Macro News, Micro News, and Stock Prices*

Jinfei Sheng†

University of British Columbia

December 2016

Abstract

I present evidence of a complementary relation between macro announcements and firm-specific news by examining how macro news affects investors' reactions to earnings announcements. It is well known that investors tend to react to earnings news slowly and there are drifts following firms' earnings announcements. The presence of macro news significantly impacts investors' reactions to earnings news: immediate price reaction is 17% stronger and the drift is 71% weaker when important macro news is released on the same day. This effect also exists when earnings news is released on days with a large number of macro announcements. I further investigate several potential explanations and find that institutional investors pay substantially more attention to announcing firms on macro-news days. The results cannot be explained by changes in risk, information transmission from macro news or strategic timing. Overall, these findings provide new evidence that the market is more efficient on macro-news days and investor attention is allocated rationally and is not always limited by the quantity of information.

Keywords: macro news, earnings announcements, drift, market efficiency, investor attention.

* First draft: August 2015. I am grateful to my advisors Adlai Fisher, Murray Carlson, Kai Li, Jan Bena and Carolin Pflueger for constant guidance and support. I also thank Markus Baldauf, Oliver Boguth, Nuno Clara (discussant), Jack Favilukis, Wayne Ferson, Lorenzo Garlappi, Ron Giammarino, Thomas Gilbert, Will Gornall, Alexander Hillert (discussant), Hernan Ortiz-Molina, Elena Simintzi, Selim Topaloglu (discussant), Dexin Zhou and seminar participants at UBC, 2016 LBS TADC, 2016 NFA, 2016 FMA Doctoral Consortium for helpful discussions and comments. I thank Michael Drake for sharing the daily Google Search Volume data. All errors are my own.

† Sauder School of Business, University of British Columbia. Email: jinfei.sheng@sauder.ubc.ca.

1. Introduction

The link between information and asset price is one of the most important questions in finance literature. Investors are often faced multiple sets of information at the same time. Thus, the interaction between different types of information is crucial to understand how information is incorporated into stock prices. Broadly speaking, there are two types of news: economic-wide (macro) and firm-specific (micro) news. In this paper, I study the interaction between macro and micro news. In particular, I examine whether macro news affects how investors react to firms' earnings announcements and what the implications of this effect are for asset pricing.

Although the notion that macro news affects investor reaction to earnings announcements is economically intuitive, the direction of this effect is not clear ex ante. It is well documented that investors react to earnings announcements slowly and earnings news is incorporated into stock prices only gradually, which is called "post-earnings announcements drift."[1] One major reason for the drift is that not all the investors pay attention to earnings announcements when the information is released. Investors are distracted by other firms' earnings announcements (Hirshleifer, Lim, and Teoh, 2009), and they pay less attention when the earnings news is released on Friday (DellaVigna and Pollet, 2009). Thus, on the one hand, the presence of macro news distracts investors, leading to less attention to earnings announcements. I call this a *substitute relationship* between macro and micro news. On the other hand, macro announcements like Federal Open Market Committee (FOMC) decisions are usually attention-grabbing events, and draw investor's attention to stock markets. As a result, investors pay more attention to earnings announcements on macro-news days. I call this a *complementary relationship*.

I first examine whether macro news affects investor behavior around firms' earnings release

[1] See Ball and Brown (1968), Bernard and Thomas, (1989, 1990).

by focusing a set of four important macro announcements. I find that the immediate price reaction to a firm's earnings surprise is significantly stronger and the drift is significantly weaker when macro news is released on the same day. This result suggests that earnings information released on macro-news days is incorporated into stock prices much faster, leading to more efficient stock valuation. The finding remains after controlling for existing factors that affect investor reaction to earnings news, such as the number of earnings news, the day of week, and the level of market returns. The economic magnitude of such effect is significant. Firms with the largest earnings surprises on macro-news days experience a 17% higher immediate reaction and a 71% lower drift compared to reactions to earnings surprises on other days. This macro-news effect on price reactions to earnings announcements still holds if I measure drifts at various horizons. Overall, these results support the *complementary relationship* between macro and earnings news.

I further examine whether such complementary relationship exists on days with many macro announcements. Using a full list of macro announcements from Bloomberg, I identify days with a large number of macro announcements. I find that investor' immediate reaction to earnings announcements is 12% stronger and the drift is 46% weaker when earnings announcements are released on days with many macro announcements. This finding further confirms that macro and earnings news are complementary.

Another way to test the impact of macro news on investors' reaction to earnings announcements is to use a trading strategy designed to capture this impact. The drift suggests that firms that have positive (negative) earnings surprises experience increases (decreases) in stock prices following announcements. Thus, a typical trading strategy based on drift buys stocks with positive earnings surprises and shorts stocks with negative earnings surprises. Such strategy no longer has abnormal returns for earnings released on macro-news days, though it still has about 1%

abnormal returns per month among earnings announcements released on non-macro-news days. In short, the trading strategy approach confirms the effect of macro news on investors' reactions to earnings announcements.

I then investigate several explanations for why investors' reactions to earnings announcements are so different on macro-news days. One possible explanation has to do with investor attention. It is possible that investors pay more attention to stock markets on macro-news days, leading to more reactions to earnings announcements. The theoretical foundation for this explanation lies in rational attention literature. Financial economists have established that investors have limited amount of time and cognitive resources, and they allocate them rationally (Hirshleifer and Teoh, 2003; Peng and Xiong, 2006; Kacperczyk, Nieuwerburgh, and Veldkamp, 2016). Given that macro-news is one of the most important information for investment decision and is pre-scheduled, investors may rationally choose to pay more attention to stock markets on macro-news days.

To test this explanation, I use a measure of abnormal institutional investor attention (AIA) from Bloomberg (Ben-Rephael, Da, and Israelsen, 2016). I find that AIA is higher on macro-news days in general, and AIA to firms with earnings announcements is significantly higher when macro-news is released on the same day. I also find that the macro-news effect is concentrated among firms with high institutional ownerships. Moreover, investors' trading volume reaction to earnings announcements is substantially higher on macro-news days. Together, these results suggest that the impact of macro news on investors' reactions to earnings announcements is strongly related to investors' attention.

The second potential explanation is related to risk. Savor and Wilson (2013) find that the market risk premium is higher on macro-news days due to the fact that the market becomes riskier when macro-news is announced. Patton and Verardo (2012) show that firms' betas increase on

earnings-announcement days, and their betas decrease from the second trading day after news release. Thus, the increased immediate reactions can be driven by announcing firms high betas on announcement days, and the decreased drift may be related to lower beta afterwards. However, I only find some weak evidence that the market risk loadings are associated with the macro-news effect on reactions to earnings announcements. Furthermore, the risk-based explanation cannot explain why investor's immediate reactions to earnings announcements still increase even if macro-news is released one or two days after the earnings news. According to Patton and Verardo (2012), firms' betas already start declining when macro-news is released one or two days after earnings announcements and we would expect weaker immediate reactions. Instead, I observe the opposite pattern. Overall, the risk explanation cannot consistently account for the macro-news effect documented above.

A further possible explanation is related to information transmission from macro-news to earnings announcements. The presence of macro news may help investors process earnings news in a better or faster manner, resulting in stronger reactions to earnings announcements. Macro news is one type of information that affects investors' expectations of firm values. When investors face both macro news and firm-specific news, the presence of macro news may affect how investors process firm-specific information. Goldstein and Yang (2015) provide theoretical evidence that the presence of complementarities facilitates information acquisition and improves price informativeness.[2] Although the information spillover explanation is appealing, I do not find any supporting evidence. I find that the macro-news effect does not depend on the content of macro news.

The fourth potential explanation is that if firm managers are aware of increase in investors'

[2] Their paper focuses on information of firms and does not speak to the relationship between macro news and firm-specific news.

reactions to earnings news on macro-news days, they may strategically choose dates to announce their earnings. This strategic manipulation may bias our results if firms tend to advance their earnings announcements dates to macro-news days and delay those dates to non-macro-news days. However, I find that the macro-news effect is concentrated among firms that do not significantly change their earnings announcements, suggesting that strategic timing is unlikely to drive the effect.

This paper contributes to the literature on limited investor attention.[3] In their seminal paper, Peng and Xiong (2006) provide theoretical evidence that retail investors tend to process market and sector-wide information before processing firms-specific information. In Kacperczyk, Nieuwerburgh, and Veldkamp (2016), institutional investors (mutual fund managers) rationally allocate more attention to aggregate shocks in recessions and idiosyncratic shocks in booms. Both studies assume the relationship between the two types of information is substitute in the sense that investors have to choose one of them to process. I find that while retail investors behave as these theories suggest, institutional investors' behavior is different. They pay more attention to firm-specific news when there are both macro and firm-specific news at the same time compared to when there is only firm-specific news. My findings suggest an alternative framework to existing theories where investors' attention is not limited by the quantity of information. This framework highlights that institutional investors as professionals allocate attention differently compared to retail investors.

This study is also closely related to several recent studies on the determinants of investors' reactions to earnings announcements.[4] For instance, prior research finds that investors can get

[3] The literature on limited investor attention goes back to prospect theory in Kahneman and Tversky (1979) and rational inattention theory in Sims (2003). There is evidence that even institutional investors are constrained by limited attention (Corwin and Coughenour, 2008; Kempf, Manconi, and Spalt, 2015).

