in conglomerates, different divisions have different loadings, and the value weights on different divisions are continually fluctuating (see e.g., Boguth, Duchin, and Simutin, 2020).

particular, the presence of macro news might potentially make firm-level news more informative about value, resulting in stronger reactions to earnings announcements. We call this the information transmission effect. Theoretical research suggests that investors rationally react more to the same firm-specific news when revealed in downturns than in upturns (e.g., Schmalz and Zhuk, 2018). This suggests that the macro news may sometimes contain information that makes stock prices more sensitive to earnings announcements.

To explore this possibility, we conduct tests on analyst forecasts. If information from macro news complements firm-specific news in the sense of making firm-specific news more informative, analysts forecast revisions should be more sensitive to firm-level earnings news. Consistent with this argument, we find analysts revise their forecasts more frequently, and provide more accurate forecasts, when earnings announcements are released on macro-news days.

To further examine the information transmission channel, we test whether the complementary relationship varies with firm size and analyst coverage. Since idiosyncratic risk diversifies, large firms and firms with high analyst coverage tend to be more highly correlated with the macro economy. This suggests that macro news will, in relative terms, be more pertinent to investors for understanding their earnings announcements. Indeed, we find that the effect is more pronounced for large firms and firms with high analyst coverage. These results are supportive of the information transmission channel.[6]

Estimates of the complementarity or substitutive relationship between macro and earnings news could potentially be influenced by firms strategically choosing to announce their earnings on

[6] The limited attention explanation for the complementary relationship has the appealing feature that it also explains why post-earnings announcement drift is weaker when there is macro-news: because more earnings information is incorporated quickly into price. It is not obvious whether the information transmission explanation for the complementary relationship of macro news to the immediate price reaction to earnings news also explains the effect on post-earnings announcement drift, but we do not rule out this possibility.

macro-news versus no-macro-news days. Based on past studies, we categorize firms as strategically changing their earnings announcement dates if the announcement date differs from their previous same-quarter date by more than five days. We find that the complementary relationship is concentrated among firms that do not strategically change their earnings announcement dates. This suggests that strategic timing does not drive the complementary relationship.

Finally, we consider the possibility that the complementary relationship between macro and micro news is driven by a firm's liquidity premium. Previous studies find that the earnings announcement premium is associated with liquidity risk (Sadka, 2006; Frazzini and Lamont, 2007). It is possible that firms with a positive earnings surprise have greater liquidity on macro-news days. Using two measures of liquidity, we find that liquidity is higher on macro-news days in general. However, firms with high earnings surprises do not have more liquidity on days with macro news compared to firms with low earnings surprises. These findings suggest that it is unlikely that liquidity explains the complementary relationship.

Moreover, we use distraction events that contain little information about fundamentals, and in particular about the rational sensitivity of firm-level fundamentals to earnings news, to further test the attention channel. We argue that these events draw attention away from the stock market. We find that distraction events (news about terrorism and gun shooting) are associated with weaker market reactions to earnings news, which supports the attention channel. We also use complementary attention events of famous firms (events that arguably draw attention to the stock market) to distinguish the attention channel from the information transmission channel. We find that these events lead to higher sensitivity of firm level returns to earnings news, which also supports the attention channel.

This paper bears upon several strands of literature, including theories of rational inattention (e.g., Sims, 2003) discussed earlier.[7] The literature on the determinants of investors' reactions to earnings announcements finds evidence of lower investor attention to firm-level earnings announcements when earnings are announced on Fridays (DellaVigna and Pollet, 2009), when there is a greater number of distracting same-day earnings announcements from other firms (Hirshleifer, Lim, and Teoh, 2009), and when the market return is low (Gulen and Hwang, 2012). Our paper differs in documenting how macro news affects price reactions to firm-level earnings announcements, and in particular documenting how macro news can *attract* attention rather than distract.

This paper extends the literature on how macro news affects stock markets in two ways (e.g., Boyd, Hu, and Jagannathan, 2005; Gilbert, 2011; Gilbert et al., 2017).[8] First, we provide a more direct test of the effect of macro news on market efficiency. Our results suggest that the stock market is more efficient on macro-news days in the sense that earnings information is incorporated into stock price faster.

There are past studies that provide indirect evidence that the presence of macro-news is related to efficient processing of firm-level information. For instance, Savor and Wilson (2014) find that CAPM fits stock returns better on macro-news days, suggesting that the stock market is more efficient on macro-news days. Their approach to testing how macro-news affects market efficiency therefore relies on the validity of the asset pricing model (Fama, 1970). Our approach does not make strong assumptions about the underlying asset pricing model.

Second, this paper speaks to the debate on the underlying mechanisms through which macro

[7] This paper is also related to the literature on investor attention (e.g., Da, Engelberg, and Gao, 2011; Ben-Rephael, Da, and Israelsen, 2017; Liu, Peng, and Tang, 2019; Huang, Huang, and Lin, 2019).

[8] More generally, this paper also relates to the literature on media coverage and stock market anomalies (Chan, 2003; Hillert, Jacobs, and Muller, 2014; Engelberg, McLean, and Pontiff, 2018).

news affects stock prices. While some studies offer risk-based explanations for their findings (Savor and Wilson, 2013, 2014; Hu, Pan, Wang, and Zhu, 2021), others suggest that imperfect rationality is important (Lucca and Moench, 2015; Cieslak, Morse, and Vissing-Jogensen, 2019; Fisher, Martineau, and Sheng, 2021). Our findings suggest that investor attention allocation and information transmission both may play a role in explaining how macro news affects the market for individual stocks.

2. Data

2.1 Macroeconomic announcements

We first select a set of important macro announcements from a list of 40 macro announcements by Bloomberg Econoday. This data has macro announcements since 1997. We define a day to be a macro-news day (hereafter, Macroday) if one of the following four announcements happens on this day: the Federal Open Market Committee (FOMC) decision, Employment situation, ISM PMI, and Personal Consumption. These days make up 23% of all trading days. The rationale for selecting these four announcements is given below.

Following Savor and Wilson's (2013) method, we test whether the market excess return (market return minus riskfree rate) is significantly higher on announcement days for each type of macroeconomic announcement. The announcements that have statistically and economically significant impacts on the market excess return include FOMC, Employment situation, ISM PMI, and Personal consumption. The results are provided in the Internet Appendix. The importance of the FOMC announcement is well documented (see, e.g., Lucca and Moench, 2015). Gilbert et al. (2017) find that macroeconomic announcements, including Employment situation, ISM PMI, and Personal consumption, are important for financial markets.

2.2 Earnings news

We obtain quarterly earnings release data from Compustat and I/B/E/S as micro news from 1997 to 2014. Following Hirshleifer, Lim, and Teoh (2009), we measure earnings surprise (ES) using Equation (1). It is the difference between actual earnings ($Actual$) for the quarter recorded by I/B/E/S and the median forecast ($Forecast$) included in the I/B/E/S detail file during the 30 days before the quarterly earnings announcements scaled by the stock price ($Price$) at the end of the corresponding quarter.

$$ES = \frac{Actual - Forecast}{Price} \tag{1}$$

Stock price response to earnings news is measured by cumulative abnormal return (CAR) for each stock, which is the raw buy-and-hold return adjusted using estimated beta from the market model. For each earnings announcement date τ of quarter t, we define the cumulative abnormal return over time period $(\tau + h,\ \tau + H)$ $CAR[h, H]$ as follows

$$CAR[h, H] = \left[\prod_{j=\tau+h}^{\tau+H} (1 + R_{j,k}) - 1\right] - \hat{\beta}_{t,k}\left[\prod_{j=\tau+h}^{\tau+H} (1 + R_{j,m}) - 1\right] \tag{2}$$

where $R_{j,k}$ is the stock return of company k on day j, $R_{j,m}$ is the market return on day j, and $\hat{\beta}_{t,k}$ is obtained from the market model regression $R_{j,k} = \alpha_{t,k} + \beta_{t,k} R_{j,m} + \epsilon$ for days j from $\tau - 300$ to $\tau - 46$.

For the immediate stock price reaction, we use CAR over a 2-trading-day window [0, 1]. For drift, we use CAR over a 60-trading-day window [2, 61]. In Section 3.1, we show that the results are robust to alternative choices of windows. We exclude the penny stocks, observations in which actual or forecast earnings are greater than stock price, and those with a missing earnings surprise.

The final sample includes 158,399 observations.

2.3 Summary statistics

Table 1 Panel A reports summary statistics based on the full sample. It shows that, on average, there are 118 earnings announcements per day. The mean immediate reaction to an earnings announcement ($CAR[0,1]$) is 0.1%, and the mean of the drift ($CAR[2,61]$) is 1%. Panel B shows the same statistics, conditional on being on a Macroday, compared to all other days. On average, Macrodays have a significantly fewer number of earnings announcements and higher market return. Firms that release their earnings announcements on macro-new days have significantly higher immediate reaction to earnings news ($CAR[0,1]$), and lower drift ($CAR[2,61]$).

[Insert Table 1 here]

3. Macro news and the processing of firm-level earnings news

We next describe tests of whether there is a complementary or substitute relationship between macro news and market sensitivity to micro news. Then, in Subsection 3.2 we test the relationship using a portfolio trading strategy.

3.1 Main results

We test whether reactions to earnings announcements on days with macro news are different from reactions on other days. Following existing literature, we rank firms' earnings surprises and assign them into 11 quantiles for each year. Firms with negative surprises are equally assigned to quantiles 1 to 5, and firms with positive surprises are equally assigned to quantiles 7 to 11. Firms with zero surprises are labeled as quantile 6. In general, the earnings announcement literature uses

earnings surprise quantiles rather than the raw value of earnings surprise because raw earnings surprises do not result in a well-specified linear regression (Bernard and Thomas, 1989). In Section 6, we show that the results are robust to alternative choices of earnings surprise partitions, such as decile sorting.

