# Information Consumption and Asset Pricing*

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January 2019

**Abstract**

We construct measures of expected information consumption (EIC) to test whether information processing by investors is associated with a risk premium. We show that most expected information processing about individual firms occurs during spillovers, when peer firm or macroeconomic announcements occur. On days when institutions are expected to consume information, stocks earn a significant risk premium (10% annualized) and the CAPM performs better. The positive effect of FOMC announcements on the risk premia for individual stocks is modulated by the expected information consumption by institutional investors. In contrast, expected retail information consumption has little effect on asset prices.

* We are grateful to Jules van Binsbergen, Ian Dew-Becker, Karl Diether, Joey Engelberg, Craig Holden, Deborah Lucas, Stefan Nagel (the Editor), Jeff Pontiff, Pavel Savor, Duane Seppi, Avanidhar Subrahmanyam, Mungo Wilson, two anonymous referees, as well as seminar participants at Aalto University, Brigham Young University, Case Western Reserve University, The Chinese University of Hong Kong, DePaul University, Fordham University, IDC Herzliya, INSEAD, University of Illinois at Chicago, Indiana University, University of Kentucky, Peking University, University of New South Wales, University of Melbourne, Monash University, Rutgers University, University of Texas at Dallas, NBER Asset Pricing 2017 Fall Meeting, the 2018 Jackson Hole Finance Conference, the 2018 Western Finance Association Meeting, the 2018 European Finance Association Meeting, and the Securities Exchange Commission, and for helpful comments.

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## 1. Introduction

How information becomes incorporated into asset prices is one of the most fundamental issues in finance.[1] For a long time, it has been well-accepted that risk premia should accrue on days when the arrival of information gets processed, resolves uncertainty, and generates systematic price movements. Indeed, according to the historic parable, it is only when the boats arrive that the risk per unit time is higher and investors earn a premium from owning the payoffs of the journey (Robichek and Myers, 1966; Kalay and Loewenstein, 1985). Yet, despite the longstanding importance of this idea, there has been a recent rebirth in interest in these risk premia and the performance of CAPM during information events (Patton and Verardo 2012; Savor and Wilson, 2013, 2014, and 2016).[2]

To study the impact of information on individual stock prices, a natural place to start is with the set of information events for a firm, such as scheduled firm announcements, earnings reports, dividend announcements, or news releases. While individual firm announcements may sometimes command a risk premium (e.g., Savor and Wilson, 2016), focusing on these events may overlook information spillovers from related firms and the macroeconomy, which are more systematic in nature. Additionally, analyzing settings when the boats arrive does not guarantee that investors are standing on the shore (i.e., investor attention). In a world where information is overabundant and investors practice rational inattention, knowledge needs to be consumed to affect asset prices.

In this paper, we characterize how information processing by institutional and retail investors affects asset prices. We construct several ex-ante measures of *Expected Information Consumption* (*EIC*), based on predictions regarding when investors are likely to consume information in the market. The bases for the *EIC* measures are the abnormal institutional attention (*AIA*) measure established by Ben-Rephael, Da, and Israelsen (2017) and Google search activity (*DSVI*) as described by Da, Engelberg, and Gao (2011). Since both of these arise contemporaneously with returns, we form new ex-ante measures of consumption that allow us to associate the excess returns that we observe with risk premia that accrue to investors. *EIC* also helps us avoid concerns of reverse causality and endogeneity that arise with contemporaneous measures like *AIA* and *DSVI*.

[1] For example, see Beaver (1968), Grossman and Stiglitz (1976), and Copeland (1976).
[2] See also Ai and Bansal (2018) and Andrei, Cujean, and Wilson (2017) for recent theoretical analysis.

We find that *Institutional EIC* (*EIIC*) is an important proxy for detecting when information resolves uncertainty and affects risk premia. It is more systematic in nature, captures value-relevant information that spills over to and from other stocks, and guarantees investor attention and timely information processing. As a result, we find that the information expected to be actively consumed by institutional investors is associated with a risk premium, the CAPM performs better when they consume information, and our *EIIC* proxies modulate the well-documented effects of macroeconomic announcements on CAPM performance (Savor and Wilson, 2014). In contrast, we find that *Expected Retail Information Consumption* (*ERIC*) behaves differently than *EIIC* and has no systematic implications whatsoever.

To form our measures of *EIIC*, we begin by analyzing what drives institutional information consumption. Naturally, when news is released about a particular firm, *AIA* for that stock is more likely to be positive. But, this is not a necessary condition: consumption of information about a particular stock commonly arises when no news about that firm has been released. We find that information consumption on individual stocks is often triggered by peer- and other aggregate macroeconomic news events. Thus, *AIA* appears to capture information spillovers and learning across stocks, in a way that proxies for firm-specific information events cannot.

Based on this, we compute various measures of *EIIC*. The first type uses scheduled firm-specific events provided by Bloomberg. If a firm's *AIA* tends to spike on a particular scheduled event in the past, we predict that its *AIA* will likely spike again during that event in the future. The second type captures information spillovers from other firms' scheduled events. If a firm's *AIA* often spikes when other firms in the market make announcements, then we predict it will happen in the future. The third type captures information spillovers from FOMC or other macroeconomic announcements. If the tendency for a firm's *AIA* is to spike during these events in the past, we predict that they will in the future. Empirically, the vast majority of *EIIC* events are of the second and the third types (88%), highlighting the importance of information spillover. Using *DSVI* from Google, we compute similar measures for expected information consumption by retail investors (*ERIC*).

In general, we confirm that *EIIC* is associated with a positive risk premium by using panel regressions similar to those in Engelberg, McLean, and Pontiff (2018). But, the results depend on the type of consumption. We do not find the *EIIC* triggered by own-firm scheduled announcements to be associated with a significant additional risk premium, after controlling for days in which

those firms make earnings announcements. We document an earnings announcement premium that is consistent with previous evidence (Frazzini and Lamont, 2007; Barber, De George, Lehavy and Trueman, 2013; Savor and Wilson, 2016).

However, the story is very different for the majority of *EIIC* events that are triggered by information spillovers. When peer firms in the market release information, *EIIC* is associated with a risk premium, even after controlling for information supply. Additionally, *EIIC* commands a premium when macroeconomic events arise. Both of these results are economically and statistically significant. This implies that during such market events, information with systematic importance disseminates and leads to increased information processing about individual firms, which yields a risk premium.

We verify that the higher returns on *EIIC* days are not driven by temporary price pressure (e.g., Barber and Odean 2008). Instead, consistent with the risk premium interpretation, we show that the CAPM beta is roughly 5% higher on days with positive *EIIC*, even after controlling for scheduled firm-specific information events including earnings announcements. This result further suggests that *EIIC* also captures information spillovers that are priced in the market.[3]

We then turn to testing the Capital Asset Pricing Model (CAPM) using Fama-MacBeth (1973) cross sectional regressions, where we regress daily stock excess returns on pre-estimated betas. We find evidence of a significant daily market risk premium of 12 basis points for observations associated with expected institutional information consumption. By contrast, we find that the CAPM performs poorly (-0.3 basis points) when *EIIC* is zero.

We also confirm the findings of Savor and Wilson (2014) that the CAPM works in the set of days with important macroeconomic announcements. However, we find that this result is conditional on institutional information consumption. Overall, the estimated market risk premium on days with FOMC announcements is about 14 basis points. However, the estimated CAPM risk premium is 44 basis points for stocks with positive *EIIC* and not statistically significant for stocks with zero *EIIC*. This suggests that information consumption is a necessary condition.

We further investigate these relationships by analyzing four sub-groups in which we expect the results to be stronger. We confirm that smaller firms and those with less attention from analysts

[3] This is also consistent with Peng and Xiong (2006) who show that limited investor attention leads to category-learning behavior, i.e., investors tend to process more market and sector-wide information than firm-specific information. Consequently, demand for firm-specific information likely coincides with that of aggregate information and carries systematic implications.

are more sensitive to spillover effects and command higher premia during industry and macroeconomic events. We also find that returns are higher during the first quarter of the year when 10-K statements are released, compared to quarters 2-4 that are associated with the release of 10-Q statements. This seems to be related to the nature of information being released during the earnings season. We also confirm that firms that announce earnings late in the earnings cycle command a higher risk premium. Naturally, as other firms in the same industry make announcements earlier, there is higher expected information consumption in the firms among late announcers that result from information spillovers.

Finally, we document the economic magnitudes of our findings by using calendar-time trading strategies, made possible by our ex ante information consumption measures. We find that positive *EIIC* days are associated with daily excess returns of 10.41 basis points, compared to 6.83 basis points for days with zero *EIIC*. The resulting annualized Sharpe ratio for positive *EIIC* days is 1.32 and is 0.964 for days with zero *EIIC*. Both of these differences are statistically and economically significant.

The remainder of the paper is organized as follows. In Section 2, we describe our raw measures of information consumption and supply. There we also outline how we construct our ex-ante expected measures of information consumption. In Section 3, we analyze how our measures of *EIC* are related to risk premia and the performance of the CAPM. Section 4 concludes. The Appendix provides more details regarding the variables we construct and some added robustness checks.

## 2. Data and Empirical Measures

In Section 2.1, we summarize our raw measures of information consumption and supply. Then, in Section 2.2, we construct ex-ante measures of expected information consumption (*EIC*). The Appendix contains added details about our empirical measures.

### *2.1 Raw Measures of Ex Post Information Consumption and Supply*

Bloomberg provides data that include transformed measures of news reading and news searching activity on Bloomberg's terminals. The majority of Bloomberg terminal users are institutional investors who have both the incentives and financial resources to react quickly to important news about a firm (Ben-Rephael, Da, and Israelsen, 2017). Based on data availability,

our sample period ranges from February 2010 to December 2017.[4] Following Da, Engelberg, and Gao (2011), we begin with the sample of all stocks that appeared in the Russell 3000 index during our sample period. We then require the stocks in our sample to satisfy the following conditions: (1) have measures of news-searching and news-reading activity on Bloomberg terminals and the Google search engine; (2) have a share code of 10 or 11 in the Center for Research in Securities Prices (CRSP) database; (3) have stock prices greater than or equal to $5 at the end of the previous month; (4) have book-to-market information. After applying these conditions, we study 3,188 stocks and 4,047,195 day-stock observations.

**Abnormal institutional attention (AIA)**: Our first variable of information consumption measures ex post spikes in attention by institutions (Ben-Rephael, Da, and Israelsen, 2017). Bloomberg records the number of times terminal users actively search for or read news articles on particular stocks, and places more emphasis on active demand for information for a specific firm by assigning a score of 10 when users search for news and 1 when users simply read a news article. These numbers are aggregated into hourly counts and Bloomberg creates an attention score by comparing the average hourly count during the previous 8 hours to all hourly counts over the previous month for the same stock. They assign a score of 0, 1, 2, 3 or 4 if the rolling average is in the lowest 80% of the hourly counts over the previous 30 days, between 80% and 90%, 90% and 94%, 94% and 96%, or greater than 96% of the previous 30 days' hourly counts, respectively. Bloomberg aggregates these scores up to a daily frequency by taking a maximum of all hourly scores throughout the day.[5] Using this daily measure and following Ben-Rephael, Da, and Israelsen (2017), we compute the abnormal institutional attention (*AIA*) as a dummy variable that takes a value of 1 if Bloomberg's daily maximum is 3 or 4, and 0 otherwise. The dummy variable allows easier interpretation of the differential impact of high vs. low institutional attention shocks on economic outcomes, and we confirm that alternative definitions of AIA do not alter our conclusions in the paper. Ben-Rephael, Da, and Israelsen (2017) provide evidence that *AIA* facilitates the incorporation of information into prices.