[4] This paper is also related to research on investor attention and earnings related trading strategies (see e.g., Hou, Lin, and Xiong, 2009) and studies on the dynamics of investor attention (Andrei and Halser, 2016; Fisher, Martineau, and Sheng, 2016).

distracted and decrease their reactions to an earnings announcement when there is a greater number of same-day earnings announcements from other firms (Hirshleifer, Lim, and Teoh, 2009), when earnings are announced on Fridays (DellaVigna and Pollet, 2009), when market return is low (Gulen and Hwang, 2012), and when the earnings news is released after larger earnings surprise is announced by other large firms on the same day or the previous day (Hartzmark and Shue, 2016). This paper extends this line of research by studying the impact of macro news on investor reactions to earnings news. Macro news is distinct from any factor considered by prior literature. Macro-news days are clearly different from Fridays as macro news can be announced on any day of the week. Compared to the number of earnings news, macro news is a completely different type of information than earnings news. Although both market return and macro-news are market-wide variables, they are very different. Macro-news is pre-scheduled and is associated with information release, while market return is unpredictable ex ante. Thus, the asset pricing implications and channels through which macro news affects investors' reactions to earnings announcements are totally different from prior findings.

Finally, this paper adds our understanding of the impact of macro news on stock markets in a number of ways (e.g., Andersen et al., 2003; Boyd, Hu, and Jagannathan, 2005; Gilbert, 2011; Gilbert et al., 2015).[5] First, I provide a direct test of the effect of macro-news on market efficiency. Savor and Wilson (2014) find that an asset pricing model like CAPM fits better to stock returns on macro-news days, suggesting that the stock market is more efficient on macro-news days. Their conjecture of the impact of macro-news on market efficiency is from the joint hypothesis in the sense that it is from the fitness of asset pricing model. This paper directly tests the effect of macro

[5] More generally, this paper also relates to the literature on investors' attention and stale news (Huberman and Regev, 2001; Tetlock, 2011), media coverage (Chan, 2003; Barber and Odean, 2008; Kaniel and Parham, 2016), sports news (Edmans, Garcia and Norli, 2007; Schmidt, 2013), related firms' news (Cohen and Frazzini, 2008), and the level and volatility of the stock market (Sicherman et al., 2016).

news on market efficiency through event study. Second, this paper offers a comprehensive examination of the underlying mechanisms through which macro-news affects asset prices. While some studies propose risk-based explanation (Savor and Wilson, 2013, 2014), others suggest that alternative channels need to be considered (Lucca and Moench, 2015; Cieslak, Morse, and Vissing-Jogensen, 2015; Bernile, Hu, and Tang, 2016). My findings suggest that factor beyond risk, such as investor attention, is very important for understanding the impact of macro news on stock prices; risk-based explanation is not enough to explain this impact.

2. Data

2.1 Macroeconomic announcements

There are many macroeconomic announcements and almost every day there is at least one macro announcement.[6] However, not every announcement is important for stock markets. Thus, I first select a set of important macro announcements from a list of 40 macro announcements from Bloomberg Econoday.

Following Savor and Wilson's (2013) method, I test whether the market excess return (market return minus risk free rate) is significantly higher on announcement days for each macroeconomic announcement. I find that announcements that have statistically and economically significant impacts on the market excess return include Federal Open Market Committee (FOMC) decision, Nonfarm Payroll, ISM PMI, and Personal Consumption. The results are provided in Internet Appendix. The importance of the FOMC announcement is well documented (see, e.g., Lucca and Moench, 2015; Cieslak, Morse, and Vissing-Jogensen, 2015). Gilbert et al (2015) find that announcements, including Nonfarm payroll, ISM PMI, and Personal consumption, are important

[6] For example, there are more than 130 different macro announcements according to Bloomberg's Econoday calendar (http://mam.econoday.com/).

for financial markets.

The macro announcement surprise is measured by the difference between the actual announcement values and market expected values. For FOMC, I calculate the market expectation from Federal funds futures traded at the CME, following Bernile, Hu, and Tang (2016) and in the spirit of Kuttner (2001) and Bernanke and Kuttner (2005). Specifically, I first calculate the implied interest rate for the remainder of the life of different contracts at the end of each trading day. The expected Federal funds target rate is then estimated by the mean implied spot rate across all available contracts, weighting each contract by its daily trading volume. For the remaining macro announcements, I use the median economist forecast from Bloomberg as the market expectation.

2.2 Earnings news

I obtain quarterly earnings release data from Compustat and I/B/E/S as micro news from 1998 to 2014. Following Hirshleifer, Lim, and Teoh (2009), I 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 at the end of the corresponding quarter.

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

Stock 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, I define the cumulative abnormal return over time period $(\tau + h,\ \tau + H)$ $CAR[h, H]$ as follows

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

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 $R_{j,m} = \alpha_{t,k} + \beta_{t,k} R_{j,k}$ for days j from $\tau - 300$ to $\tau - 46$.

For immediate stock price reaction, I use CAR over a 2-trading-day window [0, 1]. For drift, I use CAR over a 60-trading-day window [2, 61]. I drop penny stocks and exclude observations in which actual or forecast earnings are greater than stock price or those with a missing earnings surprise.

2.3 Summary statistics

Table 1 Panel A reports summary statistics based on full samples. It shows that, on average, there are about 118 earnings announcements per day. The mean immediate reaction to earnings announcement ($CAR[0,1]$) is about 0.1 %, the mean of the drift ($CAR[2,61]$) is 1%. Panel B shows the difference in various variables between the sample of macro-news days (Macroday) and the sample of other days. On average, macro-news days have 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 abnormal trading volume ($AVOL[0,1]$), and lower drift ($CAR[2,61]$).

3. The macro-news effect

3.1 Top and bottom groups

In this section, I test whether reactions to earnings announcements on days with macro news are significantly different from reactions to those on other days by focusing on firms that have the most positive and negative earnings surprise. Following DellaVigna and Pollet (2009), I rank firms' earnings surprise 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 surprise are equally assigned to quantiles 7 to 11. Firms with zero surprise are labeled as quantile 6. In this section, I focus on the top and bottom groups, quantiles 1 and 11, because this makes it easy to interpret the magnitude of the effect. To empirically test this effect, I run the following regression

$$CAR = a_0 + a_1 ESTOP + a_2 Macroday + a_3 (ESTOP \times Macroday) + Control + e \qquad (3)$$

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

The key coefficient of interest is a_3. If the relationship between macro news and earnings announcements is complementary, investor's immediate reaction to earnings announcements is stronger and the drift is weaker when macro-news is released on the same day. Thus, I expect that $a_3 > 0$ for $CAR\,[0,1]$ and $a_3 < 0$ for $CAR\,[2,61]$. In contrast, if the relationship is substitute, I 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*×*Macroday*) is positive and significant at the 1% level (1.277), suggesting

that price reaction to earnings announcement with a big surprise is stronger on macro-news days than other days. The economic magnitude is also significant. Compared to the coefficient on the stock reaction to top earnings surprise (*ESTOP*) on other days (8.352), the reaction is greater by 15% (1.277/8.352) to earnings news on macro-news days. The economic magnitude increases to 17% (1.373/8.127) if control variables are included. This is comparable to the 15% reduction for Friday announcements documented in DellaVigna and Pollet (2009), and the 13% reduction for days with high-news day earnings announcements documented in Hirshleifer, Lim, and Teoh (2009).

For the drift, the coefficient on interaction term is negative (-3.458 without controls, -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 my estimates indicate 71% (3.458/4.846) smaller drifts for earnings announcements released on macro-news days. Again, the economic magnitude is significant and comparable to prior studies. 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.

To further understand the nature of this differential drift, I compare the drift differences over various horizons in Figure 1. The drift is defined as the difference between average cumulative abnormal returns of the top group and those of the bottom group. The differential drift between Macroday and non-Macroday announcements starts departing from the 10^{th} trading day after the earnings announcement and continues to increase during next 60 trading days. The drift on Macroday announcements increases quickly during the first 10 trading days after announcements,

but decreases slightly until the 50th trading day. However, drift on non-Macroday announcements displays a totally 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 incorporated in prices within 10 trading days following the announcement. However, earnings news released on non-Macroday requires significantly more time to be incorporated into price.

3.2 All earnings announcements

In this section, I examine how macro news affects investors' reactions to earnings announcements with all earnings surprises quantiles. To empirically test this effect, I estimate the following regression

$$CAR = b_0 + b_1 ES + b_2 Macroday + b_3 (ES \times Macroday) + Control + e \qquad (4)$$

where most variables are similarly defined as in Equation (3). *ES* is earnings surprise quantile, which equals 1 to 11. Again, the coefficient on the interaction term (b_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*×*Macroday*) is positive and significant for $CAR\,[0,1]$, suggesting that immediate stock response to earnings news is stronger on macro-news days 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 reaction is greater by 11% (0.092/0.848) to earnings news released on macro-news days (Column (2)). For the drift, the coefficient on interaction term is negative and significant at the 1% level, suggesting that drift is smaller for earnings news released on macro-news days compared to earnings news on other days. Column (4) shows that my estimates indicate

52% (0.201/0.388) smaller drifts for earnings announcements released on macro-news days.

There are several interesting findings from control variables. First, I find that the immediate price reaction to earnings announcements is much smaller if news is released on Friday, which is consistent with DellaVigna and Pollet (2009). Second, Earnings announcement released on days with a high number of earnings news experience much weaker immediate reaction and much stronger drift, which is consistent with Hirshleifer, Lim, and Teoh (2009). Third, earnings released on days with high market returns have much stronger immediate reactions, which is consistent with Gulen and Hwang (2012).