We first focus on the top and bottom groups, quantiles 1 and 11, because this makes it easy to interpret the magnitude of the effect. To test for the effect of macro news on the processing of earnings news, we run the following regression

$$CAR = a_0 + a_1 ESTOP + a_2 Macroday + a_3(ESTOP \times Macroday) + \sum_{i=1}^{n} b_i X_i + \sum_{i=1}^{n} c_i(ESTOP \times X_i) + e \quad (3)$$

where CAR is either $CAR\,[0,1]$ for immediate reaction, or $CAR\,[2,61]$ for drift. *ESTOP* equals to 1 if the earnings surprise quantile is 11 and 0 if the earnings surprise quantile is 1. $Macroday$ is a dummy variable equaling 1 if that day is an announcement day for any FOMC, Employment situation, ISM PMI, or Personal consumption news. X_i contains various control variables. Previous research shows that stock response to earnings news varies with firm size, analyst coverage, day of the week, the number of the same-day earnings announcements, and the aggregate stock market return (e.g., Bernard and Thomas, 1989; DellaVigna and Pollet, 2009; Hirshleifer, Lim, and Teoh, 2009; Gulen and Hwang, 2012). Thus, we include size deciles, analyst coverage, share turnover, day of week/month/year dummies, the number of earnings announcements per day, and market returns as control variables.

We consider two hypotheses. The first, motivated by past theoretical models, holds that attention to macro news draws attention away from processing the earnings announcements of individual firms. We call this *Substitution Hypothesis.* Alternatively, motivated by the discussion

in the introduction, that macro news may increase the sensitivity of price reactions to firms' earnings announcements. We call this *Complementarity Hypothesis.*

The key coefficient for testing between *Substitution Hypothesis* and *Complementarity Hypothesis* is a_3. Under *Complementarity Hypothesis,* the market's immediate reaction to earnings announcements is stronger, and the drift is weaker when macro news is released on the same day. Thus, $a_3 > 0$ for $CAR\,[0,1]$ and $a_3 < 0$ for $CAR\,[2,61]$. In contrast, under *Substitution Hypothesis*, we expect that $a_3 < 0$ for $CAR\,[0,1]$ and $a_3 > 0$ for $CAR\,[2,61]$.

Table 2 Panel A reports the results of this test. Column (1) presents the result from a parsimonious specification without including any control variables. The coefficient on the interaction term ($ESTOP \times Macroday$) is positive (1.277) and significant at the 1% level, suggesting that the price reaction to a large earnings surprise is stronger on macro-news days than on other days. The economic magnitude is also significant. Compared to the coefficient on the stock reaction to a top earnings surprise ($ESTOP$) on other days (8.352), the reaction on Macroday is greater by 15% (1.277/8.352). When control variables are included, the economic magnitude increases by 17% (1.373/8.127) in this comparison. The size of this effect is comparable to the 15% reduction for Friday announcements documented in DellaVigna and Pollet (2009), and the 13% reduction for high-news-day earnings announcements documented in Hirshleifer, Lim, and Teoh (2009).

For post-earnings announcement drift, the coefficient on the interaction term is negative (3.682 with controls) and significant at the 5% level, suggesting that post-earning announcement drift is smaller for top surprise earnings announcements released on macro-news days compared to other days' earnings news. Column (4) shows that our estimates indicate 71% (3.458/4.846) smaller drift for earnings announcements released on macro-news days. Again, the economic

magnitude is substantial, and is comparable to prior studies.[9] Overall, these results support the *Complementarity Hypothesis*.

[Insert Table 2 here]

To further understand how macro announcements affect drift, we compare the drift differences over various horizons in Fig.1. Here the drift difference is defined as the difference between average cumulative abnormal returns of the top group and of the bottom group. The drift difference between Macroday and non-Macroday announcements becomes evident on the 10th trading day after the earnings announcement and continues to increase during the next 60 trading days. Specifically, the drift on Macroday announcements increases quickly during the first 10 trading days after announcements and decreases slightly until the 50th trading day. In contrast, the drift on non-Macroday announcements displays a completely different pattern. It increases quickly during the first 10 trading days and continues to increase until the 60th trading day. These patterns suggest that earnings news released on macro-news days is almost fully incorporated in prices within 10 trading days following the announcement, whereas earnings news released on non-Macroday requires much more time to be incorporated into stock prices.

[Insert Fig. 1 here]

In the analysis above, we restricted our attention to extreme earnings surprise quantiles in

[9] Hirshleifer, Lim, and Teoh (2009) report that the post-earnings announcement drift is 75% greater for high-news-day earnings announcements compared to low-news day announcements. DellaVigna and Pollet (2009) find that the drift is 69% greater for Friday earnings announcements compared to other weekday earnings announcements.

which effects should be strongest. While this approach is simple and easy to interpret, it does not take advantage of the entire sample. We next examine how macro news affects investors' reactions to earnings announcements across all earnings surprises quantiles. To empirically test this effect, we estimate the following regression

$$CAR = d_0 + d_1 ES + d_2 Macroday + d_3(ES \times Macroday) + \sum_{i=1}^{n} f_i X_i + \sum_{i=1}^{n} g_i(ES \times X_i) + \varepsilon \quad (4)$$

where ES is the earnings surprise quantile, which equals 1 to 11, and other variables are defined as in Equation (3). Again, the coefficient on the interaction term (in this case, d_3) is the key parameter of interest.

Table 2 Panel B reports the regression results. Consistent with Panel A, the coefficient on the interaction term ($ES \times Macroday$) is positive and significant for $CAR[0,1]$, suggesting that immediate stock response to earnings news is stronger on Macrodays than on other days. As for the economic magnitude, compared to the coefficient on the stock reaction to earnings surprise on other days (0.842), the sensitivity to earnings news is greater by 11% (0.092/0.842) on Macrodays (Column (2)). For the drift, the coefficient on the interaction term is negative and significant at the 1% level, which indicates that the drift is smaller for earnings news released on Macrodays than for earnings news on other days. Column (4) indicates a 52% (0.201/0.388) smaller drift for earnings announcements released on Macrodays.

The controls in these tests derive from previously-studied effects. First, consistent with DellaVigna and Pollet (2009), we find that the immediate price reaction to earnings announcements is much smaller if the news is released on Friday. Second, we verify that earnings announcements released on days with a high number of earnings news releases experience much

weaker immediate reaction and much stronger drift, consistent with Hirshleifer, Lim, and Teoh (2009). Third, we verify that earnings released on days with high market returns have much stronger immediate reactions, which is consistent with Gulen and Hwang (2012).

The complementary relationship between macro news and earnings announcements is present after controlling for these effects; macro news is distinct from these determinants of short- or long-horizon price reactions to earnings. Macro-news can be announced on any day of the week, so our results are not just driven by the Friday inattention effect. Macro news is also a different type of information from the occurrence of a large number of firm-level earnings announcements. Like market return, macro news is a market-wide variable. However, macro news is pre-scheduled and is associated with information release, while the market return is unpredictable ex-ante. We provide several additional robustness tests controlling for these effects in Section 5.

Most studies use $CAR[0,1]$ to measure immediate price reaction to earnings announcements, but different studies use different measures to capture drift. Most use $CAR[2,61]$ as the measure of drift as in Bernard and Thomas (1989), but some studies use longer horizons such as $CAR[2,75]$ (e.g., DellaVigna and Pollet, 2009). To verify robustness of the findings in Table 2, we conduct tests based upon Equation (4) using different drift windows. Table 3 Panel A presents the result and demonstrates that the conclusion is robust.

[Insert Table 3 here]

To assess the effects of macro news on the processing of earnings news, we also look at the longevity of the drift. In our sample, there is no indication of drift beyond 240 trading days. Thus, we use the 240-day drift as the benchmark. Following Bernard and Thomas (1989), we then look

at the drift over different time horizons as a fraction of 240-day drift. The longevity of the drift is measured as the number of days until approximately 100% of the 240-day drift occurs.

Table 3 Panel B shows that the longevity of the drift is shorter for earnings announcements released on macro news days than for earnings announcements released on other days. For example, approximately 100% of the drift occurs within 210 days if earnings announcements are on macro-news days, while only 89% occurs within 210 days if earnings announcements are on days without macro news. For earnings released on non-macro-news days, the drift may last up to 240 trading days. To test whether difference in longevity of the drifts is significant, we examine the effect of macro news on the 210-day drift, which is crucial in measuring the longevity. Panel A Column (6) of Table 3 shows that the effect is statistically significant and substantial. This finding provides further support for the complementary relationship between macro and micro news. Macro news not only makes the drift of earning announcements smaller, but also shorter in terms of duration.

3.2 Portfolio trading strategy

An alternative way to test the effect of macro news on investors' reaction to earnings announcements is to design a trading strategy to exploit the fact that drift is greater for non-Macroday announcements than for Macroday announcements. This provides insight about whether sophisticated professionals understand the effects of macro-news on firm-level market efficiency. If they understand these effects well, then a trading strategy should have limited profitability for investors who trade at large scale. In other words, its profitability should either be low or concentrated in illiquid firms. Large trading profits to a liquid strategy would suggest that even sophisticated professionals are generally unaware of the effects we document.