[4] Bloomberg's historical attention measures begin on 2/17/2010. Historical data are missing for the periods of 12/6/2010 – 1/7/2011 and 8/17/2011 – 11/2/2011.

[5] Please see the online data appendix at the authors' websites for detailed instructions on downloading the Bloomberg search data: https://sites.google.com/site/abenreph/, http://www3.nd.edu/~zda/ or http://ryan.israelsen.com

**Abnormal Google Search Volume Index (*DADSVI*):** Our second variable of information consumption measures ex post spikes in attention by retail investors. As described by Da, Engelberg, and Gao (2011), retail attention is measured using the daily Google Search Volume Index (*DSVI*). We calculate the abnormal *DSVI* by taking the natural log of the ratio of the *DSVI* to the average of *DSVI* over the previous month. To facilitate the comparison with a stock's *AIA*, we create a dummy variable version of *ADSVI*: for each day, we assign a score of 0, 1, 2, 3, or 4 scores using the firm's past 30 trading day *DSVI* values. Then, for each day, *DADSVI* is set to one if the score is 3 or 4, and 0 otherwise.

**Information Supply:** Our three measures of information supply are based on earnings announcements, general news and events, and macroeconomic announcements. To facilitate a comparison with *AIA* and *DADSVI*, we construct a dummy variable *EDAY*, which is equal to one for a stock when the firm announces its earnings and zero otherwise. We obtain earnings announcement dates from I/B/E/S. Likewise, we define *NDAY* as a dummy variable that is equal to one if a news article about the firm is published on the Dow Jones Newswire on a particular day and zero otherwise. We obtain news coverage of our sample stocks from RavenPack. Because we want to distinguish earnings announcements from other news, we set *NDAY* equal to zero on earnings announcement days.

For each firm, we calculate the value-weighted averages of *NDAY* and *EDAY* for other firms in the same (Fama French 48) industry, which we call *FF48_NDAY* and *FF48_EDAY*, respectively. In addition, we create two similar variables, *AGG_NDAY*, and *AGG_EDAY*, which capture the value-weighted averages of *NDAY* and *EDAY* using all firms in the sample on a given day.

In our analysis, we further sub-divide *NDAY* into non-earnings scheduled event days (*NESEDAY*) and unscheduled news days (*USNDAY*). In our sample, there are 165,172 scheduled events from 2010 to 2017.[6] Bloomberg classifies each event into one of 9 categories. The most common category – making up 43% of all events – is "TV/Conference/Presentation", which consists primarily of investor conferences, but also includes prescheduled press conferences. The next two most common categories are "Earnings Release" and "Earnings Call", which make up

[6] We gather these scheduled events from Bloomberg's Corporate Events Calendar Function (EVTS). These events are known in advance.

34% and 30% of events. Not surprisingly, these are typically scheduled on the same day (they make up 35% of events combined). The next two most common categories are "Shareholder Meeting" and "Corporate Access", accounting for 12% and 6% of all events, respectively. The remaining 4% of events fall under the categories "Mergers and Acquisitions", "Sales Result", "Analyst Marketing", and "Earnings Guidance".

Finally, we include several measures based on important macroeconomic news announcements. Because there are macroeconomic announcements almost every day, we limit ourselves to those that draw the most attention from institutional investors on Bloomberg terminals.[7] Those include announcements of nonfarm payroll (*NFP*), the producer price index (*PPI*), the Federal Open Market Committee rate decision (*FOMC*), the "advance" forecast of the U.S. Gross Domestic Product (*GDP*), and the Institute for Supply Management Manufacturing Index (*ISM*). Announcement dates and times are all from Bloomberg. For each of these five announcements, we create dummy variables equal to one on announcement days and zero on other days. In addition to the five individual dummy variables, we also create the dummy variable *MACRO* which is set equal to one on days when at least one of the five announcement dummies is equal to one and zero otherwise.

**Summary Statistics:** According to Panel A of Table 1, the average stock in our sample experiences an information consumption shock from institutional investors on 7.59% of all trading days. The average frequency of information consumption shocks by retail investors is similar at 0.0764.

Insert Table 1 about here.

Exploring the information supply variables, for a typical firm in our sample, about one day out of five is a news day, on average. Not surprisingly, firms have an average of four earnings announcement days per year. The average (median) firm size is around $6.2 ($1.1) billion. On

[7] For macro announcements, attention is measured based on Bloomberg's "relevance score" which represents the number of "alerts" set on Bloomberg Terminals for an economic event relative to all alerts set for the 130 macro events in the U.S. Users can choose to be alerted to different types of announcement events.

average, $51.09 million dollars' worth of shares is traded per day for a given stock. Finally, the mean (median) daily return in our sample is 9.44 (7.26) basis points.

Panel B of Table 1 provides cross-tabulations based on percentages of all day-stock observations. While there is a positive relationship between *AIA* and *NDAY* or *EDAY*, the supply of information is not a sufficient statistic for information consumption. Institutional attention is in fact more likely to occur on days without (non-earnings-announcement) news: only 13% (= 3.2 / 24.3) of news days draw abnormal attention and 60% (= 0.9 / 1.5) of earnings days coincide with institutional information consumption.

The third cross tab of Panel B shows only a slightly positive relation between *AIA* and *DADSVI*. The correlation of *AIA* with *DADSVI* is 3% and only 1.2% of day-stock observations include information consumption by both institutional and retail investors. This is consistent with the notion that institutions respond immediately to news while retail investors respond to news with a delay.

To examine what drives institutional information consumption, Table 2 presents the results of Logit panel regressions in which we regress *AIA* on measures of information supply at the firm, industry, and macroeconomic level. We include day-of-the-week dummies to capture seasonality in attention that been previously documented (DellaVigna and Pollet, 2009; Liu and Peng, 2015; and Ben-Rephael, Da, and Israelsen, 2017). Other controls include firm characteristics such as absolute returns, size, book-to-market, and institutional holdings.

Insert Table 2 about here.

The results suggest that in periods with more firm-level news, institutional investors are more likely to consume information for a stock, especially when the events are pre-scheduled. But, the results in Table 2 also suggest that information consumption about a particular firm rises because of spillover effects from other firms. Industry-level news, especially earnings announcements made by competitors, are correlated with greater institutional information consumption. This is intuitive given that earnings news about firms in an industry may have important implications for other firms in the industry. Additionally, when there is more news about large firms in the market, institutional information consumption for individual stocks is more likely

to be high. News about large firms may have systematic implications for other stocks, even when these firms are in different industries.

Focusing on macroeconomic news, specifications 5, 7, and 9 include the *MACRO* dummy variable. In general, institutional information consumption on individual stocks often coincides with macroeconomic announcements, even after controlling for other firm-, industry-, and market-level events. Among all five macroeconomic announcements, FOMC rate announcements appear to draw the most attention (specifications 6 and 8). Macroeconomic announcements estimates attenuate once we control for firm characteristics and absolute returns (specification 9 and 10). Note that we do not expect MACRO announcements to affect all firms in a similar manner. Later, we explore the effect of MACRO announcements on the affected stocks.

To summarize, *AIA* can be triggered not only by firm-specific events, but also via information events from other firms and from the macro-economy. In addition, not all firm-specific information events trigger *AIA*. In the next subsection, we use these observations to construct measures of expected information consumption (*EIC)*, based on how investors had responded to various events in the past.

### 2.2. Expected Information Consumption (EIC)

In order to link information consumption to asset pricing outcomes, we construct several ex-ante measures of institutional consumption (*EIIC*) and retail consumption (*ERIC*). All of the measures are dummy variables that take a value of one if the predicted frequency of consumption exceeds a threshold, and zero otherwise. Full details of the construction methodology for each measure are in the Appendix. Summary statistics about *EIIC* measures are in Table 3.

Insert Table 3 about here.

Our first class of measures of expected institutional information consumption is based on a firm's own scheduled events, including earnings announcements (*EIIC_Scheduled*). If the firm's *AIA* tends to spike on a particular scheduled event in the past, we predict that its *AIA* will likely spike again during that event in the future, and we set its *EIIC_Scheduled* equal to 1. To the extent that *AIA* spikes are driven by institutional investor attention, we posit that *EIIC_Scheduled* is more likely to capture important events that have systematic implications.

Column 1 of Table 3 reports the number of observations and percentage of AIA=1 cases conditioning on *EIIC_Scheduled* equal to 1 or 0. There are 43,308 *EIIC_Scheduled* = 1 observations (1.08% of the total number of observations in our sample). The percentage of AIA=1 for the *EIIC_Scheduled*=1 subsample is around 72%, suggesting that our methodology does a good job at predicting information consumption events in this case. In contrast, the percentage of AIA=1 for *EIIC_Scheduled* = 0 is similar to the average AIA frequency in our sample which is around 7.5% (i.e., a random draw of *AIA* = 1). The predictive power, as measured by the difference in the two frequencies, is statistically significant. To explore the effect of non-earnings firm scheduled events separately, in Column 2 of Table 3, we exclude earnings announcement days, which leaves us with non-earnings firm scheduled events. The number of *EIIC_Scheduled_Exc_Earn* =1 observations is 22,614 (more than half of all *EIIC_Scheduled* = 1 events), highlighting the importance of other types of firm scheduled events. Among those observations, 53% have an actual *AIA* = 1, confirming the predictive power of our methodology.

Our second class of measures of expected institutional information consumption is based on information spillover from other firms' scheduled events (*EIIC_Spillover_Peer).* If firm A's *AIA* often spikes on firm B's scheduled event in the past, we predict firm A's *EIIC* to be 1 on firm B's next scheduled event day. We view this *EIIC* measure as a novel measure empirically. For example, Savor and Wilson (2016) attribute the positive earnings announcement window return to a risk premium, since firm A's earnings announcement can affect other firms. Hence, the earnings announcement is systematic in nature. Their story would also predict the affected firms to have a risk premium on that day, but the literature to date has not tested this prediction directly. *EIIC_Spillover_Peer* fills this void.

Column 3 of Table 3 reports the number of observations and percentage of AIA=1 cases conditioning on *EIIC_Spillover_Peer* = 1 or 0. The percentage of AIA=1 for the *EIIC_Spillover_Peer* = 1 subsample is around 24%, which is more than three times larger than the likelihood of a random draw of AIA=1. The percentage of AIA=1 in the case of *EIIC_Spillover_Peer* = 0 is only around 8.5%. The difference in frequencies is statistically significant.

Our third class of measures of expected institutional information consumption is based on information spillover on FOMC announcement days (*EIIC_Spillover_FOMC).* If firm A's *AIA*

often spikes during previous FOMC announcements, we can predict firm A's *EIIC* to be 1 on the next FOMC announcements. While the previous literature focuses on the market risk premium around FOMC announcements, this analysis contributes by considering a cross-sectional dimension. Since not all stocks are affected equally, *EIIC_Spillover_FOMC* identifies stocks that are more likely to be associated with a risk premium during FOMC announcements. We also include the measure *EIIC_Spillover_MACRO* to study the effects of information spillover on Macro announcement days using all five macro events defined in Table 2.

Column 4 and 5 of Table 3 report the number of observations and percentage of AIA=1 observations conditioning on *EIIC_Spillover_FOMC* and *EIIC_Spillover_MACRO* equal to 1 or 0. There are 59 (334) FOMC (MACRO) announcements days, with 11,159 (18,377) *EIIC_Spillover_FOMC*=1 (*EIIC_Spillover_MACRO=1*) observations from a sample of 126,257 (716,119) firm-announcement day observations. The percentage of AIA=1 observations is around 26% (31%) for *EIIC_Spillover_FOMC*=1 (*EIIC_Spillover_MACRO=1*). The percentage of AIA=1 observations in the case of *EIIC_Spillover_FOMC* = 0 (*EIIC_Spillover_MACRO* = 0) is 8.4% (7.5%).