Macro news is distinct from any factor considered in prior literature. Macro-news days are clearly different from Fridays as macro news can be announced on any day of the week. Compared to the number of earnings news, macro news is an altogether different type of information than earnings news. Although both the market return and macro-news are market-wide variables, macro-news is pre-scheduled and is associated with information release, while the market return is unpredictable ex ante. Thus, the asset pricing implications and channels through which macro news affects investors' reactions to earnings announcements are different compared to the existing explanations. Several robustness tests controlling for these factors are provided in Section 5.

While the measure of immediate price reaction to earnings announcements is consistent across different studies (i.e., $CAR[0,1]$), different studies use different measures to capture drift. Most studies use $CAR[2,61]$ as the measure of drift as suggested by Bernard and Thomas (1989), and some studies use longer horizons like $CAR[2,75]$ (see, e.g., Della Vigna and Pollet, 2009). To address concerns that the findings in Table 2 depend on the choice of window to measure the drift, I conduct the same exercise as Equation (4) using different measures of the drift. Table 3 presents the result and demonstrates that the drift is significantly lower on macro-news days for all these

measures, which is similar to the main finding in Table 2.

3.3 The number of macroeconomic announcements

Thus far, I have focused on important macro news and have established that the relationship between macro news and earnings news is complementary in the sense that immediate (delayed) reactions to earnings news increase (decrease) on macro-news days. This finding suggests that the quantity of information does not prevent investors from processing it. To further test this idea, I examine whether investors' reactions to earnings announcements are different on days with many macroeconomic announcements. Using a full list of macroeconomic announcements from Bloomberg Econoday, I identify days with a large number of macroeconomic announcements. The cutoff point for the top 10% of the number of macroeconomic announcements is 7. Thus, I define a "High Macro News" day as one which has 7 or more macro announcements.

Table 4 Panel A presents the results of this test. The coefficients on the interaction terms are positive and significant for immediate reaction, and negative and significant for delayed reaction, for both the full sample and the sample of top and bottom earnings surprise groups. These results suggest that investors' immediate reactions to earnings announcements increase and delayed reactions decrease when a large number of macro announcements released on the same day. The economic magnitudes are significant as well. Thus, this confirms that the relationship between macro news and earnings news is complementary.

Investors' immediate reaction to earnings news is stronger and the drift is weaker when there are important macro announcements or a significant number of macro announcements. What about days with important macro news and a significant number of macro information releases? I expect to find an even stronger pattern on those days, which is confirmed by Table 4 Panel B. Economic and statistical significance of the coefficients on the interaction term increase. Compared to the

immediate price reaction to earnings surprise on other days (0.847), the reaction is greater by 17% (0.140/.847) when important macro news and a significant number of macro news is released on the same day. The drift is smaller by 84% (0.341/0.380).

3.4 Portfolio trading strategy

Another way to test the impact of macro news on investors' reaction to earnings announcements is to use a trading strategy designed to capture this impact. I have showed that the drift is substantially smaller for macro-day announcements than for non-macro-day announcements. In a typical drift portfolio, I long stocks with good earnings news and short stocks with bad earnings news. If investors underact to earnings news, then stocks with good (bad) earnings news will enjoy an increase (decrease) in returns within the following quarter. However, in a macro news setting, the profit of this type of trading strategy reduces as the drift drops more than 70% on macro-news days.

The new drift trading strategy based on macro-news is as following. In month t, it purchases firms that, in month $t-1$ made announcements on a non-macro-day in the top decile and sells short firms that made an announcement on a non-macro-day in the bottom decile. Therefore, the return for the non-macro-day drift portfolio is $R_{NM}^{D} = R_{NM}^{11} - R_{NM}^{1}$. I construct the macro-day drift portfolio for month t following a similar procedure except that I 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 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 macro-day is not profitable or has negative profit. Thus, by shorting 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 5 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 is not much smaller and statistically insignificant (column (2)). The long-short portfolio earns 0.891% per month (column (3)). The results are similar if portfolios are constructed by a value-weighted method. Standard risk factors, such as Fama-French three-factor are controlled in the regression. A similar conclusion is reached using an equally-weighted method for portfolio construction.

Overall, consistent with the complementary hypothesis, macro-news has positive effects on the sensitivity of stock returns' immediate reaction to earnings surprise and negative effects on the sensitivities of the stock return's delayed reaction to earnings surprise.

4. Explanations

So far, this study has established that investor immediate price reactions to earnings announcements increase and drift decrease when macro-news is released on the same day. This section tests several potential explanations.

4.1 Investor attention

As discussed in the literature review, one major reason for the drift is that investors do not pay full attention to 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 like FOMC is usually an attention-grabbing event, leading investors to financial markets. As a result, the fraction of investors who react to earnings news increases.

I 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 previous month's average of raw score and has value from 0 to 4 (see Ben-Rephael, Da, and Israelsen, 2016, 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 reflects more about attention of retail investors (Da, Engelberg, and Gao, 2011).

To test the attention hypothesis, I first examine whether investors pay more attention to stocks with earnings announcements on macro-news days. Table 6 presents the result of this test. In Column (1), Coefficient on $Macroday$ is positive and significant, indicating that institutional investor attention to firms is significantly higher on macro-news days compared to other days. Coefficient on $Eday$ is positive and significant, suggesting attention to firms are significantly higher when firms have earnings announcements. Most importantly, the coefficient on the interaction term is positive and significant. 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 delivered on non-macro-news days. Interestingly, I find no evidence that retail investor attention to stock market is higher on macro-news days in general (Column (3)) and attention to firms with earnings announcements is even lower on macro-news days (Column (4)). The result of retail investor attention is consistent with Peng and Xiong (2006) who model retail investors in a way that they pay more attention to macro-news than firm-specific news. Overall, these findings suggest that the macro-news effect is strongly related to institutional investors' attention.

Given the importance of institutional investors, I further test whether the macro-news effect is concentrated among firms with high institutional ownership. In general, institutional investors pay more attention to stocks that they hold. Thus, I predict that the macro-news effect is most

pronounced among firms with the highest institutional ownership. To test this idea, I partition the sample to firms with low, medium, and high institutional ownership and re-estimate regression Equation (4) separately for these three subsamples. Table 7 shows that the macro-news effect 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.

Alternatively, I test the attention explanation by looking at the volume reaction as in Hirshleifer, Lim, and Teoh (2009) and DellaVigna and Pollet (2009). It is well known that trading volume increases on days with information releases or large price moves (Karpoff, 1987). Yuan (2015) also finds that trading volume increases when there is market-wide attention-grabbing event. If the significant difference in immediate price reactions between macro-day and non-macro-day earnings announcements is caused by investor attention, I expect trading volume reaction to earnings announcements on macro-news days to be substantially higher than on other days because trading is the mechanism that causes price to adjust.

Following Hirshleifer, Lim, and Teoh (2009) and DellaVigna and Pollet (2009), I measure the abnormal trading volume as follows:

$$AVOL[j] = \log\left(V_{t+j} + 1\right) - \frac{1}{10}\sum_{k=t-20}^{t-11} \log(V_k + 1) \tag{5A}$$

or

$$AVOL[j] = \log\left(V_{t+j} + 1\right) - \frac{1}{30}\sum_{k=t-40}^{t-11} \log(V_k + 1) \tag{5B}$$

where V_{t+j} is the dollar value of trading volume. Immediate abnormal volume response is over a 2-day window ($AVOL\ [0,1]$) and defined as the average of abnormal trading volumes on the earnings announcement date ($AVOL\ [0]$) and on the following day ($AVOL\ [1]$).

Table 8 tests whether abnormal trading volume to firms with earnings announcements is higher on macro-news days. Since both extreme positive and negative cause changes in trading volume, I use absolute earnings surprise decile (*AES*) here. Columns (1)-(4) show that firms' abnormal trading volume is significantly higher on macro-news days regardless the measure of abnormal trading volume. This indicates that investors trade more on firms with earnings announcements when macro-news is released on the same day than on firms released their earnings news on other days.

4.2 Risk

One possible explanation is that firms become more exposed to systematic risk factors on macro-news days. Prior research finds that macro-news days have higher systematic risk (Savor & Wilson, 2013, 2014), and firms that announce earnings news have higher market beta than other firms (Patton and Verardo, 2012). Thus, it is possible that investors demand a higher return as compensation for the increased risk. To test this hypothesis, I augment Equation (4) by adding a set of additional variables: Fama-French three-factor, momentum factor (Fama and French, 1993; Carhart, 1997) and their interactions with ES, $Macroday$, and $ES \times Macroday$. If changes in risk matter, then we expect the coefficients on the three-way interaction term to be significant.

Table 9 reports the results for this test. The coefficients on the three-way interaction of market risk factor are positive and significant for immediate reaction and negative and significant for delayed reaction, both at a 10% level. Other risk factors are not important in explaining macro-news effect here.

Another way to test the risk-based explanation is to look at investor reactions when macro-news is released several days before or after earnings announcements. Patton and Verardo (2012) find that firms' beta decrease starting from the second day following the earnings announcements.

If we still find that investors reactions to earnings announcements is stronger on macro-news days even earnings announcements is released several days before macro news, it cast doubts the risk-based explanation.

To test this idea, I conduct similar tests as in Equation (4) but with a different definition of $Macroday$. For cases where macro-news days are one-day before the earnings announcements, $Macroday$ equals to 1 if there is macro-news on day $t-1$ for an earnings announcement released on day t. A similar definition applies to other lead and lag windows. I examine cases where macro news is released one to two days before and after earnings announcements.