A standard post-earnings announcement drift hedge portfolio goes long stocks with good earnings news and short stocks with bad earnings news. Owing to market underreaction to earnings

news, stocks with good earnings news will enjoy high returns within the following quarter. Similarly, stocks with bad earnings news will experience subsequent low returns within the following quarter.

The new drift trading strategy based on macro news is as follows. In month t, it purchases firms that, in month $t-1$ made announcements on a non-macro-day in the top quantile and sells short firms that made an announcement on a non-macro-day in the bottom quantile. Therefore, the return for the non-macro-day drift portfolio is $R_{NM}^{D} = R_{NM}^{11} - R_{NM}^{1}$. We construct the macro-day drift portfolio for month t following a similar procedure except that we only include firms that made an earnings announcement on a macro-news day in previous month. The return for this portfolio is $R_{M}^{D} = R_{M}^{11} - R_{M}^{1}$. The long-short portfolio of buying the non-macro-day drift portfolio and selling the macro-day portfolio has return, $R_{NM-M}^{D} = R_{NM}^{D} - R_{M}^{D}$. The intuition here is that conducting the traditional drift trading strategy on a macro-news day is not profitable or has negative profit. Thus, shorting the macro-day drift portfolio and longing the non-macro day drift portfolio will be profitable if macro-news indeed impacts investors' reactions to earnings announcements.

Table 4 presents the results of this trading strategy. Column 1 shows that a non-macro-day drift portfolio earns a return of 0.970% per month, while the return on the macro-day portfolio is much smaller and statistically insignificant (Column 2). The long-short portfolio earns 0.891% per month (Column 3). Standard risk factors, such as Fama-French three-factor are controlled in the regression (Fama and French, 1993). A similar conclusion is reached using an equally-weighted method for portfolio construction (Columns 4-6). Overall, these results are also consistent with a complementary relationship between macro and micro news.

[Insert Table 4 here]

4. Explanations

So far, we have documented a complementary relationship between macro news and earnings announcements which is not explained by existing theoretical literature. We next explore four potential explanations. These explanations are not mutually exclusive.

4.1 Investor attention

The first potential explanation is investor attention. As discussed in the introduction, a leading explanation for PEAD is that investors do not pay full attention to the information in earnings news. Thus, one possible explanation for increased reactions to earnings announcements when macro news is released is that investors pay more attention to earnings news on macro-news days. Macro news events such as FOMC announcements are attention-grabbing, which can encourage investors to focus on immediate valuation in stock markets rather than other activities. As a result, the fraction of investors who update their beliefs based upon earnings news increases.

To test the attention explanation, we use two direct measures of attention. One measure is abnormal institutional investor attention (AIA), which captures the news-searching and news-reading activity for specific stocks on Bloomberg terminals. Bloomberg assigns a raw score based on the number of ticker searches and the number of clicks on related articles for each firm. The AIA is a relative index compared to the previous month's average of the raw score and has a value from 0 to 4. The majority of the Bloomberg terminal users are institutional investors, so AIA is predominantly a measure of attention of institutions (see Ben-Rephael, Da, and Israelsen, 2017 for more details). The other measure is Google Search Volume Index (SVI), which captures the ticker-searching activity for each firm. Prior studies show that SVI is more informative about the attention of retail investors (Da, Engelberg, and Gao, 2011; Drake et al., 2012).

We first examine whether investors pay more attention to stocks with earnings announcements on macro-news days than on days without macro-news. In Table 5 Column (1), the coefficient on $Macroday$ is positive and significant at the 1% level, indicating that institutional investor attention to all firms is higher on macro-news days than on other days. We define $Eday$ as a dummy for whether there is an earnings announcement for each firm. The coefficient on $Eday$ is positive and significant, suggesting that attention to firms is higher when firms have earnings announcements.

Turning to the primary variable of interest, the coefficient on the interaction term ($Macroday \times Eday$) is positive and significant at the 1% level (Column 2). The economic magnitude is also large. The attention to earnings announcements is about 10% higher if major macro announcements are released on the same day. This indicates that institutional investors pay more attention to firms when earnings announcements are released on macro-news days compared to when earnings announcements are released on non-macro-news days. Interestingly, we find no evidence that retail investor attention to the stock market is higher on macro-news days (Column 3) and attention to firms with earnings announcements is even lower on macro-news days (Column 4). This is consistent with the study of Liu, Peng, and Tang (2019), who also find that retail investor attention gets crowded out by macro news. Overall, our findings strongly suggest that the complementary relationship between macro-news and earnings announcements is related to institutional investors' attention.

[Insert Table 5 here]

As discussed in the introduction, it is not obvious on basic conceptual grounds whether

attention substitution should be increasing or decreasing in investor sophistication. Since institutional investors are very important for the pricing of individual stocks, we further test whether the complementary relationship is concentrated among firms with high institutional ownership.

In general, it is plausible that investors pay more attention to stocks that they hold than stocks that they do not hold. This suggests two possibilities. On the one hand, if retail investors are more subject to attention limits, the effects could be stronger when retail holdings of a stock are high (i.e., institutional holdings of a stock are low). On the other hand, institutional investors tend to trade more actively than retail investors, and therefore are likely to be more important for price setting. This suggest that it is the attention of institutional investors that matters most, so that effects will be stronger in firms with high institutional holdings.

To test whether this is the case, we partition the sample of firms into low, medium, and high institutional ownership groups, and re-estimate regression Equation (4) separately for these three subsamples. Table 6 Panel A shows that the complementary relationship is only significant for firms with high institutional ownership. The economic magnitude is greater than that in Table 2. This finding again suggests the importance of institutional investors. This result does not have to hold for merely mechanically reasons. Although AIA is a good measure for institutional attention, it only captures the activities by institutional investors who use Bloomberg terminals. Institutional ownership is based on holdings of all institutional investors. Therefore, this finding provides further support for the AIA result.

[Insert Table 6 here]

4.2 Information transmission

Another possible source of the complementary relationship between macro and micro news derives from complementarity of information content. The content of macro news may make firm-level news incrementally more informative about firm value, resulting in stronger price reactions to earnings announcements.

We test this information transmission explanation by examining financial analyst forecasts of earnings. If there is important information from macro news for interpreting firm-level news, analysts should learn from it and revise their forecasts accordingly. We test two implications of this information transmission explanation for analyst forecast revisions.

The first implication is that analysts revise their forecasts more frequently for earnings announcements that occur on macro-news days. We count the number of analyst revisions 1 to 10 days before earnings announcements. Table 7 Column (1) presents the result. The coefficient on $Macroday$ is positive, suggesting that analysts revise their forecasts more frequently for earnings announcements released on macro-news days. This is consistent with the information transmission channel.

The second implication is that analysts issue more accurate forecasts for earnings announcements released on macro-news days since they are able to learn from macro news. We define the forecast quality as the negative value of forecast errors.[10] Our premise is that small forecast errors are indicative of high forecast quality. Table 7 Column (2) presents the result. The coefficient on $Macroday$ is positive, suggesting that analyst forecasts for earnings announcements released on macro-news days are more accurate than other ones. This result is consistent with the information transmission channel.

[10] Following the literature, analyst forecast error is defined as the absolute value of the difference between predicted earnings by analysts and actual earnings, scaled by stock prices.

[Insert Table 7 here]

To provide further evidence about the importance of the information transmission channel, we examine whether the complementary relationship varies with firm size and analyst coverage. Since idiosyncratic risk diversifies, large firms tend to be more highly correlated with the macro economy. This suggests that macro news will, in relative terms, be more pertinent to investors for understanding their earnings announcements. We therefore compare the effects of macro news on the sensitivity of prices to firm-level earnings news among small, medium, or large firms. Table 6 Panel B shows that the effect is more pronounced for large firms. Similarly, Table 6 Panel C shows that the effect is concentrated among firms with high analyst coverage. These results are supportive of the information transmission channel.[11]

4.3 Strategic timing of earnings announcements

Estimates of the complementarity or substitutive relationship between macro and earnings news could potentially be influenced by firms strategically choosing to announce their earnings on macro-news versus no-macro-news days. In the model of DellaVigna and Pollet (2009), a firm manager has an incentive to strategically release earnings news on Fridays to maximize short-term value. Similarly, the manager may also strategically release earnings news on macro news days. This raises the question of whether the complementary relationship is driven by strategic timing of earnings announcements.

[11] Note that these results do not fully rule out the attention channel. Evidence from past literature indicates that large firms attract greater attention in general. For example, Bhushan (1989) find large firms have higher analyst following. When macro-news triggers investor attention to the stock market, it is possible that this especially triggers investor attention toward large firms such as Apple and Microsoft.

We identify firms that shift their earnings announcement dates by comparing their current earnings announcement dates to the previous year's earnings announcement dates. Specifically, we categorize firms as having advanced or delayed their earnings dates if they differ from their previous same-quarter date by more than five days based on past studies (e.g., Hartzmark and Shue, 2018). We find that roughly 80% of firms do not substantially change their earnings announcement dates, 15% advance them by more than five days, and 5% delay them by more than five days.

Previous studies have hypothesized and provided evidence that firms tend to advance good news and defer bad news (e.g., deHaan, Shevlin, and Thornock, 2015; Johnson and So, 2018). Taking this idea further, firms with positive earnings news may strategically advance their earnings announcement date to a macro-news day because it is a salient day to investors and the market has stronger reactions to their announcements. Firms with negative earnings news may strategically delay their earnings announcement dates while avoiding a macro-news day. If this is the case, the average of earnings surprises of firms that advance earnings announcement dates to macro-news days would be more positive than that of firms that shift dates to other days. Similarly, the average of earnings surprises of firms that delay earnings announcement dates to macro-news days would be more negative than that of firms that shift dates to other days.