Finally, we construct two overall measures based on all three classes of expected information consumption. The first is a total spillover measure (*EIIC_Spillover_ALL*), which aggregates *EIIC_Spillover_Peer*, *EIIC_Spillover_FOMC*, and *EIIC_Spillover_MACRO*. The second (*EIIC_ALL*) is based on all available information, which includes *EIIC_Spillover_ALL* and *EIIC_Scheudled*. Column 6 and 7 of Table 3 report the number of observations and percentage of AIA=1 cases conditioning on *EIIC_Spillover_ALL* and *EIIC_ALL* equal to 1 or 0.

In total, we are able to identify 305,454 *EIIC_ALL =1* observations (from the full sample of 4,047195 observations). More than 88% of these observations reflect information spillovers (or *EIIC_Spillover_ALL* = 1). The accuracy rate (or the percentage of *AIA* = 1 observations in the case of *EIIC_ALL* = 1) is more than 29%, significantly higher than its counterpart in the case of *EIIC_ALL* = 0 of 6.5%.

To summarize and conclude this subsection, our various *EIIC* measures speak directly to the recent literature that finds higher stock returns on scheduled information event days. Examples of such events include firm-level earnings announcements (Frazzini and Lamont, 2007; Barber, DeGeorge, Lehavy, and Trueman, 2013, among others) and macro announcements (Savor and Wilson, 2003, among others). We extend this literature in several important dimensions and add

new insights. First, at the firm level, we go beyond just earnings announcements and examine other scheduled events. Second, our *EIIC* measures allow us to identify events that are more likely to have important systematic implications.[8] Third and most importantly, we directly examine information spillover. While the existing literature focuses on the risk premium on the announcing firm, we also study risk premium on other firms that are affected by the announcement. We also add an important cross-sectional dimension to macroeconomic announcements by ex-ante identifying stocks that are more likely to be affected.

## 3. EIC and Risk Premium

### *3.1 Information Consumption and the Risk Premium*

We now explore whether days with expected information consumption are associated with a risk premium. To examine this, in Table 4, we run panel regressions of daily stock returns on various *EIIC* and *ERIC* measures, including control variables, 10 return lags each, squared returns, trading volume, *NDAY*, and day fixed effects.

Insert Table 4 about here.

In many of the specifications, there appears to be a significant risk premium associated with earnings announcements (*EDAY*), which confirms the results that are present in Engelberg, McLean, and Pontiff (2018) and the presence of an earnings announcement premium (Frazzini and Lamont, 2007; Barber, De George, Lehavy and Trueman, 2013; Savor and Wilson, 2016). However, this is absent in specifications 4 and 5, in which we analyze FOMC announcements and macroeconomic events (*MACRO*).

Specifications 1 and 2 investigate whether a significant risk premium is associated with own-firm scheduled events. When controlling for *EDAY* in Specification 1, this does not appear to be the case. While *EDAY* is associated with a significant premium of 16.34 basis points, *EIIC_Scheduled* is not. Its coefficient of 3.187 basis points, while positive, is not significant. In Specification 2, *EIIC_Scheduled_Exc_Earn* is associated a risk premium of 11.64 basis points

[8] In contrast, when we explore *ERIC* as a dependent variable (as in Table 2), we find that it does not respond to industry or aggregate firm information, or macroeconomic events. Details available from the authors upon request.

when earnings announcement days are excluded. While some non-earnings firm scheduled events seem important, overall, it does not appear that expected information consumption during own firm announcements is reliably associated with an additional risk premium, as much of this effect is subsumed by firm earnings announcements. However, it is important to bear in mind that *EIIC_Scheduled* = 1 events only account for less than 15% of all *EIIC_ALL* = 1 events.

The story changes markedly in Specifications 3-6, as there is a significant risk premium on *EIIC* triggered by scheduled macroeconomic announcements and scheduled events from other firms. The magnitude of the risk premium is 10.634 basis points for *EIIC* on FOMC announcement days and 6.638 basis points for *EIIC* on all macro announcement days. It is noteworthy that this is after controlling for *EDAY*, which is itself not significant. The magnitude of the risk premium for *EIIC* that accrues from peer firms is 2.069 basis points, which is statistically significant. Aggregating across all types of spillover events, specification 6 shows an average risk premium of 3.731 basis points for *spillover EIIC*.

Specification 7 examines the combined *EIIC* measure, which we will use extensively in the rest of the paper. Days with earnings announcements (*EDAY*) earn a risk premium of 16.265 basis points and other scheduled event days (*NESEDAY*) earn 4.751 basis points. Even after controlling for these pre-scheduled firm-level events, combined *EIIC* is still associated with an additional risk premium of 3.706 basis points. While admittedly the magnitude of the *EIIC* risk premium is smaller compared to that associated with *EDAY* (16.265), it is important to keep in mind that earnings announcements happen only four times per year and *EIIC* = 1 is expected to occur 7.55% of the time – almost 5 times as often.

Table 4 also shows that the coefficients on *ERIC* are small and insignificant. This is consistent with the explanation that retail investors may be expected to consume information with a delay, when a significant portion of uncertainty has already been resolved in the market.

To explore this further, we examine whether systematic risk is higher on days with *EIIC*, *ERIC*, or other scheduled firm events. We estimate a time varying factor loading CAPM beta model using variations of the following model:

$$\begin{aligned} ERet_{it} = \alpha_i &+ \beta_1 \times EIIC_{it} + \beta_2 \times ERIC_{it} + \beta_3 \times NESEDAY_{it} + \beta_4 \times EDAY_{it} \\ &+ \beta_5 \times MKTRF_t + \beta_6 \times MKTRF_t \times EIIC_{it} + \beta_7 \times MKTRF_t \times ERIC_{it} \\ &+ \beta_8 \times MKTRF_t \times NESEDAY_{it} + \beta_9 \times MKTRF_t \times EDAY_{it} + \varepsilon_{it} \end{aligned}$$

where *ERet* is the stock return minus the risk free rate (in basis points) and *MKTRF* is the market return minus the risk free rate (in basis points). As in Patton and Verardo (2012), stock fixed effects are included in each regression, which allows us to capture within-firm beta estimation. Given that this is a within-firm analysis and the fact that most of the spillover observations start from April 2011 (Column 3 of Table 3), we run our beta tests from April 2011. The results are reported in Table 5.

Insert Table 5 about here.

The first four specifications in Table 5 report the coefficients from panel regressions controlling for the four information consumption and information supply measures separately. The first specification indicates that CAPM betas on days with *EIIC* are about 0.049 higher than on days with no expected shocks. The second specification shows no significant change in the CAPM betas on days with positive *ERIC*. Specifications 3 and 4 examine the impact of scheduled events and earnings announcements on betas. Betas are about 0.14 higher on days with earnings announcements, which is consistent with Patton and Verardo (2012). Other scheduled firm-level news events increase the beta by 0.062.

Specification 5 includes all four measures as interactions with market returns. The impact of *EIIC* is slightly smaller than when it is included individually.

### *3.2 Performance of the CAPM*

We now turn to tests of the Capital Asset Pricing Model. Savor and Wilson (2014) show that the CAPM performs well on macroeconomic announcement days (FOMC, unemployment, and inflation), and fails on other days. In the same spirit, we partition stock-day observations based on measures of *EIIC* and carry out our tests. Each day, we run a cross sectional regression of excess stock returns on CAPM betas. Table 6 examines the time series means of these Fama-MacBeth (1973) regressions.

Insert Table 6 about here.

Various measures of *EIIC* paint a consistent picture that the CAPM performs better for stock-days when institutional investors are expected to consume information. When *EIIC* = 0, the slope coefficient on the CAPM beta is never significant while the intercept term is often positive and significant, consistent with the well-documented failure of the CAPM in describing the cross-sectional variation in average returns. In contrast, when *EIIC* = 1, the slope coefficient on the CAPM beta is always positive and significant and the intercept term is rarely significant. The risk premium estimate for *EIIC* = 1 ranges from 8.262 to 43.868 basis points, and is always significantly higher than when *EIIC* = 0.

For example, for the combined *EIIC* (*EIIC_ALL*) in specification 7 when institutional investors are expected to consume information, the CAPM does well with a significant risk premium estimate of 11.918 basis points and an insignificant intercept term close to zero. In contrast, when *EIIC_ALL* = 0, the CAPM fails with an insignificant risk premium estimate close to zero and a significantly positive intercept term of 7.024 basis points. A risk premium of around 12 bps for *EIIC*=1 is consistent with the sample statistics reported in Table 1 and the additional increase in risk premium documented in Table 4. Note that the increase in beta of around 5% is much lower than the increase in return of *EIIC*=1 relative to *EIIC*=0 which is around 40%. This suggests that this is not just an increase in the quantity of risk, but also an increase in the compensation per unit of risk as well. Our calendar time portfolios (see Table 8) are consistent with this view, where the Sharpe ratio for *EIIC*=1 stocks is more than 30% higher than for *EIIC*=0 stocks.

Insert Figure 1 about here.

Figure 1.A illustrates the result graphically. Each day, within *EIIC_ALL* = 1 and *EIIC_ALL* = 0 subsamples, we sort stocks into decile portfolios based on their CAPM betas estimated over the previous 252 trading days using the same decile cutoffs for all stocks. Figure 1.A plots the average portfolio daily excess returns (over the risk-free rate) against their average CAPM betas, separately for the two subsamples. The figure confirms that the CAPM works better among *EIIC_ALL* = 1 stocks. There is a positive relation between the average excess return and the CAPM beta for stocks when institutional investors are expected to consume information. Among *EIIC_ALL* = 0 stocks, the relation is in fact slightly negative.

Specification 4 in Table 6 focuses on the interesting case of the FOMC announcements. Savor and Wilson (2014) find that the CAPM performs well on those days. We find their results to be modulated by *EIIC*. On FOMC announcement days, the CAPM only works well among a subset of stocks where institutional investors are expected to consume information. For those stocks, the CAPM regression generates a significant risk premium estimate of 43.868 basis points. For the remaining stocks, the risk premium estimate is still small and insignificant.

Figure 1.B illustrates the FOMC results graphically. We observe the strongest positive relation between the average excess return and the CAPM beta among *EIIC* = 1 stocks on FOMC announcement dates. On these dates, the relation between average excess returns and CAPM betas is much weaker among *EIIC* = 0 stocks. Similar patterns apply to the broader set of macroeconomic announcements as well, as reported in specification 5.

### *3.3 Further Characterization and Economic Magnitudes*

To further explore these relationships, we consider four subsamples in our data. The first two are based on firm characteristics: the relative size within the firm's Fama French 48 industry and number of analysts covering the firm. We hypothesize that *ceteris paribus*, smaller firms in an industry and firms with lower analyst coverage should respond more to information disseminated by other firms. The second two subsamples of firms are chosen based on the timing aspect of their information releases. Specifically, we explore differences across 10-K and 10-Q reporting quarters and differences across the first half and second half of the earnings cycle. *Ceteris paribus*, we hypothesize that information released in the 10-K and information released during the first half of the earnings cycle should be more material and informative compared to information released in the 10-Q and the second half of the earnings cycle. As such, information consumption during the 10-K quarter and information consumption during the first half of the earnings cycle should command a higher risk premium.

Insert Table 7 about here.

Table 7 repeats the analyses in Tables 4 and 6 and reports the risk premium and the CAPM regression slopes for all four subsamples using *EIIC_Spillover_ALL*. As with the previous analyses, the risk premia are statistically significant and the CAPM performs appropriately for

*EIIC_Spillover_ALL*=1. The differences across subsamples are economically significant and appear to be consistent with our conjectures. Smaller firms and firms with lower analyst coverage have higher risk premia when *EIIC* is equal to 1, and the CAPM slopes are steeper. This also appears to be the case for the 10-K quarter and for firms who report in the first half of earnings cycles.