Table 10 presents the results of these tests. Columns (1) shows that immediate price reaction to earnings announcements is significantly higher when macro-news is released one day later. Similar conclusion for immediate reaction when macro-news is released two days after earnings announcements (Column (3)). This findings cannot be explained by risk-based story because firms' betas already start decreasing from the second day when the macro-news is released, meaning lower immediate reactions. Thus, the stronger immediate reactions is associate with something beyond risk.

I find a similar (but weaker) result if macro news is released one before earnings announcements. As for the drift ($CAR[2,61]$), there is no significant difference if macro news is released one day before or after the earnings news.[7] Thus, the documented macro-news effect is Section 3 only occurs when earnings and macro news is released on the same day.

4.3 Information transmission

Another possible explanations for the effects of macro news on investors' reaction to earnings

[7] The coefficients on interaction terms (for both CAR[0,1] and CAR[2,61]) are not significant when macro-news is three or more days before/after earnings announcements.

news is that macro news provides additional information and therefore helps investors to have a better understanding of earnings news. Grossman and Stiglitz (1980) show that if factors other than genuine information affect asset prices, then rational agents will collect information. In reality, investors collect information all the time, suggesting that factors other than genuine information are important for investment decisions. Macro news is clearly one type of information that investors care about. The presence of macro news may affect the informativeness of earnings news. Thus, it possible that investors learn from macro news and then react to earnings news. If the information content of macro news matters, then investors have stronger reactions when earnings and macro announcements are in the same direction (i.e., both are positive or negative), compared to reactions when these two sources of news have different directions.

In order to test this hypothesis, I use a similar regression as in Equation (4) with additional variables (*Macro positive* and *Macro negative*) capturing the content of macro news and their interactions with earnings surprise quantiles. *Macro positive* and *Macro negative* are measured by two methods. The first is the market-based surprise method, *Macro positive* equals to 1 if the market return is positive on that macro-news day. Among all macro-news days, market returns are either positive or negative. One dummy variable is sufficient. The second method is the survey-based, the surprise is measured as the difference between the actual value of macro announcements and the survey consensus from Bloomberg. *Macro positive* equals to 1 if that macro-news day only has one macro announcement and the surprise is positive if that day has multiple macro announcements and all of them have positive surprise. A similar definition applies to *Macro negative*. I treat days with multiple announcements and the surprises are not in the same direction as zero surprises.

This regression compares whether the effects of macro news depends on the direction of two

types of news. Notice that *ES* is earnings surprise quantiles, which has the greatest positive surprise in quantile 11. If this hypothesis holds, then I expect that the coefficient on the interaction term $ES \times Macro\ positive$ or $ES \times Macro\ negative$ will be significant. Table 11 shows the results for this test. The coefficients on interaction term are not significant for both immediate and delayed reactions, suggesting that the sign of macro news surprise does not matter. Thus, I find little evidence to support this hypothesis.

4.4 Strategic timing of earnings announcements

A further possible explanation is that firms may strategically choose the dates to announce their earnings if they are aware that the macro news is salient. Prior research finds that firms advance or delay their earnings announcements relative to the schedule used in the previous year. They tend to advance the earnings announcement date with good news and delay the date with bad news (Boulland and Dessaint, 2015; So, 2015). Following Hartzmark and Shue (2015) and So and Weber (2015), I identify firms that move their earnings announcement dates by comparing their current earnings announcement dates to the previous year's earnings announcement dates. Specifically, I categorize firms as having advanced or delayed their earnings date if it differs from their previous same-quarter date by five or more days. I find that roughly 80% of firms do not significantly change (five day or more) their earnings announcement dates, 15% advance it by five or more days and 5% delay it by five or more days.

The strategic manipulation may bias our results if firms tend to advance their dates to days with macro news and delay dates to days without macro news. If this were the case, then one would expect that for firms that change their earnings announcements day to an earlier date, the average earnings surprise on macro-news days would be more positive. One would expected the opposite for firms that delayed their earnings announcement dates. Table 12 Panel A tests this idea. Among

firms that significantly advance their earnings announcement dates, about 14% (1137/(1137+7202)) of them move the new announcement date to a macro-news day. Among firms that significantly delay their earnings announcement dates (more than 5 days), about 15% of them move the new announcement date to a macro-news day. Thus, there is no evidence that firms consider or are aware of the fact that reactions to earnings are significant different on macro-news days when they change their earnings announcement dates. Also, the t-statistics suggest that there is no significant difference in earnings surprise between firms that change earnings announcement dates to macro-news days and firms that change dates to other days.

Another way to test strategic timing is to perform some subsample analysis. If firms indeed play strategic timing with macro-news days, then one would expect that the macro-news effect is concentrated among firms that significantly change their earnings announcements dates. Table 12 Panel B rejects this hypothesis. Column (1) shows that firms that did not greatly change their announcement date have a large positive coefficient of 0.097 on immediate reaction that is statistically and economically significant. Firms that changed their earnings announcements forward or backwards have insignificant estimates of the effects of macro news on reaction to earnings news. Columns (3) and (4) reach similar conclusions for delayed reaction to earnings. Thus, the evidence does not support the strategic timing hypothesis.

5. Robustness and heterogeneity

This section provides several robustness tests. One test is designed to address the concern that the set of firms that announce their earnings news on macro-news days are always the same. Two other tests addresses factors that affect investors' reactions to earnings announcements in prior literature. One factor is the number of earnings news documented by Hirshleifer, Lim, and Teoh (2009), the other one is the market return as in Gulen and Hwang (2012). These factors are included

as control variables in all the tests I conducted above and do not affect the findings discussed above. Thus, they are not likely to drive the results. Nevertheless, I provide further tests by excluding observations that can potentially contributes to the macro-news effect.

5.1 Firms with strong preference of announcements dates

One concern is that firms that choose to announce on macro-news days are always the same set of firms. If this is the case, the macro-news effect of reactions to earnings news is just the difference between this set of firms and other firms. To address this concern, I calculate the fraction of firms that always issue their earnings announcements on macro-news days. Specifically, I create Abnormal Announcement Preference (AAP) ratio for each firm, which is the number of earnings announcements on macro-news day divided by the total number of its announcements. There are no firms where all earnings announcements are released on macro-news days (AAP ratio=1). Among firms that release earnings news on macro-news days at least once, only less than 3% (114 firms) of them issue more than 50% of their earnings news on macro-news days. This accounts for only 13% even if I count firms that issue more than 33% of their earnings announcements on macro-news days.

I then formally conduct a test by re-estimating Equation (4) without these firms. Table 13 Panel A reports the results of this test. It shows that the macro-news effect on reactions to earnings news remains statistically and economically similar as in Table 2. Thus, my results cannot be driven by a small set of firms that have strong preference of announcements dates.

5.2 The number of earnings announcements

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), one may be concerned that the macro-news effect is driven by days with low number of earnings news. I address this concern by removing days with low number of earnings news (bottom quantile) and present the results in Table 13 Panel B. It shows that the macro-news effect is the same as in Table 2 at both statistical and economical levels. Thus, the macro-news effect on reactions to earnings announcements is a distinct contributor that cannot be explained by the number of earnings news.

5.3 Stock market swings

Gulen and Hwang (2012) show that investors' immediate reactions to corporate event, 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 market returns affect investors' reactions to earnings news does not mean that macro news is not distinct and compelling 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, there are many factors that 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. Macro-news announcement dates are pre-scheduled. This makes the investor attention explanation more plausible as investors can plan to allocate their attention beforehand.

Nevertheless, to address the concern that macro-news and market returns are the same driving force for the changes in investors' reactions to earnings news, I re-estimate Equation (4) by excluding days with high market returns (top quantile). Table 13 Panel C reports the results for this test. The macro-news effect is barely affected by removing these observations, suggesting that market return swings cannot explain this effect.

5.4 Alternative measures

I also test whether the results are robust to alternative measures of investor reactions and earnings surprise groups. First, instead of using the market model, I use Fama-French Three-Factor model when calculating $CAR[0,1]$ and $CAR[2,61]$ and re-estimate Equation (4). Table 13 Panel D presents the results. The coefficient on 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, I use 10 groups of earnings surprise and re-estimate Equation (4) and the results remain qualitatively and quantitatively similar (Columns (3)-(4)). Overall, the macro-news effect is robust to the choice of model in calculating the reaction measures.

5.5 Size and analyst coverage

The main results in Section 4 focus on both large and small firms. To test whether the macro-news effect varies with firm size, I examine the effect separately for small, medium, and large firms. Interestingly, Table 14 Panel A shows that the effect is most pronounced for firms with large size. I also test the effect separately for firms with low, medium, and high analyst coverage and find that the effect is concentrated among firms with high analyst coverage. This is consistent with the finding that the macro-news effect is concentrated among firms with high institutional ownership in Section 4.1 because firms' size and analyst coverage are highly correlated with firms'

institutional ownership (above 0.5).

6. Conclusion

How the interaction of two types of information affects stock prices? The answer to this question is crucial to understand the functioning of stock markets. Ever increasing access to information has made the problem of how investors process information when they face multiple sources of news at the same time more relevant. I examine the interaction between macro news and earnings announcements and document a novel complementary relationship between these two types of information. The presence of macro news increases investors' information-processing of earnings announcements. Their immediate price reaction to earnings announcements is 17% higher and the drift is 71% lower when macro-news is released on the same day.

The impact of macro news on investors' reaction is strongly related to increased attention to earnings announcements by institutional investors on macro-news days. This finding is consistent with rational attention theories in the sense that investors allocate their attention rationally over time. But the pattern is novel to existing literature where researchers assume that investors are limited by the quantity of information. My findings suggest that what limits institutional investors' attention is a fixed cost of entering the market rather than the quantity of information.