However, Table 8 Panel A shows that these effects are not present in the data. The difference in earnings surprises (0.013) for two groups of firms that advance their earnings announcements to macro-news days and other days is not statistically significant (t=0.349). Similarly, the difference in earnings surprise is not significant when firms delay their earnings announcements. Thus, these results suggest that firms do not strategically time their earnings announcements in conjunction with macro announcements.

Also, we examine whether firms are more likely to strategically change their earnings

announcements to a macro-news day when their earning surprise is positive versus negative. If firms strategically release earnings news on macro news days, firms with positive earnings surprises are more likely to do so because the market has stronger reactions to their announcements. Table 8 Panel B presents the results. Firms with positive (negative) earnings surprises are less (more) likely to change their earnings announcement dates to a macro-news day, which opposes the strategic timing account.

To examine whether the complementary relationship is driven by firms strategically changing their earnings announcement dates, we test whether the complementary relationship is present even firms that do not strategically change their earnings announcement dates. The results are described in Table 8 Panel C. Column (1) shows that firms that did not greatly change their announcement dates have a large positive coefficient of 0.095 on the immediate reaction that is statistically and economically significant. Firms that changed their earnings announcements forward or backward have insignificant coefficients for the effects of macro news on reaction to earnings news. Columns (2) reaches similar conclusion for the drift.[12] Overall, these results suggest that strategic timing does not drive the complementary relationship.

[Insert Table 8 here]

4.4 Trading frictions

We also examine the possibility that the complementary relationship between macro and micro news may be driven by a firm's liquidity premium. Even with rational investors, it is possible that

[12] As a robustness check, we show similar results when analyzing firms that changed their earnings announcements more than three days in the Internet Appendix.

the effect is driven by shifts in firms' liquidity premia if firms with positive earnings surprises are more liquid or have lower trading costs on Macrodays. Past literature shows that the earnings announcement premium is associated with liquidity risk (Sadka, 2006; Frazzini and Lamont, 2007).

Table 9 tests for such an explanation. We use two measures of liquidity: bid-ask spread and turnover. For a firm, greater bid-ask spread means it is less liquid, while higher turnover means it is more liquid. If the liquidity story holds, we would expect that the coefficient on the interaction term $ES \times Macroday$ is significant and positive. However, Table 8 shows that the coefficients are not significant. Thus, liquidity is unlikely to account for the complementary relationship.

[Insert Table 9 here]

4.5 Further evidence

So far, we examine four potential explanations for the complementary relationship between macro news and earnings announcements. Our results suggest that a combination of attention and information transmission channels may explain this complementary relationship. We next perform two further types of tests of these two channels.

First, to address the attention channel, we examine whether distraction events affect the incorporation of earnings news by the stock market. If extraneous news distracts investors from earnings news, the market reactions to earnings news will be weakened (Hirshleifer, Lim, and Teoh, 2009; DellaVigna and Pollet, 2009).[13] For distraction events, we use events related to terrorism and gun shooting. These two topics have been salient in the US in the past two decades. Terrorism and shooting events receive heavy attention in the media. Also, it is likely that such events generally convey little direct information about how a firm's fundamentals should react to earnings

[13] Peress and Schmidt (2020) study the effect of distraction events on noise trading.

news.[14] So the information transmission channel does not offer any implication that such extraneous news would affect the sensitivity of stock prices to earnings news.

Specifically, we use RavenPack (a database of news articles) to find events that are related to terrorism and gun shooting.[15] RavenPack data starts from 2000 and there are 778 events during the sample period. The regression specification is similar to Equation (4). We replace *Macroday* with *DistractDay*, which is a dummy variable equaling 1 if day t has a distracting event defined above. We exclude the days with important macro news in the sample.

Table 10 Panel A reports the results. The interaction term *ES*×*DistractDay* is negative and significant for CAR[0,1], suggesting that these events distract investors away from earnings news. The sensitivity to earnings news is smaller by 5% (0.049/0.893) on days with distraction events than that on other days. This magnitude is much smaller than the magnitude of macro-news (11%) in our main result, which may explain why the effect on the drift is not statistically significant. These results are consistent with the idea that distraction events lead investors to react less to earnings news, which supports the attention channel. We further examine the analyst forecasts around these events. Table 9 Panel B shows that the number of revisions and the forecast quality on days with distraction events are not significantly different to that on other days. This is consistent with the idea that these events do not contain useful information for firms and do not affect analyst forecasts.

[Insert Table 10 here]

[14] For example, a shooting might convey bad news to investors about law and order. Such news might induce some rational updating about the fundamental prospects of a firm. But it is much less obvious that this should cause rational expectations of future profits to be more sensitive or less sensitive to earnings news.

[15] We focus on the following types of events: "shooting", "violence", "bombing", "terrorism", "hijacking", "suicide-bombing", "evacuation", and "assassination."

Second, to further distinguish the attention channel from the information transmission channel, we examine complementary attention events. These are events which may *attract* investor attention to the stock markets, but also contain little direct information that is relevant for updating expectations in response to earnings news. The attention-grabbing events that we focus on are executive deaths and lawsuits involving famous firms. These events lead investors to pay attention to these firms and they may pay attention to other firms too (in this regard, see the evidence of Hirshleifer, Lim and Teoh (2009) about how same-industry earnings announcements draw attention to other firms in that industry). As a result, the attention channel suggests that market reactions to earnings news may be stronger on days with such complementary attention events. Also, as verification that these events have little truly relevant information about the fundamentals of the test firms, we verify whether these events affect analysts' forecasts of such firms.

We collect a list of complementary attention events from RavenPack for the top 50 stocks in terms of analyst coverage because they are famous among investors. We focus on two types of events: executive related sudden events (e.g., death, health, and scandal) and legal issues (e.g., regulatory investigation). There are 325 events during the sample period. We then examine whether they affect the processing of earnings announcements. These top 50 stocks are excluded in the analysis. The regression specification is similar to Equation (4). We replace *Macroday* with *AttractDay*, which is a dummy variable equaling 1 if day t has a complementary attention event defined above. We exclude the days with important macro news in the sample.

[Insert Table 11 here]

Table 11 Panel A reports the results. The interaction term *ES*×*AttractDay* is positive and

significant, suggesting that these events attract investors to earnings news. The effect on the drift is negative and significant. These results support the idea that complementary attention events lead investors to react more to earnings news. This is consistent with the attention channel. We further examine the analyst forecasts around these events. Table 10 Panel B shows that the number of revisions and the forecast quality on days with complementary attention events are not significantly different from their behaviors on other days. These results are consistent with the idea that these are non-information events and do not affect analyst forecasts.

Overall, these two tests are supportive of the attention channel by demonstrating effects that are consistent with that channel, and that are not predicted by the information transmission channel.

5. Additional results and robustness tests

We first discuss additional results to provide further insights about the sources of effects. Then, in Section 5.2, we discuss robustness checks.

5.1 Additional results

We next provide two additional results. First, we examine situations where earnings announcements are released a few days before or after macro news. For earnings announcements released after macro news, the information transmission explanation is potentially consistent with investors processing subsequent earnings news differently, because they can learn information from earlier macro news that is relevant for the interpretation of the earnings news. The attention explanation is potentially consistent with greater investor attention to subsequent earnings announcements being triggered by preceding macro news. Thus, both explanations are potentially consistent with stronger reactions to earnings. Table 12 Panel A shows that there is some effect of

macro news on immediate reactions to earnings news when earnings are released one day after macro news. As discussed above, this is potentially consistent with either the attention channel or the information transmission channel (or both).

For earnings announcements released before macro announcements, under the attention explanation, the *prospect* of scheduled arrival of macro-news may trigger firm-level attention. Consistent with this idea, other research shows that investor attention to the stock market (as measured by news media coverage) rises several days before macro announcements (Fisher, Martineau, and Sheng 2021). This would increase the sensitivity of the market reaction to earnings news. The information transmission explanation does not predict that the prospect of macro news will result in stronger market reaction to preceding earnings news. Table 12 Panel B shows that there is significant and positive effect of macro news on immediate reactions to earnings news when earnings are released one or two days before macro news. Again, this result is potentially consistent with either the attention channel or the information transmission channel (or both).

[Insert Table 12 here]

Second, a further plausible implication of the information transmission explanation is that macro news is more relevant for the processing of earnings news for industries that are more sensitive to macro news. Likewise, for the attention explanation, macro news may be a stronger trigger for attention in industries that are more sensitive to macro news. To perform this test, we use Fama French 10 industries. To estimate the sensitivity of the industry to macro news, we regress the value-weighted industry portfolio returns on *Macroday*. Industry sensitivity is measured by the coefficient on *Macroday*. We then compare whether industries that are more

sensitive to macro news have the largest effect of macro-news on the sensitivity of returns to earnings news. Table 13 presents the results. Columns (1) and (2) show that the effect of macro news on the processing of earnings news, is most pronounced in two big industries: (i) Wholesale, Retail, and Some Services; (ii) Other (including finance, business services, etc.). Consistent with this result, Column (3) shows that these two industries are also the industries that are very sensitive to macro news.[16]

[Insert Table 13 here]

5.2 Robustness tests

A possible concern is that the apparent complementary relationship actually reflects differences between firms that choose to announce on macro-news days and firms that announce on non-macro-news days. In the extreme, these two sets of firms might not overlap, so that the complementary relationship between macro news and earnings announcements is just the difference between this set of firms and other firms.