Finally, we explore the economic magnitudes of our findings using calendar-time trading strategies. The analysis in Table 5 indicates that there is an additional return of almost 4 basis points when *EIIC* is 1. The trading strategies are implementable since the *EIIC* measures are constructed using only historical information. Importantly, this allows us to calculate the Sharpe ratios and excess returns associated with *EIIC*.

Insert Table 8 about here.

Panel A reports the daily average excess returns (in basis points), the standard deviation of daily returns (in basis points) and annualized Sharpe ratios of three equally weighted daily portfolios: *EIIC_ALL*=1, a portfolio that holds stocks that their *EIIC_ALL* measure is expected to be 1; *EIIC_ALL*=0, a portfolio that holds stocks that their *EIIC_ALL* measure is expected to be 0; and *ALL* a portfolio that holds all the stocks in our sample (i.e., regardless of *EIIC_ALL* predicted outcome). We can immediately observe that the *EIIC_ALL*=1 portfolio daily excess return is 52.4% higher than the daily excess return (annualized Sharpe ratio) of the *EIIC_ALL*=0 portfolio (10.412 vs. 6.834). At the same time, the standard deviation of the *EIIC_ALL*=1 daily excess return is only 11.4% higher than that of the *EIIC_ALL*=0 portfolio (125.41 vs. 112.58). As a result, the *EIIC_ALL*=1 portfolio has an annualized Sharpe ratio that is 36.7% higher than that of the *EIIC_ALL*=0 portfolio. All three differences are statistically significant.

To further investigate the returns associated with *EIIC_ALL=1*, we look at the *EIIC_ALL=1* daily excess returns (*EIIC_ALL=1 minus RF*) after risk adjustment using factor models based on the CAPM, Fama-French 3-, and 5- factors (CAPM, FF3 and FF5, respectively). As evident in Panel B, the daily risk premium associated with *EIIC_ALL*=1 is around 3-4 basis points regardless of the risk factors used.

In Appendix A.2, we provide additional robustness checks to our main results and examine several alternative explanations. For example, we provide evidence suggesting that price pressure

is unlikely to drive the results in this paper. We also confirm that our results are robust to using the raw *AIA* measure. While it is impossible to account for all possible alternative explanations, the collection of our results involving ex-ante measures, average returns, betas, and the performance of the CAPM does provide strong support for a risk premium interpretation.

## 4. Concluding Remarks

Understanding the relationship between information consumption and asset pricing is fundamentally important. Recent evidence suggests that the arrival of information is associated with a risk premium (Savor and Wilson, 2013, 2014, 2016). We argue that only considering the supply of information on individual stocks might understate the effects that new information has on asset prices. Consequently, we use the Ben-Rephael, Da, and Israelsen (2017) abnormal institutional attention measure (*AIA*), which captures information consumption shocks from institutions to create an expected consumption measure.

We confirm that expected information consumption is associated with a risk premium, that the CAPM performs well for individual stocks on days in which information consumption is expected to be high, and that expected information consumption appears to modulate the effect of FOMC announcements on asset prices (Savor and Wilson, 2014).

In sum, then, information processing often is a necessary condition for the arrival of information to get incorporated into asset prices. Ex-post, this seems like a logical conclusion. Indeed, investors actually do need to be on the shores when the boats arrive, in order for news about their yields to affect claims to the assets in the ships.

**References**


Ai, H. and R. Bansal. 2018, Risk preferences and the macro announcement premium. *Econometrica*, 86(4): 1383-1430.

Andrei, D., Cujean, J. and Wilson, M., 2017. The Lost Capital Asset Pricing Model. SSRN #3106811.

Barber, B.M., De George, E.T., Lehavy, R. and Trueman, B., 2013. The earnings announcement premium around the globe. *Journal of Financial Economics, 108(1),* pp.118-138.

Barber, B.M. and Odean, T., 2008. All that glitters: The effect of attention and news on the buying behavior of individual and institutional investors. *Review of Financial Studies*, *21*(2):785-818.

Beaver, W.H., 1968. The information content of annual earnings announcements. *Journal of Accounting Research.* 67-92.

Ben-Rephael, A., Z. Da, and R. Israelsen. 2017. It depends on where you search: Institutional investor attention and underreaction to news. *Review of Financial Studies*, 30: 3009-3047.

Copeland T. E. 1976. A model of asset trading under the assumption of sequential information arrival. *Journal of Finance* 31(4): 1149-1168.

Da, Z., J. Engelberg, and P. Gao. 2011. In search of attention. *Journal of Finance* 66:1461-1499.

DellaVigna, S. and Pollet, J.M., 2009. Investor inattention and Friday earnings announcements. *The Journal of Finance*. *64*(2):709-749.

Engelberg, J., McLean, R.D. and Pontiff, J., 2018. Anomalies and news. *Journal of Finance*, 73(5), pp.1971-2001.

Fama, E.F. and MacBeth, J.D., 1973. Risk, return, and equilibrium: Empirical tests. *Journal of political economy*. *81*(3):607-636.

Frazzini, A. and Lamont, O., 2007. The earnings announcement premium and trading volume. NBER working paper #13090.

Grossman, S. J., and J. E. Stiglitz. 1976. Information and competitive price systems. *The American Economic Review* 66(2): 246-253.

Kalay, A. and Loewenstein, U., 1985. Predictable events and excess returns: The case of dividend announcements. *Journal of Financial Economics 14*(3):423-449.

Liu, H. and L. Peng. 2015. Investor attention: Seasonal patterns and endogenous allocations. Working Paper, Baruch College, CUNY.

Patton, A.J. and Verardo, M., 2012. Does beta move with news? Firm-specific information flows and learning about profitability. *Review of Financial Studies*, *25*(9), pp.2789-2839.

Peng, L. and Xiong, W., 2006. Investor attention, overconfidence and category learning. *Journal of Financial Economics*, 80(3), pp.563-602.

Robichek, A. A. and Myers, S.C., 1966. Conceptual problems in the use of risk -adjusted disc rates. *Journal of Finance*, 21(4), pp.727-730.

Savor, P., and M. Wilson. 2013. How much do investors care about macroeconomic risk? Evidence from scheduled economic announcements. *Journal of Financial and Quantitative Analysis* 48, (2): 343-375.

Savor, P. and Wilson, M., 2014. Asset pricing: A tale of two days. *Journal of Financial Economics 113*(2):171-201.

Savor, P. and Wilson, M., 2016. Earnings announcements and systematic risk. *The Journal of Finance 71*(1):83-138.

## A. Appendix

In this appendix, we first give more details regarding the construction of our *EIIC* measures (Section A.1). Table A.1 provides a full list of the variables that we use in our regressions. Subsequently, in Section A.2, we provide a few robustness analyses, which were referred to in the body of the paper.

### *A.1. EIIC Construction*

The first set of measures of *EIIC* is based on the predicted response of institutional search for information to a particular firm's - earnings and non-earnings - scheduled events. Using a list of scheduled events available to Bloomberg terminal users in advance, we create an ex-ante (predicted) measure of expected information consumption based on firm scheduled events (*EIIC_Scheduled*). For each scheduled event in our sample, we examine *AIA* for all previous scheduled events of the same category for the same firm over a period up to a year. If *AIA* is equal to one at least 50% of time over the period, we set *EIIC_Scheduled* to 1 for that scheduled event. If there are multiple scheduled events for a firm on the same day, we take the maximum of the *EIIC_Scheduled* across events. On all remaining days, we set *EIIC_Scheduled* equal to 0.

The second set of measures is based on the predicted response of AIA to peer-firm scheduled events. We construct a predicted information consumption measure that aims to capture *systematic* information spillovers from *peer-firm* scheduled events (*EIIC_Spillover_Peer*). In particular, we zoom in on two dimensions. The first is systematic information spillovers during earnings cycles from other firms' scheduled earnings announcements. The second is systematic information spillover from other firms' non-earnings scheduled events. The basic idea behind our method is intuitive and simple: if firm A's *AIA* often spikes during firm B's past earnings announcements (firm B's previous non-earnings scheduled events), we can predict its *AIA* will likely be 1 on firm B's next earnings announcement (non-earnings scheduled event). Our *EIIC _Spillover_Peer* measure is the combination of these two dimensions.

To identify systematic information spillovers during the earnings cycle period, for each firm i in quarter q, we examine the set of J firms (excluding firm i) over the past four quarters and count the cases in which firm i's *AIA* spikes (i.e., *AIA*=1) on firm j's earnings announcement days. We then calculate the ratio between the number of *AIA*=1 spikes and the total number of firm j's earnings announcements. For example, if *AIA* for firm i spiked on three of firm j's announcements

days, the score of pair i-j is set to 3/4. We repeat this calculation for all J firms. We then use these scores to predict information consumption for firm i that spills over from each firm j on their subsequent earnings announcement days. Returning to the previous example, the score 3/4 is assigned to firm i on the day firm j announces earnings in quarter q. Given that multiple firms may report their earnings on same day *t* of quarter q we examine the maximum and median scores for firm i across all firms announcing earnings.

We then construct an earnings spillover dummy variable that receives a value of 1 for firm i when the max score on a given day is equal or greater than 3/4 and the median score is greater than 1/4 (i.e., a minimum response to an earnings event out of 4 potential events). The median score requirement is geared toward revealing systematic signals from multiple firms. The earnings spillover dummy variable is set to zero otherwise. Finally, to reduce the noise and increase the possibility that investors learn from peer firm earnings announcements, for each firm i we include observations from the beginning of the quarter until the firm's own earnings announcement. We also make sure to exclude firm i's own earning announcement day.

To identify systematic information spillovers peer firm non-earnings scheduled events, we exclude earnings announcements and earning calls from the Bloomberg's scheduled list of events. Since the median number of non-earnings scheduled events per firm and year is around 6, we treat the non-earnings scheduled events as a one pooled category. We then use the same methodology. In particular, for each firm i in quarter q, we examine the set of J firms over the past four quarters and count the cases in which firm i's *AIA* spikes (i.e., *AIA*=1) on firm j's non-earnings scheduled event days. We then calculate the ratio between the number of *AIA*=1 spikes and the total number of firm j's non-earnings scheduled events. We repeat this calculation for all J firms. Next, the scores are placed in quarter q based on each firm j's quarter-q scheduled event days and calculate the maximum score. As in the case of earnings spillovers, we construct a non-earnings scheduled dummy variable that receives a value of 1 for firm i if the max score on a given day is equal to 1 and the median score is greater than 1/6 (i.e., a minimum response to a scheduled event with a frequency of 6 events per year). The dummy variable is set to zero otherwise. Finally, to increase the possibility that investors learn from peer firm non-earnings scheduled events, we make sure to exclude firm i's own scheduled events.

Finally, to construct *EIIC_Spillover_Peer* measure, we combine the two dummy variables (i.e., the earnings spillover dummy and the non-earnings scheduled event dummy) by taking the max of the two dummy variables.

The third set of measures is based on the predicted response of *AIA* to FOMC announcements and all MACRO announcements. We construct a predicted information consumption measure for each stock and FOMC announcement day (*EIIC_Spillover_FOMC*) and each stock and MACRO announcement day (*EIIC_Spillover_Macro*). The measures are based on *firm AIA* behavior over the previous four FOMC announcements days or year's worth of MACRO announcement days.