Furthermore, these results provide new evidence that the stock market is more efficient on macro-news days because the post-earnings-announcement drift is significantly smaller. This finding furthers our understanding of the time-varying properties of market efficiency. While the concept of market efficiency date to Fama (1970), the dynamics of market efficiency for individual stocks is not studied until recently (Savor and Wilson, 2014; Rosch et al., 2016). The improved price efficiency on macro-news days indicates that market efficiency varies through time in a predictable way.

References

Andersen, Torben G, Tim Bollerslev, Francis X Diebold, and Clara Vega, 2003, Micro effects of macro announcements: real-time price discovery in foreign exchange, *American Economic Review* 93, 38-62.

Andrei, Daniel, and Michael Hasler, 2016, Dynamic attention behavior under return predictability, Working paper, University of California at Los Angeles.

Ball, Ray, and Philip Brown, 1968, An empirical evaluation of accounting numbers, *Journal of Accounting Research* 6, 159–178.

Barber, Brad M., and Terry Odean, 2008, All that glitters: The effect of attention and news on the buying behavior of individual and institutional investors, *Review of Financial Studies* 21, 785-818.

Bernanke, B. S., and Kuttner, K. N., 2005, What explains the stock market's reaction to Federal Reserve policy? *Journal of Finance* 60, 1221-1257.

Bernard, V., and J. K. Thomas, 1989, Post-earnings-announcement drift: Delayed price response or risk premium? *Journal of Accounting Research* 27, 1–36.

Bernard, V.L. and Thomas, J.K., 1990, Evidence that stock prices do not fully reflect the implications of current earnings for future earnings, *Journal of Accounting and Economics 13*, 305-340.

Bernile, Gennaro, Jianfeng Hu and Yuehua Tang, 2016, Can information be locked-up? Informed trading ahead of macro-news announcements, *Journal of Financial Economics* 121, 1-25.

Ben-Rephael, A., Da, Z. and Israelsen, R.D., 2016, It depends on where you search: A comparison of institutional and retail attention, Working paper *Available at SSRN 2692181*.

Boulland, R. and Dessaint, O., 2015, Announcing the announcement, Working paper, *Available at SSRN 2537184*.

Boyd, John H., Jian Hu, Ravi Jagannathan, 2005, The stock market's reaction to unemployment news: Why bad news is usually good for stocks, *Journal of Finance* 60, 649-672.

Carhart, M.M., 1997. On persistence in mutual fund performance. *Journal of finance 52*, 57-82.

Chan, W., 2003, Stock price reaction to news and no-news: drift and reversal after headlines, *Journal of Financial Economics* 70, 223-260.

Cieslak, Anna, Adair Morse, and Annette Vissing-Jogensen, 2015, Stock returns over the FOMC

cycle, Working paper, *Available at SSRN 2687614*.

Cohen, Lauren, and Andrea Frazzini, 2008, Economic links and predictable returns, *Journal of Finance* 63, 1977–2011.

Corwin, S. A., and Coughenour, J. F., 2008, Limited attention and the allocation of effort in securities trading, *Journal of Finance* 63, 3031-3067.

Da, Zhi, Joseph Engelberg, and Pengjie Gao, 2011, In search of attention, *Journal of Finance* 66, 1461-1499.

DellaVigna, Stefano, and Joshua M. Pollet, 2009, Investor inattention and Friday earnings announcements, *Journal of Finance* 64, 709-749.

Edmans, A., Garcia, D. and Norli, Ø., 2007, Sports sentiment and stock returns, *Journal of Finance* 62, 1967-1998.

Fama, E.F., 1970. Efficient capital markets: A review of theory and empirical work, *Journal of Finance 25*, 383-417.

Fama, E.F. and French, K.R., 1993, Common risk factors in the returns on stocks and bonds, *Journal of Financial Economics* 33, 3-56.

Fisher, Adlai J., Charles Martineau, and Jinfei Sheng, 2016, Media attention, macroeconomic fundamentals, and stock market activity, Working paper, *Available at SSRN 2703978*.

Gilbert, Thomas, 2011, Information aggregation around macroeconomic announcements: Revisions matter, *Journal of Financial Economics* 101, 114-131.

Gilbert, Thomas, Chiara Scotti, Georg Strasser, and Clara Vega, 2015, Is the intrinsic value of macroeconomic news announcements related to their asset price impact? Working paper, *Available at SSRN 2729210*.

Goldstein, Itay, and Liyan Yang, 2015, Information diversity and complementarities in trading and information acquisition, *Journal of Finance* 70, 1723-1765.

Grossman, Sandy, and Joseph Stiglitz, 1980, On the impossibility of informationally efficient markets, *American Economic Review* 70, 393-408.

Gulen, Huseyin, and Byoung-Hyoun Hwang, 2012, Daily stock market swings and investor reaction to firm-specific news, Working paper, *Available at SSRN 1934873*.

Hartzmark, Samuel M. and Kelly Shue, 2016, A tough act to follow: Contrast effects in financial markets, Working paper, *Available at SSRN 2613702*.

Hirshleifer, David, Sonya Lim, and Siew Hong Teoh, 2009, Driven to distraction: Extraneous

events and underreaction to earnings news, *Journal of Finance* 64, 2289-2325.

Hirshleifer, David, and Siew Hong Teoh, 2003, Limited attention, information disclosure, and financial reporting, *Journal of Accounting and Economics* 36, 337–386.

Hou, Kewei, Lin Peng and Wei Xiong, 2009, A tale of two anomalies: The implications of investor attention for price and earnings momentum, Working paper, *Available at SSRN 976394*.

Huberman, G., and Regev, T., 2001, Contagious speculation and a cure for cancer: a non-event that made stock prices soar, *Journal of Finance* 56, 387–396.

Kacperczyk, Marcin, Stijn Van Nieuwerburgh, and Laura Veldkamp, 2016, A rational theory of mutual funds attention allocation, *Econometrica* 84, 571-626.

Kahneman, D. and Tversky, A., 1979, Prospect theory: An analysis of decision under risk, *Econometrica* 47, 263-291.

Kaniel, Ron, and Robert Parham, 2016, WSJ Category Kings-the impact of media attention on consumer and mutual fund investment decisions, *Journal of Financial Economics*, forthcoming.

Karpoff, Jonathan M. 1987, The relation between price changes and trading volume: A survey, *Journal of Financial and Quantitative Analysis* 22, 109–26.

Kempf, Elisabeth, Alberto Manconi, and Oliver Spalt, 2015, Distracted shareholders and corporate actions, Working paper, *Available at SSRN 2356163.*

Kuttner, Kenneth N., 2001, Monetary policy surprises and interest rates: Evidence from the Fed funds futures market, *Journal of Monetary Economics* 47, 523-544.

Lucca, David O., and Emanuel Moench, 2015, The Pre-FOMC announcement drift, *Journal of Finance* 70, 329-371.

Patton, Andrew. J. and Michela Verardo, 2012, Does beta move with news? Firm-specific information flows and learning about profitability, *Review of Financial Studies* 25, 2789-2839.

Peng, Lin, and Wei Xiong, 2006, Investor attention, overconfidence and category learning, *Journal of Financial Economics* 80, 563-602.

Rösch, D., Subrahmanyam, A. and van Dijk, M., 2016. The dynamics of market efficiency. *Review of Financial Studies*.

Savor, Pavel, and Mungo Wilson, 2013, How much do investors care about macroeconomic risk? Evidence from scheduled economic announcements, *Journal of Financial and Quantitative*

Analysis 48, 343-375.

Savor, Pavel and Mungo Wilson, 2014, Asset pricing: A tale of two days, *Journal of Financial Economics* 113, 171-201.

Schmidt, Daniel, 2013, Investors' attention and stock covariation: Evidence from Google sport searches, Working paper, HEC Paris.

Schmidt, Daniel, 2015, Distracted Institutional Investors, Working paper, HEC Paris.

Sicherman, N., G. Loewenstein, D. Seppi, and S. Utkus, 2016, Financial attention, *Review of Financial Studies* 29, 863-897.

Sims, Christopher A., 2003, Implications of rational inattention, *Journal of Monetary Economics* 50, 665–690.

So, E.C. and Weber, J., 2015, Time will tell: Information in the timing of scheduled earnings news, Working paper, *Available at SSRN 2480662*.

Tetlock, Paul, 2011, All the news that's fit to reprint: Do investors react to stale information?. *Review of Financial Studies* 24, 1481-1512.

Tetlock, Paul, 2014, Information transmission in finance, *Annual Review of Financial Economics* 6, 365-384.

Yuan, Yu, 2015, Market-wide attention, trading, and stock returns, *Journal of Financial Economics* 116, 548-564.

Figure 1. The drift on macro-news days and on other days

This figure plots the drift over different horizons for earnings announcements released on macro-news days and other days. The sample covers January 1997 to December 2014. The drift is measured by cumulative abnormal return for each stock based the market model. In 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).