To address this concern, we calculate the fraction of firms that always issue their earnings announcements on macro-news days. Specifically, we create an Abnormal Announcement Preference Ratio (AAPR) for each firm, which is the number of earnings announcements on macro-news day divided by the total number of its announcements. Among firms that release earnings news on macro-news days at least once, less than 3% (114) of firms release more than 50% of their earnings news on macro-news days. This accounts for only 13% even if we count

[16] Given that the analysis is based on a sample of 10 industries, the evidence is suggestive. We also considered an analysis with a larger number of industries but doing so greater reduces the sample size for estimation. There are fewer observations within an industry when using a larger number of industries. In the sample of 30 industries, some industries have less than 1,000 observations, as compared to 158,399 observations in our main analysis.

firms that issue more than 33% of their earnings announcements on macro-news days. This evidence suggests that the complementary relationship between macro news and earnings announcements is unlikely driven by a set of firms that repeatedly announce earnings on macro-news days.

Nevertheless, we test for this possibility by re-estimating Equation (4) with a sample that excludes these firms. Table IA3 Panel A in the Internet Appendix reports the results of this test. It shows that the complementary relationship between macro news and earnings announcements on reactions to earnings news remains statistically and economically similar as in Table 2. Thus, our results cannot be driven by a small set of firms that have strong preference of announcement dates.

Hirshleifer, Lim, and Teoh (2009) find that investors' immediate reactions to earnings announcements are much weaker, and drift is much stronger when a large number of earnings are issued by other firms on the same day. Given that macro-news days have slightly fewer earnings announcements (Table 1 Panel B), a possible concern is that the complementary relationship between macro news and earnings announcements is driven by days with a low number of earnings news. We address this concern by removing days with a low number of earnings news (bottom quantile) and present the results in Table IA3 Panel B. It shows that the complementary relationship between macro and micro news is the same as in Table 2 at both statistical and economic levels. Thus, the complementary relationship between macro and micro news is a distinct contributor that is not explained by the number of earnings news.

Hirshleifer, Lim, and Teoh (2009) find the distraction effect is mainly driven by unrelated earnings news, which is defined earnings news from other industries. For the same-industry announcement, there is no distraction effect. This finding is similar in spirit to the finding of this paper that aggregate/macro announcement can draw attention to a firm rather than serves as a

distraction.

Gulen and Hwang (2012) show that investors' immediate reactions to corporate events, including earnings announcements, are much stronger and delayed reactions are much weaker when earnings are released on days with high market returns and the earnings surprises are positive. To the extent that both macro-news and market returns are aggregate variables, one may be concerned about the new implications from macro-news compared to market returns. The fact that market returns and macro-news are correlated (Savor and Wilson, 2013) and that market returns affect investors' reactions to earnings news does not mean that macro news is not a distinct phenomenon for studying investor behaviors. Macro-news is different from market returns for at least two reasons. First, macro-news affects stock market returns, but not the opposite. Also, many factors move stock market returns. Thus, the impact of market returns on investor behavior can come from factors other than macro news. Second, macro news is associated with information release and its impact on reactions to earnings news provides a unique setting to study the interaction between two types of information. This is crucial in understanding the channels through which macro-news affects investors' behavior.

To address the concern that macro-news and market returns are the same driving force for the changes in investors' reactions to earnings news, we re-estimate Equation (4) by excluding days with high market returns (top quantile). Table IA3 Panel C reports the results of this test. The complementary relationship between macro and micro news is barely affected by removing these observations, suggesting that market return swings cannot explain this effect.

Finally, we test whether the results are robust to alternative measures of investor reactions and earnings surprise groups. First, instead of using the market model, we use the Fama-French Three-Factor model when calculating $CAR[0,1]$ and $CAR[2,61]$ and re-estimate Equation (4). Table

IA3 Panel D presents the results. The coefficient on the interaction term is positive and significant for $CAR[0,1]$ (Column 1), and negative and significant for $CAR[2,61]$ (Column 2). Thus, the results are similar to the main findings in Table 2. The economic magnitudes of the coefficients are also similar. Moreover, we use 10 groups of earnings surprise and re-estimate Equation (4) and the results remain qualitatively and quantitatively similar (Table IA3 Panel E). Overall, the complementary relationship between macro and micro news is robust to the choice of model in calculating the reaction measures.

6. Conclusion

We investigate how the arrival of macro news affects the sensitivity of stock prices to firm-level earnings news. Models of limited attention in the stock market have predicted that since investors need to allocate cognitive resources between different activities, there will be substitution between attention to different signals. There is evidence of such distraction triggered by news arrival about individual stocks. Surprisingly, we find that the effects are opposite to this theoretical prediction: macro news increases the sensitivity of stock prices to firm-level news. So the relationship between macro and micro news is complementary.

A possible explanation for this complementary relationship between macro news and earnings announcements is the attention channel, wherein investors pay more attention to firm-level news on macro-news days. Another explanation is provided by the information transmission channel, wherein earnings announcements become more informative when there is also macro-news. We provide evidence consistent with both explanations. Moreover, we use events that potentially distract attention from the stock market (terrorism and gun shootings) to test for the effects of the attention channel. We find that that these events are associated with lower sensitivity of firm-level

returns to earnings news, consistent with the attention channel. We also use complementary attention events, which potentially draw attention to the stock market, to distinguish the attention channel from the information transmission channel. We find that these events are associate with greater sensitivity of firm level returns to earnings news, also consistent with the attention channel.

These results suggest that it will be fruitful to broaden the modeling of limited attention in the stock market to consider an additional margin for attention allocation—the margin between attending to the stock market at all versus other activities. In particular, our findings suggest that macro news stimulates overall attention to the stock market, including firm-specific news.

This evidence also speaks to the dynamics of market efficiency for individual stocks (Savor and Wilson, 2014; Rosch, Subrahmanyam, and van Dijk, 2017; Engelberg, McLean, and Pontiff, 2018; Birru, 2018). The finding of improved price efficiency on macro-news days differs from these papers in suggesting that shifts in attention allocation may be an important source of such market efficiency dynamics.

The idea that swings in investor attention are often in the same direction at macro-news level and the firm level, instead of being only between them, may operate much more broadly in financial markets than the application to earnings news that we have focused upon. Several stylized facts or anecdotal observations are potentially consistent with this idea. Investors trade individual stocks more heavily when the aggregate market has performed well (US: Statman, Thorley, and Vorkink, 2006); 46 countries: Griffin, Nardari, and Stulz, 2007). During sector or aggregate market bubble periods, it seems that investors become especially excited about individual stocks, as exemplified by the rise of day trading, investment clubs, and stock market chat rooms during the internet boom at the turn of the millennium. So the complementarity between aggregate and firm-level attention may be a far-reaching phenomenon.

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Fig. 1. Performance of drift at different horizons. This figure plots the cumulative abnormal returns over different horizons. Cumulative abnormal return for each stock is based on the market model. For event time, day 0 is the day of earnings announcement. X-axis is the event time window, and Y-axis is average cumulative abnormal returns (Quantile 11 minus Quantile 1).

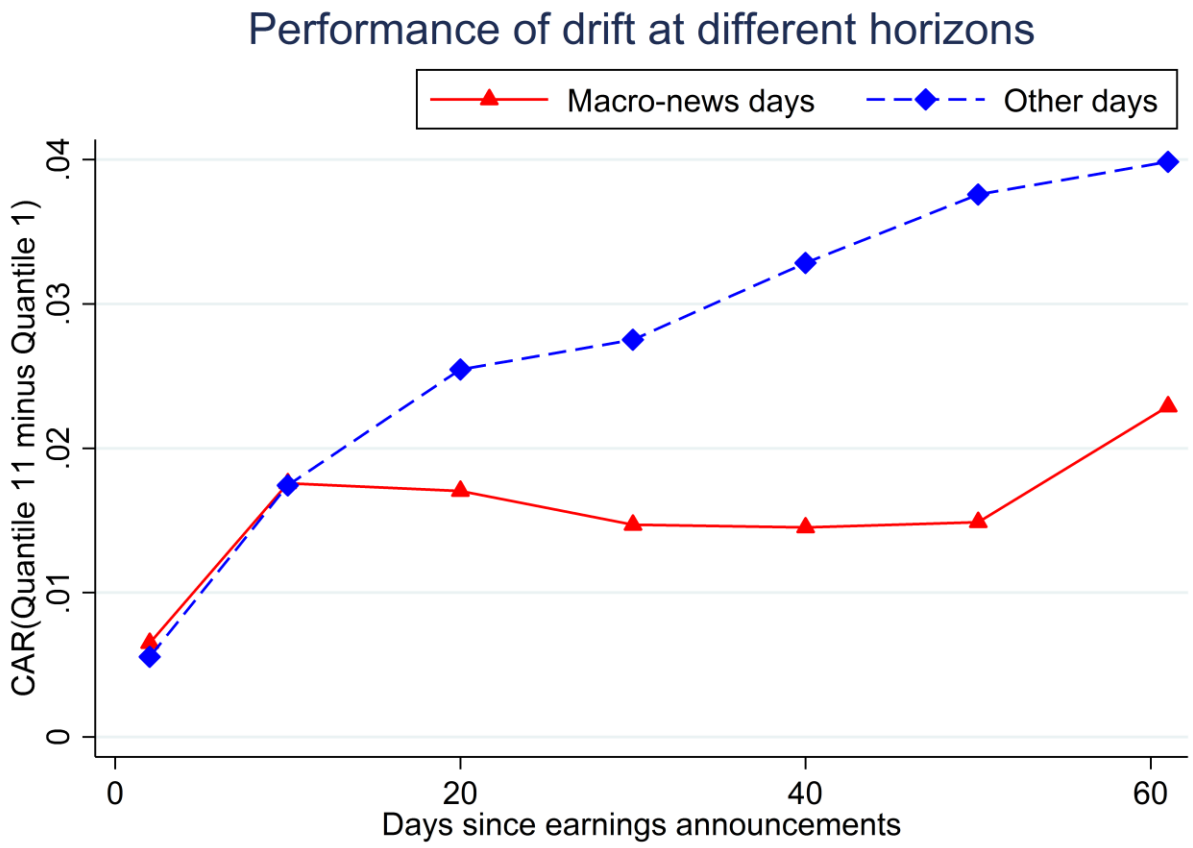

Table 1
Summary statistics

This table reports summary statistics. *SUE* is earnings surprise. *# Earnings news* is number of earnings announcements per day. *# Analyst* is the number of analysts following the firm. *Market cap* is the market capitalization. *Share turnover* is the turnover of a firm's share. and *Market return* is the daily value-weighted market return from CRSP, *CAR[0,1]* is the cumulative abnormal return based on market model over days [0,1].*CAR[2,61]* is the cumulative abnormal return based on market model over days [2,61]. Macro news days (*Macroday*) include days with announcements of Federal Open Market Committee (FOMC) decision, Employment situation, ISM PMI, or personal consumption.