For FOMC announcement days, if a given stock, If *AIA* is equal to one at least 50% of the previous four FOMC announcement days[9], we set *EIIC_Spillover_FOMC* to 1 on the current FOMC announcement day, and zero otherwise. During the first few months of our sample we allow for *up to* 4 announcements, to minimize loss of observations

For MACRO announcement days, since there are macroeconomic announcements almost every day, we limit ourselves to the five categories that draw the most attention from institutional investors on Bloomberg terminals (see Table 2): Nonfarm Payroll (NFP), Producer Price Index (PPI), FOMC, the advance estimate for GDP (GDP), and the ISM manufacturing index (ISM). The Macroeconomic announcement dates are from Bloomberg. For each category, for a given stock, If *AIA* is equal to one at least 50% of the previous year, and set the category dummy variable to 1, and zero otherwise.[10] *EIIC_Spillover_MACRO* is then the max across five categories.

Finally, we construct two overall measures based on the expected information consumption measures constructed. The first is a total spillover measure (*EIIC_Spillover_ALL*) which is the aggregation of *EIIC_Spillover_Peer*, *EIIC_Spillover_FOMC* and *EIIC_Spillover_MACRO*. The second (*EIIC_ALL*) is based on all available information which also includes firm *own* scheduled events (*EIIC_Scheudled*). Summary statistics about all of these measures are provided in Table 3 in the body of the paper.

### *A.2 Robustness*

[9] The Federal Reserve Open Market Committee (FOMC) holds 8 regularly scheduled meetings per year and additional meetings as needed.

[10] As in the case of non-earnings firm scheduled events, since the number of macro announcements in general is not fixed, we look at a period of up to a year.

One alternative explanation for the positive returns associated with *EIIC* (Table 4) is temporary price pressure (e.g., Barber and Odean 2008). Given that it is more costly to short than to buy, attention may simply be associated with buying on average, which may lead to an eventual reversal. To rule out this explanation, we focus on the combined *EIIC* measure and repeat the main analysis conducted in Table 5, but replace day $t$ returns with day $t$+1 to $t$+5 cumulative returns. Results are presented in Table A.2.

Insert Table A.2 about here.

As Table A.2 shows, there is no evidence of price pressure associated with expected information consumption from institutional investors. There is no evidence of a reversal in the premium accruing on days with *EIIC*. We do not observe reversals associated with expected retail information consumption (*ERIC*) either. This is because *ERIC* = 1 events are predicted and unlikely to result in a large spike in retail attention.

Another potential concern about our results is that our findings may simply be due to the way in which we construct our expected consumption measures. To consider this, we repeat the main analysis conducted in Tables 4, 5 and 6, but use the raw *AIA* measures instead of *EIIC*. We acknowledge that this type of analysis may be less conclusive due to endogeneity and potential reverse causality. However, our goal here is to show that the underlying raw measure is also associated with higher returns and convince ourselves that we have not artificially related excess returns and information consumption by construction. The results are reported in Table A.3.

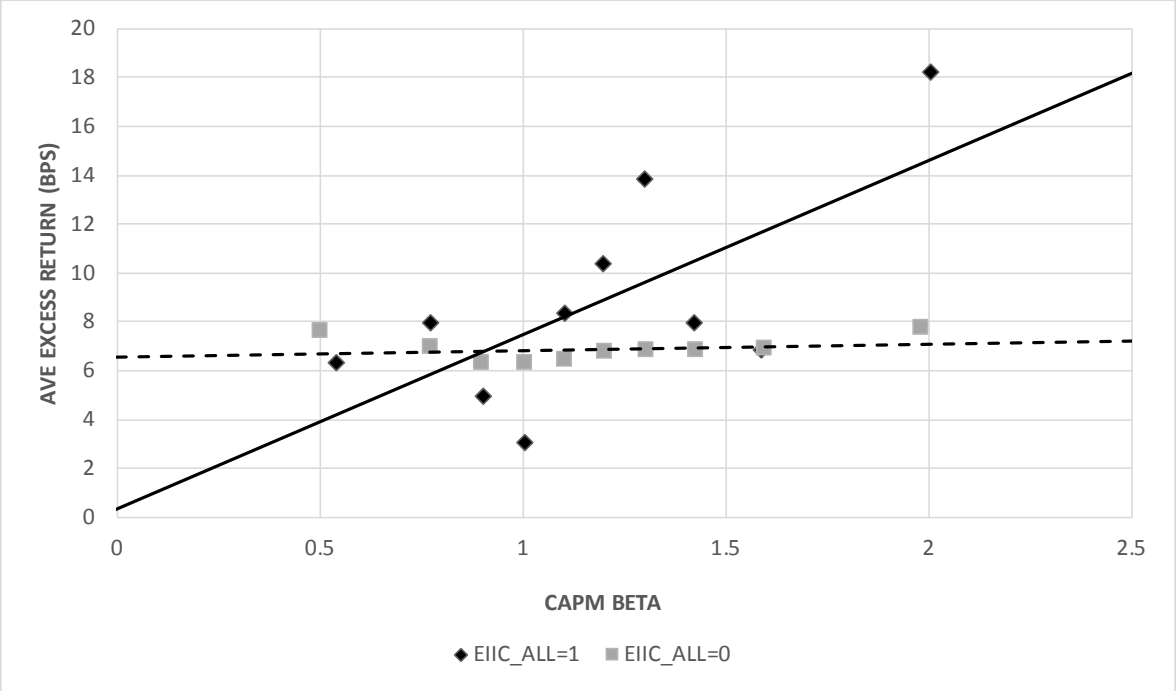
Insert Table A.3 about here.

As evident in Table A.3, the results are much stronger with the raw *AIA* measure that captures actual institutional information consumption ex-post. Consistent with the results found using *EIIC*, we find that days with *AIA*=1 have higher returns. More importantly, *AIA*=1 is associated with higher betas and *AIA*=1 is a necessary condition for the CAPM to hold on regular days and MACRO announcements days.

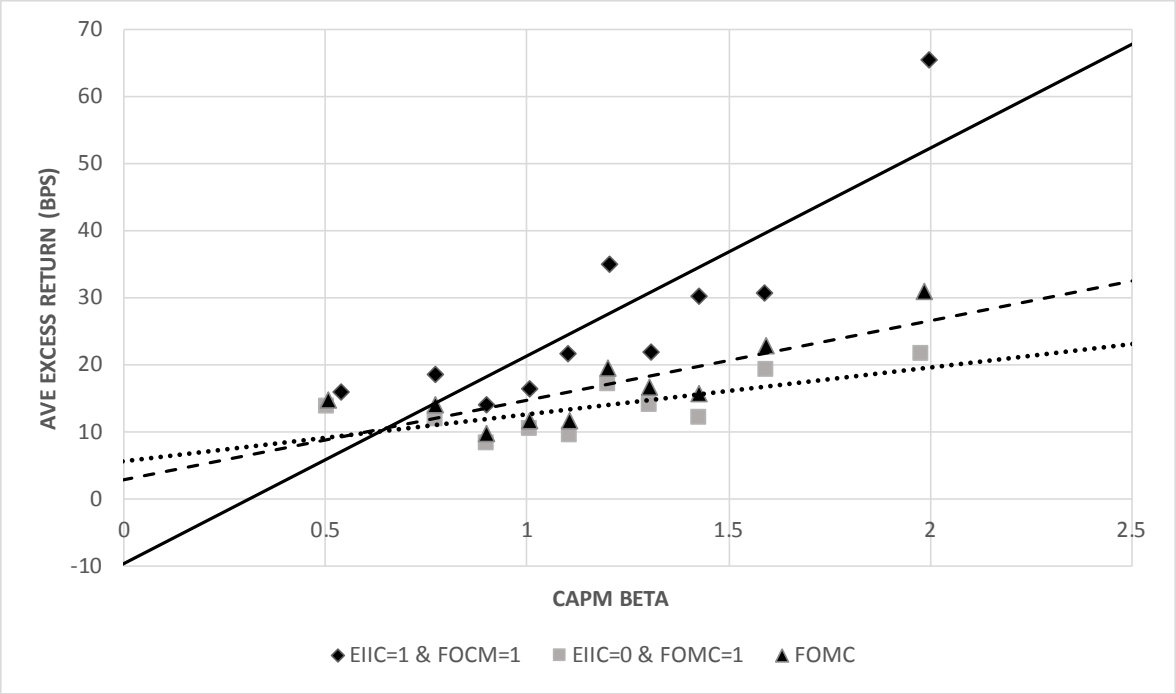
## Figure 1. CAPM in Various Subsamples

Each day, we partition stocks in our sample into ten decile portfolios based on their CAPM betas, which are estimated using the previous 252 trading days. Then, for each decile, we create two subsamples based on whether their *EIIC_ALL* equal 1 or 0 on that day. Panel A plots the average portfolio daily excess returns (over the risk-free rate) against their average CAPM betas, separately for *EIIC_ALL* = 1 (solid line) and *EIIC_ALL* = 0 (dashed line) subsamples. In Panel B, we plot the average portfolio daily excess returns against their average CAPM betas separately for (1) *EIIC* = 1 stocks over FOMC announcement dates (*EIIC* = 1 & FOMC = 1, solid line); (2) *EIIC* = 0 stocks over FOMC announcement dates (*EIIC* = 0 & FOMC = 1, dotted line); (3) stocks over FOMC announcement dates (FOMC, dashed line).

### Graph 1.A – Excess Return and CAPM Betas: *EIIC_ALL* = 1 and *EIIC_ALL* = 0 Subsamples



**Graph 1.B – Excess Returns and CAPM Betas FOMC / *EIIC* Subsamples**



## Table 1. Summary Statistics

This table reports the summary statistics of our Abnormal Institutional Attention measure (*AIA*) and other selected variables from February 2010-December 2017. Our full sample includes all stocks that appeared in the Russell 3,000 index during our sample period, with CRSP Share Codes 10 and 11, *AIA* and book-to-market information, and end of previous month price of at least $5. This results in 4,047,195 day-stock observations across 3,188 unique stocks. All variables are defined in Table A.1. In Panel A, *Num Firms* reports the number of unique firms. Mean, Median, and SD refer to the cross-sectional average, median, and standard deviation of the firms' time series averages. Due to data coverage, *DADSVI* statistics are based on 2,713,692 *DADSVI* day-stock observations. See Table A.1 for information regarding the augmentation of *DADSVI's* sample with zeros when analyzing *AIA* and *DADSVI* together. Panel B reports the cross-tabulations between *AIA* and *EDAY*, *NDAY* and *DADSVI* conditioning on each variables binary outcomes. As in Panel A, the cross-tabulations of *AIA* and *DADSVI* are based on *DADSVI*'s non-missing observations. Percentages of the total number of day-stock observations are reported for each intersection.