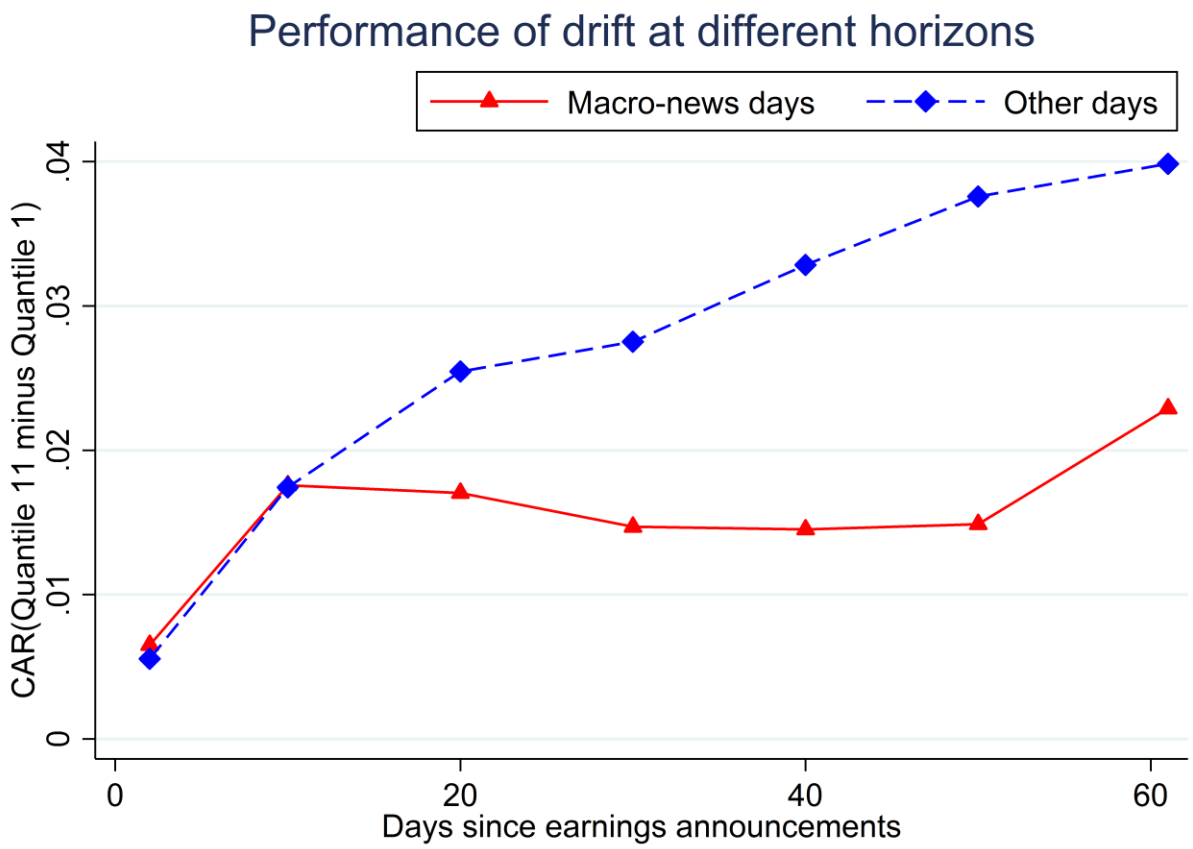

Table 1. Summary statistics

This table reports summary statistics. The sample covers January 1997 to December 2014. *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], *AVOL[0,1]* is the average abnormal trading volume on the earning announcement day *AVOL[0]* and on the following day *AVOL[1]*, where abnormal trading volume on day *t* is the difference between log dollar volume and the average log dollar volume over days [-20,-11]. Macroeconomic 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
AVOL[0,1]	158018	0.64	0.73	0.19	0.62	1.07

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
AVOL[0,1]	18833	139185	0.70	0.63	0.07	12.89

Table 2. The macro-news effect

This table reports the macro-news effect. The sample covers January 1997 to December 2014. The dependent variable is cumulative abnormal return and is indicated under each column heading. *ES* is earnings surprise decile (11 groups), ES Top equals to 1 if earnings surprise decile is 11 and 0 if the earnings surprise decile 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. Control variables include 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. Top and bottom groups

VARIABLES	CAR[0,1]		CAR[2,61]	
	(1)	(2)	(3)	(4)
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	N	Y	N	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. All sample

VARIABLES	CAR[0,1]		CAR[2,61]	
	(1)	(2)	(3)	(4)
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	N	Y	N	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

This table reports the impact of macro news on drift over different horizons. The sample covers January 1997 to December 2014. 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. Control variables include 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)	(5)	(6)
VARIABLES	CAR[2,30]	CAR[2,45]	CAR[2,61]	CAR[2,75]	CAR[2,90]	CAR[3,61]
ES	0.250***	0.306***	0.388***	0.372***	0.376***	0.333***
	(0.018)	(0.023)	(0.029)	(0.035)	(0.038)	(0.028)
Macroday	0.135	1.262**	0.785	0.572	0.538	0.679
	(0.397)	(0.571)	(0.589)	(0.660)	(0.685)	(0.575)
ES×Macroday	-0.100*	-0.213***	-0.201***	-0.186**	-0.206**	-0.183**
	(0.051)	(0.072)	(0.076)	(0.087)	(0.090)	(0.074)
Constant	0.506	0.714	1.152	1.541*	2.039**	1.584**
	(0.462)	(0.553)	(0.727)	(0.819)	(0.850)	(0.719)
Controls	Y	Y	Y	Y	Y	Y
Observations	158,399	158,399	158,399	158,399	158,399	158,399
Adj. R2	0.005	0.005	0.008	0.006	0.005	0.008

Table 4. Many macroeconomic announcements

This table presents results with many macroeconomic announcements on earnings days. The sample covers January 1997 to December 2014. The dependent variable is cumulative abnormal return and is indicated under each column heading. *ES* is earnings surprise decile (11 groups), ES Top equals to 1 if earnings surprise decile is 11 and 0 if the earnings surprise decile is 1. *High Macro News* equals to 1 if that day has 7 or more macroeconomic announcements. *Macroday* is a dummy variable equaling 1 if that day is an announcement day for Federal Open Market Committee (FOMC) decision, Employment situation, ISM PMI, or personal consumption. *Macroday High* is a dummy variable equaling 1 if that day has the listed announcement and has more than 7 macro announcements at the same time. Control variables include 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. High number of macro news

	(1)	(2)	(3)	(4)
VARIABLES	CAR[0,1]	CAR[2,61]	CAR[0,1]	CAR[2,61]
High Macro News	-0.028	2.797**	-0.581***	1.188**
	(0.353)	(1.417)	(0.172)	(0.583)
ES Top	8.176***	5.240***		
	(0.176)	(0.529)		
(ES Top)×(High Macro News)	1.021**	-4.085***		
	(0.426)	(1.541)		
ES			0.841***	0.385***
			(0.011)	(0.029)
ES×(High Macro News)			0.101***	-0.179**
			(0.024)	(0.075)
Constant	-3.926***	4.542*	-5.175***	1.340*
	(0.670)	(2.359)	(0.232)	(0.761)
Controls	Y	Y	Y	Y
Observations	26,460	26,460	158,399	158,399
Adj. R2	0.124	0.018	0.100	0.008

Table 4 (continued)

Panel B. Macroday & high number of macro news

VARIABLES	(1) CAR[0,1]	(2) CAR[2,61]	(3) CAR[0,1]	(4) CAR[2,61]
Macroday High	-0.843	6.141**	-0.865***	2.539**
	(0.572)	(2.495)	(0.265)	(0.998)
ES Top	8.215***	5.107***		
	(0.172)	(0.511)		
(ES Top)×(Macroday High)	1.699**	-7.372***		
	(0.677)	(2.665)		
ES			0.847***	0.380***
			(0.011)	(0.027)
ES×(Macroday High)			0.140***	-0.341***
			(0.037)	(0.125)
Constant	-3.283***	3.525	-5.010***	1.186
	(0.631)	(2.268)	(0.225)	(0.728)
Controls	Y	Y	Y	Y
Observations	26,460	26,460	158,399	158,399
Adj. R2	0.124	0.018	0.099	0.008

Table 5. 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 from January 1997 to December 2014. 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 decile; sells short firms that made an announcement on a non-macro-day in the bottom decile. Therefore, the return for the non-macro-day drift portfolio is $R^{D}_{NM} = R^{11}_{NM} - R^{1}_{NM}$. I construct the macro-day drift portfolio for month t following a similar procedure except that I only include firms that made an earnings announcement on a macro-day in a previous month. The return for this portfolio is $R^{D}_{M} = R^{11}_{M} - R^{1}_{M}$. The long-short portfolio of buying the non-macro-day drift portfolio and selling macro-day portfolio has return, $R^{D}_{NM-M} = R^{D}_{NM} - R^{D}_{M}$. 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)
VARIABLES	Other days	Macroday	Long-Short	Other days	Macroday	Long-Short
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 6. Investor attention

This table presents the results of investor attention. The sample periods depends on the data availability of attention measures. Abnormal institutional investor attention (AIA) is the news-searching and news-reading activity for Russell 3000 firms from Bloomberg terminal from 2010 to 2014. AIA is a dummy variable if AIA index is higher than 2. The regression for AIA test is 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 and more earnings announcements. Google search volume index (SVI) is the ticker-searching activity for S&P 500 firms from 2005 to 2008. 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 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 7. Institutional ownership

This table reports how macro-news effect varies by institutional ownership. The sample covers January 1997 to December 2014. 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. The table 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. Control variables include 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)	(5)	(6)
	Low instown		Medium instown		High instown	
VARIABLES	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)
Constant	-4.101***	-0.195	-5.950***	0.499	-9.386***	6.541***
	(0.453)	(1.539)	(0.350)	(0.987)	(0.536)	(1.361)
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

Table 8. Volume reaction

This table tests whether stock volume response to earnings news is different on macro-news days. The sample covers January 1997 to December 2014. The dependent variables are two measures of abnormal trading volume. *AES* is absolute earnings surprise decile, 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. Following Hirshleifer, Lim, and Teoh (2009), I define abnormal trading on earnings announcement day *AVOL[0]* is the difference between log dollar volume on day 0 and the average log dollar volume over days [-20,-11]. Similar definition applies to the abnormal trading volume on the following day *AVOL[1]*. *AVOL[0,1]A* is the average of AVOL[0] and AVOL[1]. *AVOL[0,1]B* has similar definition except it is demeaned by the average trading volume over window [-40,-11]. Control variables include 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)
VARIABLES	AVOL[0,1]A		AVOL[0,1]B	
Macroday	0.050***	0.048***	0.070***	0.049***
	(0.017)	(0.016)	(0.017)	(0.016)
AES	0.015***	0.015***	0.019***	0.017***
	(0.001)	(0.001)	(0.001)	(0.001)
Constant	0.537***	0.713***	0.526***	0.745***
	(0.007)	(0.025)	(0.008)	(0.024)
Controls	No	Yes	No	Yes
Observations	158,018	158,018	158,018	158,018
Adj. R2	0.004	0.182	0.006	0.170

Table 9. Changes in risk

This table tests whether the effects of macro news on stock price response to earnings news is driven by changes in risk. The sample covers January 1997 to December 2014. The dependent variable is cumulative abnormal return and is indicated under each column heading. *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. Mkt-rf, SMB, HML, and UMD are Fama-French 3 factors and momentum factor, respectively. Control variables include 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.