Panel A. Full Sample

	Count	Mean	SD	P25	P50	P75
ES %	158399	-0.01	1.10	-0.05	0.04	0.21
# Earnings news	158399	118	79	46	107	180
# Analyst	158399	6.03	5.78	2	4	8
Market cap($ml)	158399	5187	20513	238	735	2617
Share turnover %	158399	2.42	4.01	0.48	1.22	2.83
Market returns %	158399	0.04	1.31	-0.60	0.09	0.67
CAR[0,1] %	158399	0.10	8.54	-3.77	0.02	3.96
CAR[2,61] %	158399	1.05	27.16	-12.44	-0.68	11.44

Panel B. Sample of Macroday vs. sample of other days

	Count		Mean		Mean comparison	
	Macroday	Other days	Macroday	Other days	Mean diff	T-stat
ES %	18876	139523	-0.004	-0.010	0.006	0.76
# Earnings news	18876	139523	110	119	-9	-13.92
# Analyst	18876	139523	6.12	6.02	0.10	2.16
Market cap($ml)	18876	139523	4895	5227	-332	-2.09
Share turnover %	18876	139523	2.63	2.39	0.24	7.78
Market returns %	18876	139523	0.25	0.01	0.24	23.75
CAR[0,1] %	18876	139523	0.24	0.08	0.16	2.34
CAR[2,61] %	18876	139523	0.70	1.09	-0.40	-1.88

Table 2
The complementary relationship between macro and micro news

This table reports the attention trigger effect. The dependent variable is cumulative abnormal return and is indicated under each column heading. *ES* is earnings surprise quantile (11 groups). ES Top equals to 1 if earnings surprise quantile is 11 and 0 if the earnings surprise quantile is 1. *Macroday* is a dummy variable equaling 1 if day *t* is an announcement day for Federal Open Market Committee (FOMC) decision, Employment situation, ISM PMI, or personal consumption. *Size* is the deciles of market capitalization of a firm. # *Earnings news* is the number of earnings announcements on that day. # *Analyst* is the number of analysts following the firm. Turnover is the turnover ratio, defined by trading volume divided by shares outstanding. Market return top is a dummy variable that equals to 1 if the market return of that day belongs to the top 10% during the sample period. Other control variables include dummy variables for year, month, and day of week. Standard errors are adjusted for heteroscedasticity and clustered by the day of earnings announcement. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Top and bottom groups

	(1)	(2)	(3)	(4)
	CAR[0,1]		CAR[2,61]	
ES Top	8.352***	8.127***	4.846***	5.190***
	(0.175)	(0.179)	(0.527)	(0.535)
Macroday	-0.667*	-0.514	1.912	1.468
	(0.369)	(0.377)	(1.349)	(1.358)
(ES Top)×Macroday	1.277***	1.373***	-3.458**	-3.682**
	(0.446)	(0.450)	(1.504)	(1.504)
Friday		-0.614		1.452
		(0.385)		(1.298)
Size		0.255***		-0.322***
		(0.036)		(0.101)
# Analyst		-0.917***		-0.572
		(0.147)		(0.426)
# Earnings news		-0.193*		0.804**
		(0.109)		(0.316)
Turnover		0.128***		0.022
		(0.043)		(0.059)
Market return top		0.352**		1.314**
		(0.165)		(0.533)
Constant	-4.491***	-3.299***	-0.385	3.328
	(0.137)	(0.633)	(0.446)	(2.275)
Controls	Y	Y	Y	Y
Observations	26,460	26,460	26,460	26,460
Adj. R2	0.119	0.124	0.004	0.018

Table 2 (continued)

Panel B: Full sample

	(1)	(2)	(3)	(4)
	CAR[0,1]		CAR[2,61]	
ES	0.848***	0.842***	0.357***	0.388***
	(0.011)	(0.011)	(0.029)	(0.029)
Macroday	-0.459**	-0.354*	1.056*	0.776
	(0.186)	(0.183)	(0.586)	(0.588)
ES×Macroday	0.089***	0.092***	-0.192**	-0.201***
	(0.026)	(0.025)	(0.076)	(0.076)
Friday		-0.263**		0.342
		(0.112)		(0.359)
Size		0.138***		-0.306***
		(0.011)		(0.030)
# Analyst		-0.213***		0.286**
		(0.044)		(0.112)
# Earnings news		-0.184***		0.155*
		(0.032)		(0.091)
Turnover		-0.235***		-0.003
		(0.017)		(0.021)
Market return top		0.183***		0.967***
		(0.051)		(0.154)
Constant	-5.737***	-5.019***	-1.513***	0.981
	(0.079)	(0.226)	(0.212)	(0.728)
Controls	Y	Y	Y	Y
Observations	158,399	158,399	158,399	158,399
Adj. R2	0.086	0.100	0.002	0.008

Table 3
Drift over different horizons and longevity of the drift

This table reports the impact of macro news on drift over different horizons. In Panel A, the dependent variable is cumulative abnormal return and is indicated under each column heading. *ES* is earnings surprise quantile (11 groups). *Macroday* is a dummy variable equaling 1 if day *t* is an announcement day for Federal Open Market Committee (FOMC) decision, Employment situation, ISM PMI, or personal consumption. Control variables include the number of earnings announcements, the number of analysts following the firm, analyst dispersion, market capitalization, share turnover, market return, and dummy variables for year, month, and day of week. Standard errors are adjusted for heteroscedasticity and clustered by the day of earnings announcement. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Panel B presents the longevity of the post-earnings announcement drift (PEAD). We calculate the PEAD over different time horizons and report the PEAD as a fraction of 240-day drift. We compare earnings announcements released on days with important macro announcements (Macroday) and earnings announcements on other days (Other days).

Panel A: Drift over different horizons

	(1)	(2)	(3)	(4)	(5)	(6)
	CAR[2,30]	CAR[2,45]	CAR[2,61]	CAR[2,75]	CAR[2,90]	CAR[2,210]
ES	0.250***	0.306***	0.388***	0.372***	0.376***	0.718***
	(0.018)	(0.023)	(0.029)	(0.035)	(0.038)	(0.071)
Macroday	0.135	1.262**	0.785	0.572	0.538	0.692
	(0.397)	(0.571)	(0.589)	(0.660)	(0.685)	(1.254)
ES×Macroday	-0.100*	-0.213***	-0.201***	-0.186**	-0.206**	-0.354**
	(0.051)	(0.072)	(0.076)	(0.087)	(0.090)	(0.162)
Constant	0.506	0.714	1.152	1.541*	2.039**	4.737***
	(0.462)	(0.553)	(0.727)	(0.819)	(0.850)	(1.350)
Controls	Y	Y	Y	Y	Y	Y
Observations	158,399	158,399	158,399	158,399	158,399	158,336
Adj. R2	0.005	0.005	0.008	0.006	0.005	0.004

Panel B: Longevity of the drift

	PEAD as a fraction of 240-day drift	
	(1)	(2)
Drift horizons	Macroday	Other days
[2,61]	0.234	0.209
[2,120]	0.457	0.383
[2,180]	0.746	0.653
[2,210]	1.000	0.888
[2,240]	1.000	1.000

Table 4
Trading strategy on drift portfolios

This table presents the results from a post-earning announcement drift trading strategy. The stock returns data is from CRSP and is matched with firms' characteristics from Compustat and I/B/E/S. The trading strategy portfolio based on non-macro-day drift is constructed as following. In month t, it purchases firms that, in month $t-1$ made an announcement on a non-macro-day in the top quantile; sells firms that made an announcement on a non-macro-day in the bottom quantile. Therefore, the return for the non-macro-day drift portfolio is $R_{NM}^{D} = R_{NM}^{11} - R_{NM}^{1}$. We construct the macro-day drift portfolio for month t following a similar procedure except that we only include firms that made an earnings announcement on a macro-day in a previous month. The return for this portfolio is $R_{M}^{D} = R_{M}^{11} - R_{M}^{1}$. The long-short portfolio of buying the non-macro-day drift portfolio and selling macro-day portfolio has return, $R_{NM-M}^{D} = R_{NM}^{D} - R_{M}^{D}$. The Fama-French three-factor returns are from Ken French's website. Standard errors are adjusted for heteroscedasticity and clustered by the day of earnings announcement. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Value-weighted			Equally-weighted		
	(1)	(2)	(3)	(4)	(5)	(6)
	Other days	Macroday	Difference	Other days	Macroday	Difference
Constant	0.970**	0.157	0.891**	1.150***	0.350***	0.804**
	(0.387)	(0.478)	(0.437)	(0.397)	(0.108)	(0.406)
Market Excess Return	0.078	-0.092	0.170	0.263	-0.027	0.290*
	(0.200)	(0.148)	(0.234)	(0.166)	(0.065)	(0.164)
Size Factor Return (SMB)	0.180	-0.336**	0.517**	0.015	-0.172**	0.187
	(0.235)	(0.142)	(0.259)	(0.168)	(0.072)	(0.180)
Value Factor Return (HML)	0.020	-0.211	0.231	0.059	-0.154	0.213
	(0.227)	(0.215)	(0.276)	(0.206)	(0.122)	(0.220)
Observations	179	179	179	179	179	179
Adj. R2	0.011	0.025	0.018	0.002	0.019	0.014