### Panel 1.A – Cross Sectional Mean, Median and Standard Deviation

| Variable | Mean | Median | SD |
|---|---|---|---|
| *Num Firms* | 3,188 | | |
| *AIA* | 0.0759 | 0.054 | 0.081 |
| *DADSVI* | 0.0764 | 0.0755 | 0.041 |
| *NDAY* | 0.218 | 0.222 | 0.128 |
| *SEDAY* | 0.036 | 0.034 | 0.031 |
| *NESEDAY* | 0.024 | 0.017 | 0.026 |
| *EDAY* | 0.015 | 0.016 | 0.004 |
| *Ret (in basis points)* | 9.44 | 7.26 | 28.05 |
| *DolVol* | 51.09 | 10.31 | 173.11 |
| *BM* | 0.640 | 0.522 | 0.941 |
| *SizeInM* | 6,234 | 1,081 | 22,838 |
| *InstOwn* | 0.616 | 0.671 | 0.234 |

**Panel 1.B – Sample Cross Tabulations (Percentages of Day-Stock Observations)**

| | *AIA* = 1 | | |
|---|---|---|---|
| *NDAY* = 1 | No | Yes | Total |
| No | 70.7% | 5.0% | 75.7% |
| Yes | 21.1% | 3.2% | 24.3% |
| Total | 91.8% | 8.2% | |

| | *AIA* = 1 | | |
|---|---|---|---|
| *EDAY* = 1 | No | Yes | Total |
| No | 91.1% | 7.4% | 98.5% |
| Yes | 0.7% | 0.9% | 1.5% |
| Total | 91.8% | 8.2% | |

| | *AIA* = 1 | | |
|---|---|---|---|
| *DADSVI* = 1 | No | Yes | Total |
| No | 83.1% | 7.9% | 91.0% |
| Yes | 7.8% | 1.2% | 9.0% |
| Total | 90.9% | 9.1% | |

## Table 2. Determinants of Institutional Information Consumption

This table reports results from Logit panel regressions of the Abnormal Institutional Attention measure (*AIA*) from Bloomberg on various measures of scheduled and unscheduled information supply measures and additional control variables. All variables are defined in Table A.1. Specification 1 includes three firm information supply measures: an unscheduled news day dummy (*USNDAY*), a non-earnings scheduled event dummy (*NESEDAY*), and an earnings announcement day dummy (*EDAY*). In Specifications 2-4, we also include the value weighted average of *NDAY* (scheduled and unscheduled firm news excluding earnings) for firm *i*''s Fama French 48 industry (excluding firm *i*) (*FF48_NDAY*), and a similar measure using earnings announcements (*FF48_ENDAY*) as well as value weighted measures at the market level for news (*AGG_NDAY*) and earnings announcements (*AGG_EDAY)*. In Specifications 5-8, we explore the MACRO announcement days. Macroeconomic announcement dates are from Bloomberg. Specifications 5 and 7 include a dummy variable indicating that that there was at least one of five major macroeconomic news announcements that day (*MACRO*). Specification 6 and 8, include individual dummy variables for each of the five macroeconomic news announcements: Nonfarm Payroll (*NFP*), Producer Price Index (*PPI*), the FOMC rate announcement (*FOMC*), the advance estimate for GDP (*GDP*), and the ISM Manufacturing index (*ISM*). In Specifications 9 and 10, we also include the following firm control variables: the natural logarithm of the firm's market capitalization (*LnSize*); the natural logarithm of the firm's book-to-market ratio (*LnBM*); the stock's level of institutional ownership (*InstOwn*); the absolute return of the stock (*AbsRet*) and abnormal retail attention (*DADSVI*). All specifications include day-of-the-week fixed effects. The sample includes 4,047,195 day-stock observations. Standard errors (in parentheses) are double clustered by firm and date. Statistical significance at the 10%, 5%, and 1% level is indicated with *, **, and ***, respectively. *Pseudo R Squared* is the logistic model's Max-rescaled R-Square.

| Variable | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|---|---|---|---|---|---|---|---|---|---|---|
| *USNDAY* | 0.928 *** | 0.924 *** | 0.909 *** | 0.910 *** | | | 0.910 *** | 0.910 *** | 0.456 *** | 0.456 *** |
| | (0.019) | (0.924) | (0.019) | (0.019) | | | (0.019) | (0.019) | (0.012) | (0.012) |
| *NESEDAY* | 1.277 *** | 1.279 *** | 1.280 *** | 1.281 *** | | | 1.281 *** | 1.282 *** | 0.762 *** | 0.762 *** |
| | (0.035) | (0.035) | (0.034) | (0.034) | | | (0.034) | (0.034) | (0.028) | (0.028) |
| *EDAY* | 3.146 *** | 3.118 *** | 3.089 *** | 3.085 *** | | | 3.084 *** | 3.085 *** | 2.513 *** | 2.515 *** |
| | (0.027) | (0.027) | (0.026) | (0.026) | | | (0.026) | (0.026) | (0.034) | (0.034) |
| *FF48_NDAY* | | 0.123 ** | | -0.052 | | | -0.052 | -0.052 | -0.073 | -0.073 |
| | | (0.055) | | (0.065) | | | (0.065) | (0.065) | (0.040) | (0.040) |
| *FF48_EDAY* | | 0.818 *** | | 0.489 *** | | | 0.490 *** | 0.492 *** | 0.443 *** | 0.444 *** |
| | | (0.095) | | (0.084) | | | (0.085) | (0.085) | (0.076) | (0.076) |
| *AGG_NDAY* | | | 0.591 *** | 0.634 *** | | | 0.636 *** | 0.636 *** | 1.202 *** | 1.204 *** |
| | | | (0.092) | (0.108) | | | (0.108) | (0.108) | (0.112) | (0.113) |
| *AGG_EDAY* | | | 1.997 *** | 1.539 *** | | | 1.483 *** | 1.636 *** | 2.022 *** | 2.232 *** |
| | | | (0.410) | (0.426) | | | (0.434) | (0.434) | (0.437) | (0.446) |
| *MACRO* | | | | | 0.081 *** | | 0.049 * | | 0.015 | |
| | | | | | (0.026) | | (0.027) | | (0.031) | |
| *FOMC* | | | | | | 0.150 *** | | 0.107 ** | | 0.064 |
| | | | | | | (0.048) | | (0.047) | | (0.077) |
| *GDP* | | | | | | 0.290 *** | | -0.105 | | -0.150 |
| | | | | | | (0.055) | | (0.071) | | (0.091) |
| *ISM* | | | | | | 0.068 * | | 0.061 | | 0.005 |
| | | | | | | (0.041) | | (0.046) | | (0.048) |
| *PPI* | | | | | | -0.044 | | 0.034 | | 0.056 |
| | | | | | | (0.047) | | (0.050) | | (0.051) |
| *NFP* | | | | | | 0.068 | | 0.036 | | 0.015 |
| | | | | | | (0.057) | | (0.062) | | (0.065) |
| *Day of Week FE?* | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| *Other Controls?* | | | | | | | | | YES | YES |
| Pseudo R Squared | 0.094 | 0.095 | 0.096 | 0.096 | 0.005 | 0.005 | 0.096 | 0.096 | 0.238 | 0.238 |

## Table 3. Institutional Investor Expected Information Consumption Measures and Subsamples

This table reports statistics for the seven expected institutional information consumption measures (EIIC) defined in Appendix A.1. *# of Observations* is the number of sample observations used in the analysis. *EIIC=1 Obs* is the number of observations with expected institutional information consumption equal to 1. *% of EIIC=1 Obs* is the percentage of these observations from total observations in that sample. Next, the table reports the percentage of AIA=1 observations conditioning on *EIIC*=1 and *EIIC*=0. *P-Value of diff*, is the P-Value of the difference in percentages. *Sample Range* indicates the first month and last month of the analyzed sample.

| | EIIC_Scheduled | EIIC_Scheduled_Exc_Earn | EIIC_Spillover_Peer |
|---|---|---|---|
| | (1) | (2) | (3) |
| # of Observations | 4,047,195 | 4,026,006 | 2,308,059 |
| *EIIC* = 1 Obs | 43,803 | 22,614 | 252,623 |
| % of *EIIC*=1 Obs | 1.08% | 0.56% | 10.95% |
| *EIIC* = 1 and *AIA* = 1 | 0.716 | 0.528 | 0.241 |
| *EIIC* = 0 and *AIA* = 1 | 0.075 | 0.075 | 0.091 |
| P-Value of diff | <.0001 | <.0001 | <.0001 |
| Sample Range | Feb10-Dec17 | Feb10-Dec17 | Apr11-Dec17 |

| | EIIC_Spillover_FOMC | EIIC_Spillover_MACRO | EIIC_Spillover_ALL |
|---|---|---|---|
| | (4) | (5) | (6) |
| # of Observations | 126,257 | 716,119 | 4,047,195 |
| *EIIC* = 1 Obs | 11,159 | 18,377 | 270,145 |
| % of *EIIC*=1 Obs | 8.84% | 2.57% | 6.67% |
| *EIIC* = 1 and *AIA* = 1 | 0.256 | 0.309 | 0.242 |
| *EIIC* = 0 and *AIA* = 1 | 0.084 | 0.075 | 0.084 |
| P-Value of diff | <.0001 | <.0001 | <.0001 |
| Sample Range | Apr10-Dec17 | Mar10-Dec17 | Mar10-Dec17 |

| | EIIC_ALL |
|---|---|
| | (7) |
| # of Observations | 4,047,195 |
| *EIIC* = 1 Obs | 305,454 |
| % of *EIIC*=1 Obs | 7.55% |
| *EIIC* = 1 and *AIA* = 1 | 0.293 |
| *EIIC* = 0 and *AIA* = 1 | 0.065 |
| P-Value of diff | <.0001 |
| Sample Range | Feb10-Dec17 |

## Table 4. Expected Information Consumption and the Risk Premium

This table reports results from panel regressions of daily returns on measures of institutional investor expected information consumption (*EIIC*), controlling for scheduled firm information supply, expected retail information consumption (*ERIC*) and other firm characteristics. All variables are defined in Table A1. In the table, *EIIC* is the expected institutional information consumption analyzed for each of the seven information consumption measures described in Table 3 and Appendix A.1. In particular, *EIIC_Scheduled* is based on firm scheduled events. *EIIC_Scheduled_Exc_Earn* is based on non-earnings scheduled events. *EIIC_Spillover_Peer* is based on peer-firm scheduled events. *EIIC_Spillover_FOMC* and *EIIC_Spillover_FOMC* are based on FOMC and MACRO announcement days. *EIIC_Spillover_ALL* is the combination of measures 3, 4 and 5. Finally, *EIIC_ALL* uses all available information, which is the combination of measures 1, 3, 4 and 5. In a similar manner, *ERIC* is the expected information consumption by retail investors constructed using *DADSVI* and the same methodology defined in Appendix A.1. *NESEDAY* is non-earnings firm scheduled event day dummy. *EDAY* is firm earnings announcement day dummy. *Size & BM Controls* refers to the natural logarithm of the firm's market capitalization (*LnSize*) and the natural logarithm of the firm's book-to-market ratio (*LnBM*). *Lag Controls* include ten lags of returns, squared returns, news dummy, and trading volume. Date fixed effects are included in each specification and standard errors (in parentheses) are double clustered by firm and date. Statistical significance at the 10%, 5%, and 1% level is indicated with *, **, and ***, respectively.

| | EIIC Scheduled | EIIC Scheduled Exc. Earn | EIIC Spillover Peer | EIIC Spillover FOMC | EIIC Spillover MACRO | EIIC Spillover ALL | EIIC ALL |
|---|---|---|---|---|---|---|---|
| Variable | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| *EIIC* | 3.187 | 11.647 *** | 2.069 *** | 10.634 *** | 6.638 *** | 3.731 *** | 3.706 *** |
| | (3.911) | (4.407) | (0.835) | (3.160) | (2.575) | (0.932) | (0.955) |
| *ERIC* | -0.330 | 7.492 | 0.251 | -1.389 | -0.220 | 0.044 | 0.055 |
| | (5.845) | (5.265) | (0.577) | (3.502) | (1.267) | (0.493) | (0.517) |
| *NESEDAY* | 4.051 ** | 2.306 | 7.471 *** | 2.095 | 2.338 | 4.677 *** | 4.753 *** |
| | (1.905) | (1.777) | (3.126) | (5.043) | (2.887) | (1.186) | (1.131) |
| *EDAY* | 16.344 *** | N/A | 16.304 *** | 4.048 | 10.536 | 17.559 *** | 16.265 ** |
| | (3.821) | | (3.979) | (12.264) | (6.422) | (3.195) | (3.212) |
| *Size & BM Controls?* | YES | YES | YES | YES | YES | YES | YES |
| *Lag Controls?* | YES | YES | YES | YES | YES | YES | YES |
| *Day FE?* | YES | YES | YES | YES | YES | YES | YES |