	(1)	(2)
VARIABLES	CAR[0,1]	CAR[2,61]
ES	0.846***	0.382***
	(0.011)	(0.029)
Macroday	-0.409**	0.880
	(0.183)	(0.588)
ES×Macroday	0.072***	-0.164**
	(0.026)	(0.077)
Mkt-rf×ES×Macroday	0.054*	-0.153*
	(0.032)	(0.087)
SMB×ES×Macroday	0.048	0.024
	(0.036)	(0.092)
HML×ES×Macroday	-0.032	-0.076
	(0.034)	(0.087)
UMD×ES×Macroday	0.058*	0.016
	(0.032)	(0.090)
Constant	-5.098***	-0.504
	(0.244)	(0.399)
Controls	Y	Y
Observations	158,399	158,399
Adj. R2	0.102	0.003

Table 10. Lead and lag effects

This table presents the lead and lag effect of macro news and earnings news. The sample covers January 1997 to December 2014. The dependent variable is cumulative abnormal return and is indicated under each column heading. ES is earnings surprise decile (11 groups). "One day before" indicates the macro news announcement is one day before the earnings announcement. Same definition applies to other lead and lag windows. For cases where the macro-news day is one-day before the earnings announcements, $Macroday$ 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 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)	(5)	(6)	(7)	(8)
	One day after		Two days after		One day before		Two days before	
	CAR[0,1]	CAR[2,61]	CAR[0,1]	CAR[2,61]	CAR[0,1]	CAR[2,61]	CAR[0,1]	CAR[2,61]
ES	0.84***	0.367***	0.843***	0.367***	0.847***	0.371***	0.851***	0.377***
	(0.011)	(0.030)	(0.011)	(0.030)	(0.011)	(0.029)	(0.011)	(0.029)
Macroday	-0.352**	0.091	-0.374**	0.246	-0.191	0.371	-0.182	0.686
	(0.155)	(0.479)	(0.160)	(0.471)	(0.168)	(0.538)	(0.170)	(0.516)
ES×Macroday	0.061***	-0.028	0.063***	-0.032	0.045*	-0.064	0.019	-0.102
	(0.021)	(0.061)	(0.022)	(0.063)	(0.023)	(0.070)	(0.023)	(0.066)
Constant	-4.668***	1.145	-4.756***	1.376*	-5.091***	1.270*	-4.860***	1.487**
	(0.230)	(0.730)	(0.224)	(0.707)	(0.232)	(0.723)	(0.231)	(0.750)
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Observations	158,399	158,399	158,399	158,399	158,399	158,399	158,399	158,399
Adj. R2	0.099	0.008	0.099	0.008	0.099	0.008	0.099	0.008

Table 11. Information spillover from macro news

This table reports the results of testing on information spillover from macro news. The sample covers January 1997 to December 2014. The dependent variable is cumulative abnormal return and is indicated under each column heading. *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. *Macro positive* and *Macro negative* are measured by two methods. Under the market-based surprise method, *Macro positive* equals to 1 if the market return is positive on that macro-news day. Among all macro-news days, market returns are either positive or negative. One dummy variable is enough. Under the survey-based surprise method, the surprise is the difference between the actual value of macro announcements and the survey consensus from Bloomberg. *Macro positive* equals to 1 if that macro-news day only has one macro announcement and the surprise is positive or if that day has multiple macro announcements and all of them have positive surprise. Similar definition applies to *Macro negative*. For days with multiple announcements and the surprises are not in the same direction, I treat them as zero surprises. Control variables include 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.

	Market based surprise		Survey based surprise	
	(1)	(2)	(1)	(2)
VARIABLES	CAR[0,1]	CAR[2,61]	CAR[0,1]	CAR[2,61]
ES	0.842***	0.388***	0.842***	0.388***
	(0.011)	(0.029)	(0.011)	(0.029)
Macroday	-0.675**	2.292**	-0.260	-0.381
	(0.267)	(1.076)	(0.290)	(0.788)
ES×Macroday	0.106***	-0.315**	0.084**	-0.352**
	(0.037)	(0.137)	(0.040)	(0.163)
Macro positive	0.513	-2.481**	-0.450	3.785***
	(0.332)	(1.215)	(0.395)	(1.253)
ES×(Macro positive)	-0.025	0.190	0.056	-0.092
	(0.046)	(0.157)	(0.055)	(0.106)
Macro negative			0.169	-0.585
			(0.389)	(1.135)
ES×(Macro negative)			-0.035	0.062
			(0.054)	(0.152)
Constant	-4.984***	1.128	-4.993***	1.163
	(0.226)	(0.727)	(0.226)	(0.728)
Controls	Y	Y	Y	Y
Observations	158,399	158,399	158,399	158,399
Adj. R2	0.100	0.008	0.100	0.008

Table 12. Strategic timing of earning announcements

This table tests whether the effects of macro news on stock price response to earnings news is driven by a firm's strategic timing of earning announcements. The sample covers January 1997 to December 2014. Panel A presents results of testing the difference between average earnings surprise (*Avg.ES*) on macro-news days and *Avg. ES* on other days. Panel B presents regression results. The dependent variable is cumulative abnormal return and is indicated under each column heading. *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. Δ*date* is the difference between the day of the current earnings announcements and the previous year's same-quarter earnings announcement. Control variables include 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

	Δdate<-5				
	Count	Mean	SD	Min	Max
Avg.ES (%) on macro days	1137	-0.105	6.682	-148.168	120.000
Avg.ES (%) on other days	7202	-0.040	4.206	-143.077	159.927
Differences		-0.065			
t-stat		-0.442			
	Δdate>5				
	Count	Mean	SD	Min	Max
Avg. ES (%) on macro days	2758	-0.283	3.855	-95.652	35.338
Avg. ES (%) on other days	16068	-0.526	11.084	-1077.576	195.906
Differences		0.243			
t-stat		1.140			

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

	CAR[0,1]		CAR[2,61]	
	(1)	(2)	(3)	(4)
ES×Macroday if abs(Δ date)<=3	0.097***		-0.263***	
	(0.029)		(0.093)	
ES×Macroday if abs(Δ date)>3	0.072		-0.044	
	(0.048)		(0.135)	
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 13. Robustness

This table reports several robustness tests. The sample covers January 1997 to December 2014. 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 test excluding firms that have strong preference to issue their earnings on macro-news days. Abnormal Announcement Preference (AAP) ratio for a firm is the number of earnings announcements on macro-news day divided by the total number of its announcements. Panel B reports the test excluding days with a low number of earnings announcements (bottom quantile). Panel C reports the test excluding days with high S&P market returns (top quantile). Panel D reports the same test as in Table 2 with CAR calculated based on Fama-French Three-Factor model. Control variables include 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. Exclude firms with strong preference

	(1)	(2)	(3)	(4)
	exclude AAP-ratio>0.5		exclude AAP-ratio>0.33	
VARIABLES	CAR[0,1]	CAR[2,61]	CAR[0,1]	CAR[2,61]
ES	0.843***	0.386***	0.844***	0.383***
	(0.011)	(0.029)	(0.011)	(0.029)
Macroday	-0.350*	0.759	-0.573***	0.686
	(0.185)	(0.592)	(0.199)	(0.616)
ES×Macroday	0.091***	-0.194**	0.120***	-0.173**
	(0.026)	(0.077)	(0.027)	(0.080)
Constant	-5.235***	1.531**	-5.352***	1.625**
	(0.234)	(0.764)	(0.236)	(0.763)
Controls	Y	Y	Y	Y
Observations	157,717	157,717	152,221	152,221
Adj. R2	0.100	0.008	0.101	0.008

Panel B. Exclude days with low number of earnings news

VARIABLES	(1) CAR[0,1]	(2) CAR[2,61]
ES	0.830***	0.397***
	(0.012)	(0.031)
Macroday	-0.324	0.529
	(0.208)	(0.640)
ES×Macroday	0.095***	-0.178**
	(0.028)	(0.083)
Constant	-4.653***	-0.877
	(0.302)	(0.931)
Controls	Y	Y
Observations	125,161	125,161
Adj. R2	0.097	0.009