Table 5
Investor attention

This table presents the results of investor attention. Abnormal institutional investor attention (AIA) is the news-searching and news-reading activity for Russell 3000 firms from Bloomberg terminal. AIA is a dummy variable if AIA index is higher than 2. The regression for AIA test is a probit test and the reported coefficient is marginal effects (there is no constant term reported and Pseudo R-squared is reported). Both measures are at daily frequency. *Eday* is dummy variable equaling 1 if that has one or more earnings announcements. Google search volume index (SVI) is the ticker-searching activity for S&P 500 firms. Control variables include dummy variables for year, month, and day of week. *Macroday* is a dummy variable equaling 1 if day *t* is an announcement day for Federal Open Market Committee (FOMC) decision, Employment situation, ISM PMI, or personal consumption. Control variables include the number of earnings announcements, the number of analysts following the firm, analyst dispersion, market capitalization, share turnover, market return, and dummy variables for year, month, and day of week. Standard errors are adjusted for heteroscedasticity and clustered by the day of earnings announcement. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
Attention measure	AIA		SVI	
Macroday	0.011***	0.012***	0.000	0.001
	(0.002)	(0.002)	(0.002)	(0.002)
Eday	0.522***	0.525***	0.098***	0.106***
	(0.008)	(0.008)	(0.035)	(0.035)
Macroday×Eday		0.055***		-0.025***
		(0.017)		(0.008)
Constant			0.008***	0.008***
			(0.001)	(0.001)
Controls	Y	Y	Y	Y
Observations	1,173,450	1,173,450	632,494	632,494
Adj. R2/Pseudo R2	0.039	0.039	0.003	0.003

Table 6
Heterogeneity

This table reports how the complementary relationship varies with firm size, analyst coverage, and institutional ownership. The dependent variable is cumulative abnormal return and is indicated under each column heading. ES is earnings surprise decile (11 groups), $Macroday$ is a dummy variable equaling 1 if day t is an announcement day for Federal Open Market Committee (FOMC) decision, Employment situation, ISM PMI, or personal consumption. Panel A reports the tests on three subsamples partitioned based on institutional ownership ($Instown$) decile calculated from Thomson Reuters Institutional (13f) Holdings data. Firms with low, medium, and high institutional ownership are in $Instown$ decile 1 to 3, 4 to 7, and 8 to 10, respectively. Panel B reports the tests on three subsamples partitioned based on firm size decile. Small, medium, and large firms are in size decile 1 to 3, 4 to 7, and 8 to 10, respectively. Panel C reports the tests on three subsamples partitioned based on analyst coverage. Low, medium, and high coverage firms are firms in decile 1 to 3, 4 to 7, and 8 to 10, respectively. Control variables include the number of earnings announcements, the number of analysts following the firm, analyst dispersion, market capitalization, share turnover, market return, and dummy variables for year, month, and day of week. Standard errors are adjusted for heteroscedasticity and clustered by the day of earnings announcement. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Institutional ownership

	(1)	(2)	(3)	(4)	(5)	(6)
	Low Instown		Medium Instown		High Instown	
	CAR[0,1]	CAR[2,61]	CAR[0,1]	CAR[2,61]	CAR[0,1]	CAR[2,61]
ES	0.706***	0.621***	0.933***	0.244***	1.038***	0.225***
	(0.013)	(0.044)	(0.013)	(0.037)	(0.017)	(0.044)
Macroday	-0.065	-0.441	-0.078	0.600	-0.740**	1.544*
	(0.280)	(0.951)	(0.275)	(0.776)	(0.348)	(0.885)
ES×Macroday	0.038	-0.140	0.042	-0.109	0.127***	-0.246**
	(0.038)	(0.127)	(0.036)	(0.102)	(0.046)	(0.116)
Controls	Y	Y	Y	Y	Y	Y
Observations	40,705	40,705	54,267	54,267	40,677	40,677
Adj. R2	0.079	0.011	0.112	0.008	0.129	0.009

Panel B: Firm size

	(1)	(2)	(3)	(4)	(5)	(6)
	Small firms		Medium firms		Large firms	
	CAR[0,1]	CAR[2,61]	CAR[0,1]	CAR[2,61]	CAR[0,1]	CAR[2,61]
ES	0.765***	0.597***	0.966***	0.255***	0.783***	0.257***
	(0.018)	(0.050)	(0.020)	(0.052)	(0.016)	(0.044)
Macroday	0.184	-2.000**	-0.570*	0.503	-0.875***	3.914***
	(0.296)	(0.921)	(0.343)	(1.007)	(0.308)	(1.136)
ES×Macroday	0.027	0.007	0.117**	-0.192	0.154***	-0.529***
	(0.040)	(0.125)	(0.048)	(0.129)	(0.042)	(0.146)
Controls	Y	Y	Y	Y	Y	Y
Observations	50,134	50,134	53,952	53,952	54,313	54,313
Adj. R2	0.096	0.015	0.136	0.008	0.089	0.009

Panel C: Analyst coverage

	(1)	(2)	(3)	(4)	(5)	(6)
	Low analyst coverage		Medium analyst coverage		High analyst coverage	
	CAR[0,1]	CAR[2,61]	CAR[0,1]	CAR[2,61]	CAR[0,1]	CAR[2,61]
ES	0.764***	0.611***	0.936***	0.190***	0.852***	0.257***
	(0.015)	(0.044)	(0.018)	(0.047)	(0.020)	(0.057)
Macroday	-0.381	0.134	-0.226	-0.285	-0.564	3.272**
	(0.263)	(0.927)	(0.316)	(0.917)	(0.425)	(1.274)
ES×Macroday	0.094**	-0.176	0.077*	-0.107	0.114**	-0.423**
	(0.037)	(0.121)	(0.043)	(0.119)	(0.058)	(0.165)
Controls	Y	Y	Y	Y	Y	Y
Observations	54,792	54,792	53,710	53,710	49,897	49,897
Adj. R2	0.093	0.012	0.120	0.008	0.090	0.011

Table 7
Analyst revisions

This table presents the result of the test on whether analyst revisions are different for earnings announcements released on days with important macro news (Macroday) compared to earnings released on other days. *# of revisions* is number of analyst revision 1 to 10 days before earnings announcements. *Forecast quality* is the negative value of forecast errors, which is defined as the absolute value of the difference between predicted earnings by analysts and actual earnings, scaled by stock prices. $Macroday$ is a dummy variable equaling 1 if day *t* is an announcement day for Federal Open Market Committee (FOMC) decision, Employment situation, ISM PMI, or personal consumption. *Size* is the deciles of market capitalization of a firm. *# Earnings news* is the number of earnings announcements on that day. *# Analyst* is the number of analysts following the firm. Turnover is the turnover ratio, defined by trading volume divided by share outstanding. Market return top is a dummy variable that equals to 1 if the market return of that day belongs to the top 10% during the sample period. Standard errors are adjusted for heteroscedasticity and clustered by the day of earnings announcement. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1) # of revisions	(2) Forecast quality
Macroday	0.092***	0.014***
	(0.031)	(0.005)
Size	0.127***	0.030***
	(0.008)	(0.002)
# Analyst	1.008***	-0.106***
	(0.055)	(0.007)
# Earnings news	-0.314***	0.003
	(0.035)	(0.005)
Turnover	0.046***	-0.009***
	(0.006)	(0.001)
Market return top	-0.020	-0.016***
	(0.013)	(0.003)
Constant	-0.671***	-0.073**
	(0.146)	(0.028)
Controls	Y	Y
Observations	158,399	158,399
Adj. R2	0.189	0.024

Table 8
Strategic timing of earning announcements

This table tests whether the complementary relationship is driven by a firm's strategic timing of earning announcements. Δ*date* is the difference between the day of the current earnings announcements and the previous year's same-quarter earnings announcement. Panel A presents results of t-test on the difference between average earnings surprise (*Avg.ES*) on macro-news days and *Avg. ES* on other days. Panel B examines whether firms are more likely to strategically change their earnings announcements to a macro-news day when their earning surprise is positive versus negative. *Eday Change* is a dummy variable equaling 1 if the absolute value of Δ*date* is greater than 5. *Positive ES* is a dummy variable equaling 1 if the earning surprise is positive. *Negative ES* and *Neutral ES* are defined in the same way. Panel C presents regression results. The dependent variable is cumulative abnormal return and is indicated under each column heading. *ES* is earnings surprise quantile (11 groups), and *Macroday* is a dummy variable equaling 1 if day *t* is an announcement day for Federal Open Market Committee (FOMC) decision, Employment situation, ISM PMI, or personal consumption. Control variables include the number of earnings announcements, the number of analysts following the firm, analyst dispersion, market capitalization, share turnover, market volatility, and dummy variables for year, month, and day of week. Standard errors are adjusted for heteroscedasticity and clustered by the day of earnings announcement. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Earnings date change and surprise