## Table 5. Expected Information Consumption and Firm Beta

This table explores the relation between *EIIC* and the CAPM beta. We report results from panel regressions of daily excess stock returns on excess market returns and on interactions of excess market returns with measures of expected information consumptions and scheduled information supply. Excess return (*ERet*) is measured relative to the risk free rate (*RF)*. The market excess return (MKTRF) and the risk free rate are from Ken French's website. We interact the market risk premium (MKTRF) with *EIIC* (i.e., *EIIC_ALL*), *ERIC* (i.e., *ERIC_ALL*), *NESEDAY* and *EDAY*. Direct effects are included and not reported to conserve space. Following Patton and Verardo (2012), the specifications include firm fixed effects, which allow us to capture within-firm beta estimation. Standard errors (in parentheses) are double clustered by firm and date. Statistical significance at the 10%, 5%, and 1% level is indicated with *, **, and ***, respectively.

| | EIIC_ALL | | | | |
|---|---|---|---|---|---|
| Variable | (1) | (2) | (3) | (4) | (5) |
| *MKTRF* | 1.148 *** | 1.153 *** | 1.151 *** | 1.151 *** | 1.147 *** |
| | (0.015) | (0.014) | (0.014) | (0.014) | (0.015) |
| *MKTRF* EIIC* | 0.049 *** | | | | 0.040 ** |
| | (0.018) | | | | (0.017) |
| *MKTRF* ERIC* | | -0.008 | | | -0.012 |
| | | (0.014) | | | (0.014) |
| *MKTRF*NESEDAY* | | | 0.062 *** | | 0.059 *** |
| | | | (0.019) | | (0.019) |
| *MKTRF*EDAY* | | | | 0.140 *** | 0.124 *** |
| | | | | (0.042) | (0.042) |
| *Direct Effects?* | Yes | Yes | Yes | Yes | Yes |
| *Firm FE?* | Yes | Yes | Yes | Yes | Yes |

## Table 6. Expected Information Consumption and the CAPM

This table reports time-series average coefficients from Fama-MacBeth (1973) cross sectional regressions of daily excess return (*ERet*) on CAPM betas for measures of institutional investor expected information consumption. All variables are defined in Table A.1. In the table, *EIIC* is the expected institutional information consumption analyzed for each of the seven information consumption measures described in Table 3 and Appendix A.1. In particular, *EIIC_Scheduled* is based on firm scheduled events. *EIIC_Scheduled_Exc_Earn* is based on non-earnings scheduled events. *EIIC_Spillover_Peer* is based on peer-firm scheduled events. *EIIC_Spillover_FOMC* and *EIIC_Spillover_FOMC* are based on FOMC and MACRO announcement days. *EIIC_Spillover_ALL* is the combination of measures 3, 4 and 5. Finally, *EIIC_ALL* uses all available information, which is the combination of measures 1, 3, 4, and 5. *EIIC=0* (*EIIC=1*) includes sample observations where *EIIC* is equal to 0 (1). *Diff 1-0* is the difference between the coefficient estimates of both samples. Given that the number of *EIIC=1* is very scarce on some days, we report value weighted averages based on the daily number of cross sectional observations. Standard errors (in parentheses) are estimated using the Newey-West adjustment with 10 lags. Statistical significance at the 10%, 5%, and 1% level is indicated with *, **, and ***, respectively.

| | EIIC_Scheduled | | EIIC_Scheduled_Exc_Earn | | EIIC_Spillover_Peer | |
|---|---|---|---|---|---|---|
| | (1) | | (2) | | (3) | |
| | Intercept | Beta | Intercept | Beta | Intercept | Beta |
| *EIIC = 0* | 6.560 *** | 0.379 | 6.330 *** | 0.612 | 4.916 *** | 0.125 |
| | (1.290) | (2.099) | (1.299) | (2.106) | (1.711) | (2.609) |
| *EIIC = 1* | -26.052 ** | 37.836 *** | -12.198 | 30.107 ** | 0.453 | 8.262 *** |
| | (13.141) | (12.468) | (15.981) | (14.551) | (3.040) | (3.160) |
| *Diff 1 - 0* | -32.612 *** | 37.457 *** | -18.528 | 29.495 ** | -4.463 | 8.136 ** |
| | (13.204) | (12.643) | (16.033) | (14.703) | (3.488) | (4.098) |

| | EIIC_Spillover_FOMC | | EIIC_Spillover_MACRO | | EIIC_Spillover_ALL | |
|---|---|---|---|---|---|---|
| | (4) | | (5) | | (6) | |
| | Intercept | Beta | Intercept | Beta | Intercept | Beta |
| *EIIC = 0* | 8.904 | 4.918 | 2.329 | 7.961 | 4.779 *** | 0.676 |
| | (9.678) | (10.245) | (3.346) | (6.208) | (1.584) | (2.566) |
| *EIIC = 1* | -15.802 | 43.868 *** | -13.383 | 29.849 *** | -0.376 | 9.797 *** |
| | (12.250) | (17.477) | (8.147) | (9.096) | (2.942) | (3.700) |
| *Diff 1 - 0* | -24.706 | 38.950 * | -15.712 * | 21.888 ** | -5.155 | 9.121 ** |
| | (15.612) | (20.259) | (8.807) | (11.013) | (3.342) | (4.503) |

| | EIIC_ALL | |
|---|---|---|
| | (7) | |
| | Intercept | Beta |
| *EIIC = 0* | 7.024 *** | -0.271 |
| | (1.286) | (2.097) |
| *EIIC = 1* | -2.069 | 11.918 *** |
| | (3.652) | (3.652) |
| *Diff 1 - 0* | -9.093 ** | 12.189 *** |
| | (3.872) | (4.211) |

## Table 7. Risk Premium and CAPM Slope for – Subsample Analysis

This table repeats the main analysis conducted in Tables 4 and 6 for subsamples based on firm relative size within Fama French 48 industry, analyst coverage, reporting quarter and time during the earnings cycle. Columns (1) and (2) repeat the analysis conducted in Table 4. In Specification 1, we rank firms based on their relative size within industry, where we keep industries with at least five firms in our sample. *Small* (*Large*) refers to firms with size below (above) the median industry size. In Specifications 2 we rank firms based on their analyst coverage, where *Low* (*High*) refers to firms with coverage below (above) the median level of analyst coverage. In Specification 3 we look at the difference between the first quarter (Q1) and other quarters (Q2-Q4). In Specification 4 we focus on the timing during the earnings cycle, where *First Half* (*Second Half*) captures the first (second) half of the cycle based on number reporting firms. Specifically, we count the number of reporting firms and define the first half as the period in the cycle where the cumulative number of reporting firms to total reporting firms is lower than 50%. For brevity, in Columns 1 and 2 only report the coefficient estimate of *EIIC_ALL* from the full panel regression (see Specification 7 of Table 4). Columns 3 and 4 only report the CAPM slope of *EIIC_ALL*=1 subsample (see Beta Column in Specification 7 of Table 6).

| | Risk Premium | | CAPM Slope | |
|---|---|---|---|---|
| | EIIC_ALL Coefficient | | EIIC_ALL = 1 Subsample | |
| | (1) | (2) | (3) | (4) |
| Firm Characteristics: | | | | |
| | Small | Large | Small | Large |
| Size IND | 9.043 *** | 2.583 *** | 11.174 | 9.213 *** |
| | (2.698) | (0.798) | (7.814) | (3.232) |
| | Low | High | Low | High |
| Analyst Coverage | 5.007 ** | 3.387 *** | 15.608 *** | 10.278 *** |
| | (2.286) | (0.827) | (6.558) | (3.359) |
| Timing: | | | | |
| | Q1 | Q2-Q4 | Q1 | Q2-Q4 |
| Quarters | 4.630 *** | 3.365 *** | 20.095 *** | 10.395 *** |
| | (1.720) | (1.120) | (7.388) | (3.686) |
| | First Half | Second Half | First Half | Second Half |
| Announcing Firms | 3.858 *** | 3.024 *** | 20.642 *** | 7.288 * |
| | (1.440) | (1.225) | (5.461) | (4.141) |

## Table 8. Assessing the Economic Magnitude via Calendar Time Portfolios

This table reports results from calendar time portfolios (CTP) of *EIIC_ALL*=1, *EIIC_ALL*=0 and the sample portfolio (*ALL*). *EIIC_ALL* is the institutional investor expected information consumption using all available information. *EIIC_ALL*=1 (*EIIC_ALL*=0) is an equally weighted daily portfolio that holds every day stocks whose *EIIC_ALL* measures are expected to be equal to 1 (0) on that day. *ALL* is a daily portfolio that holds all stocks in our sample. We augment the returns of the *EIIC_ALL*=1 portfolio with the sample returns when the number of stocks in the portfolio is expected to drop below 5. In Panel A, we report the time series average daily excess return (*RET-RF*, in basis points), the standard deviation of daily returns (in basis points) and the annualized Sharpe ratio for each of the three portfolios (Columns 1-3). In Columns 4, we report the difference in returns, volatilities and Sharpe ratios between *EIIC_ALL=1* and *EIIC_ALL=0* portfolios, and their statistical significance. The return difference is basically a long-short portfolio that holds *EIIC_ALL*=1 in a long position and *EIIC_ALL*=0 in a short position. The statistical significance is calculated using an OLS time series regression (i.e., an intercept model), where standard errors are adjusted using Newey-West with 10 lags. The significance of difference in volatilities is based on an F-test, and the Sharpe ratio significance is based on bootstrap simulations. In Panel B we further explore *EIIC_ALL=1*'s excess return (*EIIC_ALL=1 minus RF*) adjusting for risk using the CAPM, Fama-French 3- and 5- factor models (CAPM, FF3 and FF5, respectively). The factors and the risk free rate are from Ken French's website. As in Panel A, standard errors (in parentheses) are estimated using Newey-West adjustment with 10 lags. Statistical significance at the 10%, 5%, and 1% level is indicated with *, **, and ***, respectively.

### Panel 8.A – Average Excess Return and Sharpe Ratio

| | EIIC_ALL=1 | EIIC_ALL=0 | ALL | Diff (1)-(2) |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Daily Average Excess Return (bps) | 10.412 | 6.834 | 7.069 | 3.578 ** |
| Daily Volatility (bps) | 125.410 | 112.580 | 112.170 | 12.830 *** |
| Annualized Sharpe Ratio | 1.318 | 0.964 | 1.000 | 0.354 *** |

### Panel 8.B – Risk-Adjusted Returns

| | CAPM | FF3 | FF5 |
|---|---|---|---|
| | (1) | (2) | (3) |
| EIIC_ALL=1 minus RF | 3.936 ** | 4.280 *** | 4.277 *** |
| | (1.624) | (1.515) | (1.530) |

## Table A.1. Variable Definitions

| Variable | Definition |
|---|---|
| ***Information Supply Variables*** | |
| *NDAY* | A dummy variable equal to one on news days for firm *i* and zero otherwise. News days are those on which an article about the firm appears on the Dow Jones Newswire, *excluding* earnings announcement days. News data are from RavenPack. |
| *USNDAY* | A dummy variable equal to one on news days for firm *i* and zero otherwise. News days are those on which an article about the firm appears on the Dow Jones Newswire, *excluding* earnings announcement days and non-earnings firm scheduled events. News data are from RavenPack. Firm scheduled events are based on a list of scheduled firm events available to Bloomberg terminal users. |
| *EDAY* | A dummy variable equal to one on earnings announcement days for firm *i* and zero otherwise. Earnings announcement data are from I/B/E/S. |
| *FF48_NDAY* | The value-weighted average of *NDAY* for all other firms in the same Fama French 48 industry as firm *i*. Fama French 48 industry definitions are from Ken French's website. Value weights based on market capitalization are from CRSP. |
| *FF48_EDAY* | The value-weighted average of *EDAY* for all firms in the same Fama French 48 industry as firm *i*. Fama French 48 industry definitions are from Ken French's website. Value weights based on market capitalization are from CRSP. |
| *AGG_NDAY* | The value-weighted average of *NDAY* for all firms in the sample on day *t*. Value weights based on market capitalization are from CRSP. |
| *AGG_EDAY* | The value-weighted average of *EDAY* for all firms in the sample on day *t*. Value weights based on market capitalization are from CRSP. |
| *NFP* | A dummy variable equal to one on days with an announcement of the U.S. nonfarm payroll statistics by the Department of Labor, and zero otherwise. Announcement dates are from Bloomberg. |
| *PPI* | A dummy variable equal to one on days with an announcement of the U.S. Producer Price Index numbers by the Bureau of Labor Statistics, and zero otherwise. Announcement dates are from Bloomberg. |
| *FOMC* | A dummy variable equal to one on days with an announcement of the Federal Open Market Committee rate decision, and zero otherwise. Announcement dates are from Bloomberg. |
| *GDP* | A dummy variable equal to one on days with an announcement of the "advance" estimate of quarterly U.S. Gross Domestic Product by the Bureau of Economic Analysis, and zero otherwise. Announcement dates are from Bloomberg. |

*ISM* A dummy variable equal to one on days with an announcement of the Institute for Supply Management Manufacturing statistics by Bureau of Labor Statistics, and zero otherwise. Announcement dates are from Bloomberg.