Panel C. Exclude days with top S&P returns

VARIABLES	(1) CAR[0,1]	(2) CAR[2,61]
ES	0.841***	0.366***
	(0.011)	(0.030)
Macroday	-0.438**	1.047
	(0.199)	(0.663)
ES×Macroday	0.091***	-0.207**
	(0.028)	(0.084)
Constant	-4.948***	1.217
	(0.233)	(0.775)
Controls	Y	Y
Observations	141,639	141,639
Adj. R2	0.103	0.007

Panel D. CAR based on Fama-French Three-Factor model

VARIABLES	(1) CAR[0,1]	(2) CAR[2,61]
ES	0.838***	0.108***
	(0.007)	(0.025)
Macroday	-0.523***	1.086**
	(0.157)	(0.530)
ES×Macroday	0.088***	-0.159**
	(0.021)	(0.070)
Constant	-5.195***	-0.608
	(0.228)	(0.769)
Controls	Y	Y
Observations	158,399	158,399
Adj. R2	0.101	0.016

Table 14. Heterogeneity

This table reports how macro-news effect varies by size, and analyst coverage. The sample covers January 1997 to December 2014. 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 firm size decile in previous quarter. Small, medium, and large firms are in size decile 1 to 3, 4 to 7, and 8 to 10, respectively. Panel B reports the tests on three subsamples partitioned based on analyst coverage in previous quarter. Low, medium, and high coverage firms are firms with less than 2, 3 to 9, and 10 and more analyst, respectively. Control variables include 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. Firm size

	(1)	(2)	(3)	(4)	(5)	(6)
	Small firms		Medium firms		Large firms	
VARIABLES	CAR[0,1]	CAR[2,61]	CAR[0,1]	CAR[2,61]	CAR[0,1]	CAR[2,61]
ES	0.739***	0.594***	0.950***	0.169***	0.825***	0.307***
	(0.017)	(0.049)	(0.019)	(0.049)	(0.017)	(0.044)
Macroday	0.117	-1.770*	-0.889***	1.200	-0.621*	3.660***
	(0.285)	(1.001)	(0.343)	(1.058)	(0.320)	(0.971)
ES×Macroday	0.045	-0.006	0.155***	-0.254*	0.118***	-0.502***
	(0.039)	(0.132)	(0.048)	(0.132)	(0.044)	(0.126)
Constant	-4.788***	-0.424	-10.904***	5.118***	-5.273***	-2.670**
	(0.449)	(1.544)	(0.467)	(1.467)	(0.341)	(1.214)
Controls	Y	Y	Y	Y	Y	Y
Observations	43,623	43,623	45,720	45,720	69,056	69,056
Adj. R2	0.091	0.016	0.138	0.007	0.097	0.007

Panel B. Analyst coverage

	(1)	(2)	(3)	(4)	(5)	(6)
	Low analyst coverage		Medium analyst coverage		High analyst coverage	
VARIABLES	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)
Constant	-4.458***	-1.184	-6.322***	2.557**	-5.188***	1.192
	(0.371)	(1.146)	(0.417)	(1.269)	(0.417)	(1.640)
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

Appendix A. Details about Macro Announcements

1. FOMC: The Federal Open Market Committee (FOMC) is the policy-making arm of the Federal Reserve. It determines short-term interest rates in the U.S. when it decides the overnight rate that banks pay each other for borrowing reserves when a bank has a shortfall in required reserves. The Fed announces its policy decision at the end of each FOMC meeting. This is the FOMC announcement, which happens eight times a year. The announcement also includes brief comments on the FOMC's views on the economy and how many FOMC members voted for and how many voted against the policy decision.
2. Nonfarm payroll: The NFP number is the number of jobs added or lost in the economy over the last month. The data is released monthly, usually on the first Friday of the month, by Bureau of Labor Statistics, U.S. Department of Labor. Other employment situation information released on the same day includes unemployment rate, average workweek, and average hourly earnings.
3. ISM PMI: ISM manufacturing index is a diffusion index calculated from five of the eleven sub-components of a monthly survey of purchasing managers at roughly 300 manufacturing firms nationwide. It is a leading indicator of output.
4. Personal Consumption: Personal consumption expenditures are the monthly analogues to the quarterly consumption expenditures in the GDP report, available in nominal and real (inflation-adjusted) dollars.

Table A1. Characteristics of Macroeconomic Announcements
This table presents the five important macroeconomic announcements used in analysis. The release time is Eastern Time. The sample covers January 1997 to December 2014.

Announcement	Source	Frequency	Unit/Type	# of events
Federal Funds Rate	FOMC	8/year	% level	144
Nonfarm Payrolls	BLS	M	K, change	216
ISM PMI	ISM	M	index	216
Personal consumption	BEA	M	% change	216

Internet Appendix for

"Macro News, Micro News, and Stock Prices"

November 2016

A. Selecting important macro announcements

This section tests the impact of individual macro news on market risk premium. I find important macro announcements for stock markets by running the following regression over a sample period of January 1998 to December 2014.

$$Mkt_t = \gamma_0 + \gamma_1 Macroday_t + \gamma_2 Mkt_{t-1} + \gamma_3 (Mkt_{t-1})^2 + e_t \quad \text{(IA.1)}$$

where Mkt_t is the CRSP value-weighted market return minus the risk-free rate. $Macroday_t$ is a dummy variable equaling 1 if day t is an announcement day for a specific type of macro news, and 0 otherwise. For example, if my focus is on ISM PMI, then $Macroday$ equals 1 if that day has an ISM announcement, and 0 otherwise. I also include dummy variables for the day of week.

Due to limited space, I only listed macro announcements that have statistically and economically significant impact on market risk premium. Table IA1 presents results for macro announcements that have statistically and economically significant impact on market risk premium. Panel A shows the results for FOMC news. Column (1) is parsimonious specification without including any control variables. The coefficient on $Macroday$ is positive and significant, suggesting that the market risk premium is higher on FOMC days than other days. I include the market excess return lagged 1 day and squared market return as control in column (2) and add the day of week as an additional control in column (3). The $Macroday$ effect remains positive and highly significant in all specifications. Panels B-D show similar macro-day effects for announcements of Nonfarm Payroll, ISM PMI, and Personal Consumption. Panel E shows results on all of these four macro announcements. The coefficient on $Macroday$ is also positive and significant. Overall, Table IA1 shows that these four important macro announcements are market-moving indicators and therefore investors care about these types of macro news.

Table IA1. Macro announcements and market risk premium

This table reports the results of OLS regressions of daily stock market excess return on a macro announcement day (*Macroday*) dummy variable and control variables. The sample covers January 1997 to December 2014. The dependent variable MKT is the CRSP value-weighted market return minus the risk-free rate. Macro-day for Panel A-E is a dummy variable equaling 1 if day *t* is an announcement day for FOMC, Nonfarm Payroll, ISM PMI, Personal Consumption, and all these four respectively, and 0 otherwise. Monday-Thursday are dummy variables for the corresponding days of the week. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Panel A: FOMC			**Panel B: Nonfarm Payroll**			**Panel C: ISM PMI**		
Variable	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Macroday	0.25**	0.23**	0.23**	0.14*	0.14*	0.18**	0.27***	0.26***	0.27***
	(2.561)	(2.418)	(2.358)	(1.817)	(1.897)	(2.170)	(3.669)	(3.519)	(3.593)
MKT_{t-1}		0.01	0.01		0.01	0.01		0.01	0.01
		(0.522)	(0.521)		(0.556)	(0.550)		(0.580)	(0.585)
$(MKT_{t-1})^2$		40.19	39.00		38.80	38.60		48.00	46.57
		(0.461)	(0.447)		(0.445)	(0.443)		(0.551)	(0.534)
Monday			-0.01			0.03			-0.02
			(-0.131)			(0.614)			(-0.463)
Tuesday			-0.02			0.04			-0.01
			(-0.393)			(0.676)			(-0.128)
Wednesday			0.02			0.08			0.04
			(0.451)			(1.448)			(0.759)
Thursday			-0.00			0.04			-0.00
			(-0.048)			(0.700)			(-0.018)
Constant	0.03	0.02	0.02	0.03	0.02	-0.01	0.02	0.02	0.01
	(1.580)	(1.270)	(0.679)	(1.590)	(1.258)	(-0.363)	(1.184)	(0.890)	(0.401)
Observations	4,357	4,289	4,289	4,357	4,289	4,289	4,357	4,289	4,289
Adj. R2	0.10%	0.10%	0.15%	0.20%	0.60%	0.90%	0.30%	0.52%	1.60%

Table IA1 (continued)

	Panel D: Personal Consumption			Panel E: All Top 4 News		
Variable	(1)	(2)	(3)	(1)	(2)	(3)
Macro-day	0.21**	0.21**	0.21**	0.25***	0.25***	0.26***
	(2.286)	(2.287)	(2.303)	(5.629)	(5.485)	(5.627)
MKT_{t-1}		0.01	0.01		0.01	0.01
		(0.665)	(0.669)		(0.556)	(0.549)
$(MKT_{t-1})^2$		18.78	18.17		39.46	40.28
		(0.220)	(0.213)		(0.454)	(0.463)
Monday			0.00			0.04
			(0.069)			(0.790)
Tuesday			0.00			0.04
			(0.090)			(0.748)
Wednesday			0.03			0.08
			(0.600)			(1.616)
Thursday			-0.01			0.05
			(-0.134)			(0.898)
Constant	0.03	0.02	0.02	-0.00	-0.01	-0.05
	(1.594)	(1.256)	(0.462)	(-0.235)	(-0.264)	(-1.235)
Observations	4,357	4,289	4,289	4,357	4,289	4,289
Adj. R-squared	0.10%	0.21%	1.10%	0.70%	0.96%	2.60%