	Δ date<-5			Δ date>5		
	Count	Mean	SD	Count	Mean	SD
Avg.ES (%) on macro days	1137	0.052	1.230	6851	-0.063	1.327
Avg.ES (%) on other days	7202	0.039	1.185	53540	-0.067	1.241
Differences		0.013			0.004	
t-stat		0.349			0.246	

Panel B: Changes in earnings date and earnings surprises

	Eday Change		
Positive ES	-0.011*		
	(0.006)		
Negative ES		0.011*	
		(0.007)	
Neutral ES			0.003
			(0.011)
Constant	0.227***	0.217***	0.221***
	(0.005)	(0.004)	(0.003)
Observations	17,631	17,631	17,631
Adj. R2	0.000	0.000	0.000

Panel C: Earning announcement date change and the impact of macro news

	(1) CAR[0,1]	(2) CAR[2,61]
ES×Macroday if abs(Δ date)<=5	0.095***	-0.263***
	(0.029)	(0.090)
ES×Macroday if abs(Δ date)>5	0.077	-0.010
	(0.051)	(0.146)

Table 9
Trading frictions

This table tests whether the complementary relationship is driven by a firm's liquidity. The dependent variables are bid-ask spread and turnover. *ES* is earnings surprise decile (11 groups), and *Macroday* is a dummy variable equaling 1 if day *t* is an announcement day for Federal Open Market Committee (FOMC) decision, Employment situation, ISM PMI, or personal consumption. *Bid-ask* is bid-ask spread and *Turnover* is the firm's trade volume divided by number of shares outstanding. Control variables include the number of earnings announcements, the number of analysts following the firm, analyst dispersion, market capitalization, market return, and dummy variables for year, month, and day of week. Standard errors are adjusted for heteroscedasticity and clustered by the day of earnings announcement. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
	Bid-ask		Turnover	
ES	-0.182***	-0.201***	0.002***	0.002*
	(0.028)	(0.041)	(0.000)	(0.001)
Macroday	-0.008***	-0.008***	0.000***	0.000***
	(0.001)	(0.002)	(0.000)	(0.000)
ES×Macroday		0.003		0.000
		(0.004)		(0.000)
Constant	1.703***	1.706***	0.031***	0.031***
	(0.064)	(0.064)	(0.001)	(0.001)
Controls	Y	Y	Y	Y
Observations	127,045	127,045	158,399	158,399
Adj. R2	0.105	0.105	0.006	0.006

Table 10
Distraction events

This table reports the interaction between earnings announcements and distraction events of terrorism and shooting. In Panel A, the dependent variable is cumulative abnormal return and is indicated under each column heading. *ES* is earnings surprise quantile (11 groups). *DistractDay* is a dummy variable equaling 1 if day *t* has a distracting event of terrorism and shooting based. In Panel B, the dependent variables are *# of revisions*, which is number of analyst revision 1 to 10 days before earnings announcements, and *Forecast quality,* which is the negative value of forecast errors (the absolute value of the difference between predicted earnings by analysts and actual earnings, scaled by stock prices). Control variables include the number of earnings announcements, the number of analysts following the firm, analyst dispersion, market capitalization, share turnover, market return, and dummy variables for year, month, and day of week. Standard errors are adjusted for heteroscedasticity and clustered by the day of earnings announcement. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Reactions to earnings announcements

	(1) CAR[0,1]	(2) CAR[2,61]
ES	0.893***	0.327***
	(0.013)	(0.031)
DistractDay	0.364**	1.104**
	(0.168)	(0.490)
ES×DistractDay	-0.049**	-0.038
	(0.023)	(0.066)
Constant	-6.057***	-1.144***
	(0.092)	(0.232)
Controls	Y	Y
Observations	121,509	121,509
Adj. R2	0.091	0.002

Panel B: Analyst revisions

	(1) # of revisions	(2) Forecast quality
DistractDay	-0.031	0.001
	(0.101)	(0.001)
Constant	-0.485***	-0.002
	(0.080)	(0.001)
Controls	Y	Y
Observations	121,509	121,509
Adj. R2	0.195	-0.000

Table 11
Complimentary attention events

This table reports the interaction between earnings announcements and complimentary attention events of top 50 firms. The top 50 firms are ranked based on analyst coverage. In Panel A, the dependent variable is cumulative abnormal return and is indicated under each column heading. *ES* is earnings surprise quantile (11 groups). *Attract* is a dummy variable equaling 1 if day *t* has an attention-grabbing event from top 50 firms. In Panel B, the dependent variables are *# of revisions*, which is number of analyst revision 1 to 10 days before earnings announcements, and *Forecast quality,* which is the negative value of forecast errors (the absolute value of the difference between predicted earnings by analysts and actual earnings, scaled by stock prices). Control variables include the number of earnings announcements, the number of analysts following the firm, analyst dispersion, market capitalization, share turnover, market return, and dummy variables for year, month, and day of week. Standard errors are adjusted for heteroscedasticity and clustered by the day of earnings announcement. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Reactions to earnings announcements

	(1) CAR[0,1]	(1) CAR[2,61]
ES	0.830***	0.250***
	(0.013)	(0.019)
AttractDay	-0.365***	0.819***
	(0.134)	(0.225)
ES×AttractDay	0.074***	-0.053*
	(0.018)	(0.030)
Constant	-5.669***	-1.358***
	(0.094)	(0.139)
Controls	Y	Y
Observations	137,985	137,985
Adj. R2	0.086	0.002

Panel B: Analyst revisions

	(1) # of revisions	(2) Forecast quality
AttractDay	-0.001	0.003
	(0.013)	(0.003)
Constant	-0.282**	-0.004
	(0.143)	(0.004)
Controls	Y	Y
Observations	137,985	137,985
Adj. R2	0.182	-0.000

Table 12
Earnings announcements before or after macro-news days

This table presents the lead and lag effect of macro news and earnings news. The dependent variable is cumulative abnormal return and is indicated under each column heading. ES is earnings surprise quantile (11 groups). "One day before" indicates that the macro news announcement is one day before the earnings announcement. The same definition applies to other lead and lag windows. For cases where the macro-news day is one-day before the earnings announcements, $Macroday_{t-1}$ equals to 1 if there is macro-news on day $t-1$ for an earnings announcement released on day t. Macro announcements include Federal Open Market Committee (FOMC) decision, Employment situation, ISM PMI, or personal consumption. Control variables include the number of earnings announcements, the number of analysts following the firm, analyst dispersion, market capitalization, share turnover, market return, and dummy variables for year, month, and day of week. Standard errors are adjusted for heteroscedasticity and clustered by the day of earnings announcement. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Earnings announcements are released after Macro news

	1 day after (j=1)		2 days after (j=2)		3 days after(j=3)	
	CAR[0,1]	CAR[2,61]	CAR[0,1]	CAR[2,61]	CAR[0,1]	CAR[2,61]
$ES \times Macroday_{t-j}$	0.045*	-0.064	0.019	-0.102	0.006	-0.039
	(0.023)	(0.070)	(0.023)	(0.066)	(0.023)	(0.071)

Panel B: Earnings announcements are released before Macro news

	1 day before (k=1)		2 days before (k=2)		3 days before(k=3)	
	CAR[0,1]	CAR[2,61]	CAR[0,1]	CAR[2,61]	CAR[0,1]	CAR[2,61]
$ES \times Macroday_{t+k}$	0.061***	-0.028	0.063***	-0.032	0.023	-0.040
	(0.021)	(0.061)	(0.022)	(0.063)	(0.022)	(0.068)

Table 13
Industry analysis

This table presents evidence on the effects of macro news on the processing of earnings in different industries. We use Fama-French 10 industries. For each industry, we run the regression Equation (4) in the paper. The coefficients on the interaction term *ES* ×*Macroday* are reported for each industry in Columns (1) and (2). We regress the value-weighted industry portfolio returns on *Macroday*. Industry sensitivity is measured by the coefficient on *Macroday* and reported in Column (3). Standard errors are adjusted for heteroscedasticity and clustered by the day of earnings announcement. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Fama French 10 Industries	(1) CAR[0,1]	(2) CAR[2,61]	(3) Industry sensitivity
Consumer Non-durables	0.097	-0.540**	-0.131
	(0.145)	(0.271)	(0.338)
Consumer Durables	-0.026	-0.478	-0.154
	(0.160)	(0.385)	(0.513)
Manufacturing	0.093	-0.025	0.436
	(0.059)	(0.179)	(0.282)
Oil, Gas, and Coal extraction and production	0.063	-0.432	0.099
	(0.094)	(0.356)	(0.322)
Business Equipment	0.121*	-0.170	0.032
	(0.063)	(0.168)	(0.368)
Telephone and Television Transmission	0.117	0.090	-0.447
	(0.158)	(0.348)	(0.494)
Wholesale, Retail, and Some Services	0.206**	-0.514**	-0.624**
	(0.094)	(0.239)	(0.289)
Healthcare, Medical Equipment, and Drugs	0.133**	-0.416	-0.232
	(0.064)	(0.266)	(0.333)
Utilities	0.063	-0.238	0.171
	(0.047)	(0.164)	(0.187)
Other (finance, business service, etc)	0.083**	-0.226**	0.557**
	(0.035)	(0.104)	(0.258)