*MACRO* A dummy variable equal to one if at least one of *NFP*, *PPI*, *FOMC*, *GDP*, and *ISM* is equal to one, and zero otherwise.

*SEDAY* A dummy variable equal to one on days with a scheduled firm events based on a list of scheduled firm events available to Bloomberg terminal users. Specifically, for each stock, Bloomberg provides an event calendar (Bloomberg command "EVTS") for various events. Bloomberg classifies each event into one of 9 categories. "TV/Conference/Presentation", "Earnings Release", "Earnings Call", "Shareholder Meeting", "Corporate Access", "Mergers and Acquisitions", "Sales Result", "Analyst Marketing", and "Earnings Guidance".

*NESEDAY* A dummy variable equal to one on days with non-earnings scheduled firm events. Specifically, we remove the "Earnings Release", "Earnings Call" categories from Bloomberg's 9 categories.

***Information Demand Variables***

*AIA* Bloomberg records the number of times news articles on a particular stock are read by its terminal users and the number of times users actively search for news for a specific stock. Bloomberg then assigns a value of 1 for each article read and 10 for each news search. These numbers are then aggregated into an hourly count. Using the hourly count, Bloomberg then creates a numerical attention score each hour by comparing past 8-hour average count to all hourly counts over the previous month for the same stock. They assign a value of 0 if the rolling average is in the lowest 80% of the hourly counts over the previous 30 days. Similarly, Bloomberg assigns a score of 1, 2, 3 or 4 if the average is between 80% and 90%, 90% and 94%, 94% and 96%, or greater than 96% of the previous 30 days' hourly counts, respectively. Finally, Bloomberg aggregates up to the daily frequency by taking a maximum of all hourly scores throughout the day. These are the data provided to us by Bloomberg. Since we are interested in abnormal attention, our *AIA* measure is a dummy variable that receives a value of 1 if Bloomberg's score is 3 or 4, and 0 otherwise. This captures the right tail of the measure's distribution.

| | |
|---|---|
| *DADSVI* | We follow Bloomberg's methodology and assign Google's daily search volume index (*DSVI*) on day *t* one of the potential 0, 1, 2, 3, or 4 scores using the firm's past 30 trading day *DSVI* values. For example, if *DSVI* on day *t* is in the lowest 80% of past *DSVI* values, it receives the score 0. *DADSVI* is equal to one on day *t* if the score is 3 or 4, and 0 otherwise. The data coverage of DADSVI is smaller than AIA. When search volume activity is too low, Google does not provide DSVI data. To avoid creating any bias in the sample by dropping firms with no *DADSVI* information, we follow the approach of Pontiff and Woodgate (2008). That is, we define a dummy variable, which is equal to one whenever *DADSVI* exists and zero otherwise. Next, we replace the missing *DADSVI* observations with zero values. Finally, in the regressions we include both the dummy and the augmented *DADSVI* variable. |

***Expected Institutional Information Consumption Variables***

| | |
|---|---|
| *EIIC_Scheduled* | A predicted (ex-ante) measure of firm i's institutional investor expected information consumption of scheduled information released by firm i. The measure is calculated based on firm i's AIA response to firm i's previous scheduled events (see Appendix A.1 for more information regarding the measure construction). |
| *EIIC_Scheduled_ Exc_Earn* | A predicted measure of firm i's institutional investor expected information consumption of non-earnings scheduled information released by firm i. The measure is calculated based on firm i's AIA response to firm i's previous non-earnings scheduled events (see Appendix A.1 for more information regarding the measure construction). |
| *EIIC_Spillover_ Peer* | A predicted measure of firm i's institutional investor expected information consumption of information released by peer-firms' scheduled events based on the response of firm i's AIA to firms J previous scheduled events (see Appendix A.1 for more information regarding the measure construction). |
| *EIIC_Spillover _FOMC* | A predicted measure of firm i's institutional investor expected information consumption of information released on FOMC announcement days. The measure is calculated based on firm i's AIA response to previous FOMC announcement days (see Appendix A.1 for more information regarding the measure construction). |
| *EIIC_Spillover _MACRO* | A predicted measure of firm i's institutional investor expected information consumption of information released on MACRO announcement days. The measure is calculated based on firm i's AIA response to previous MACRO announcement days (see Appendix A.1 for more information regarding the measure construction). |
| *EIIC_Spillover _ALL* | A predicted measure of firm i's institutional investor expected information consumption based on an aggregation of the *EIIC_Spillover_Peer*, *EIIC_Spillover_FOMC* and *EIIC_Spillover_Macro* measures. |
| *EIIC_ALL* | A predicted measure of firm i's institutional investor expected information consumption using all available information. Namely, the aggregation of *EIIC_Scheduled*, *EIIC _Spillover_Peer*, *EIIC_Spillover_FOMC* and *EIIC_Spillover_Macro* measures. |

***Other Variables***

| | |
|---|---|
| *Ret* | CRSP's daily stock return, reported in basis points (i.e., times 10,000) for ease of presentation. |
| *AbsRet* | Absolute value of *Ret*. |
| *Ret^2* | *Ret* squared. |
| *AbnVol* | The stock's abnormal trading volume calculated following Barber and Odean (2008) as the stock's daily volume divided by the previous 252-day average trading volume. |
| *DolVol* | The daily dollar trading volume in millions of dollars. |
| *InstOwn* | The percentage of shares held by institutional investors obtained from the Thomson Reuters CDA/Spectrum institutional holdings' (S34) database. |
| *SizeInM* | Stock's market capitalization, rebalanced every June, in millions of dollars. |
| *LnSize* | The natural logarithm of the stock's average size in millions of dollars from day *t-27* to *t-6.* |
| *LnBM* | The natural logarithm of the firm's book-to-market ratio (*BM*) rebalanced every June following Fama-French (1992). |
| *RF* | The risk free rate of return from Ken French's website, reported in basis points. |
| *ERet* | The stock's daily return *(Ret)* in excess of the risk free rate (*RF*), reported in basis points. |
| *MKTRF* | The market return in excess of the risk free rate, reported in basis points, from Ken French's website. |

## Table A2. Testing for Price Pressure

This table tests for price pressure and repeat the analysis conducted in Column 7 of Table 4, replacing day *t* returns with cumulative returns from day *t*+1 through days *t*+1 to *t*+5. Standard errors (in parentheses) are double clustered by firm and date. Statistical significance at the 10%, 5%, and 1% level is indicated with *, **, and ***, respectively.

| | EIIC_ALL | | | | |
|---|---|---|---|---|---|
| Variable | *t+1 - t+1* | *t+1 - t+2* | *t+1 - t+3* | *t+1 - t+4* | *t+1 - t+5* |
| *EIIC* | 0.716 | 0.274 | -0.292 | -0.876 | -0.338 |
| | (0.887) | (1.288) | (1.615) | (1.907) | (2.143) |
| *ERIC* | 0.181 | -0.222 | -1.001 | -1.848 | -1.572 |
| | (0.524) | (0.754) | (1.002) | (1.227) | (1.434) |
| *NESEDAY* | 2.321 *** | 2.958 ** | 1.783 | 0.232 | -0.325 |
| | (0.984) | (1.370) | (1.671) | (1.936) | (2.180) |
| *EDAY* | -0.201 | -0.649 | 2.650 | 6.548 *** | 9.154 *** |
| | (1.510) | (1.990) | (2.240) | (2.555) | (2.844) |
| *RET* | -0.012 *** | -0.010 *** | -0.014 *** | -0.019 *** | -0.021 *** |
| | (0.003) | (0.004) | (0.005) | (0.005) | (0.005) |
| *Stock Controls?* | Yes | Yes | Yes | Yes | Yes |
| *Lag Controls?* | Yes | Yes | Yes | Yes | Yes |
| *Day FE?* | Yes | Yes | Yes | Yes | Yes |

## Table A3. AIA, Risk Premium and the CAPM

This table repeats the main analysis conducted in Tables 3, 4 and 6 using *AIA* instead of *EIIC*. We contrast *AIA* with *DADSVI*, *NDAY* (i.e., scheduled and unscheduled news) and *EDAY*. Panel A reports the risk premium results, where Specification 1 (Specification 2) includes all sample days (no news days). Panel B reports the Beta results. Panel C reports the CAPM results for all days in our sample (*ALL*) and for FOMC and MACRO announcements days (*FOMC* and *MACRO*, respectively).

## Panel A3.A – AIA and the Risk Premium

| Variable | (1) | (2) |
|---|---|---|
| *AIA* | 14.170 *** | 14.071 *** |
| | (1.360) | (1.449) |
| *DADSVI* | 3.856 *** | 1.350 *** |
| | (0.652) | (0.516) |
| *NDAY* | 5.393 *** | NA |
| | (0.463) | |
| *EDAY* | 12.021 *** | NA |
| | (3.223) | |
| *Size & BM Controls?* | YES | YES |
| *Lag Controls?* | YES | YES |
| *Day FE?* | YES | YES |

## Panel A3.B – AIA and Firm Beta

| Variable | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| *MKTRF* | 1.136 *** | 1.152 *** | 1.146 *** | 1.151 *** | 1.132 *** |
| | (0.014) | (0.014) | (0.015) | (0.014) | (0.015) |
| *MKTRF*AIA* | 0.190 *** | | | | 0.182 *** |
| | (0.021) | | | | (0.020) |
| *MKTRF*DADSVI* | | 0.008 | | | -0.004 |
| | | (0.012) | | | (0.012) |
| *MKTRF*NDAY* | | | 0.028 *** | | 0.017 |
| | | | (0.011) | | (0.011) |
| *MKTRF*EDAY* | | | | 0.140 *** | 0.054 |
| | | | | (0.042) | (0.042) |
| *Direct Effects?* | Yes | Yes | Yes | Yes | Yes |
| *Firm FE?* | Yes | Yes | Yes | Yes | Yes |

## Panel A3.C – AIA and the CAPM

| | ALL | | FOMC | | MACRO | |
|---|---|---|---|---|---|---|
| | (1) | | (2) | | (3) | |
| | Intercept | Beta | Intercept | Beta | Intercept | Beta |
| *AIA* = 0 | 8.005 *** | -1.580 | 9.203 | 4.415 | 6.898 * | 3.572 |
| | (1.422) | (1.796) | (9.896) | (9.393) | (3.708) | (4.465) |
| *AIA* = 1 | -5.930 * | 22.449 *** | -29.150 * | 51.758 ** | -8.402 | 32.034 *** |
| | (3.551) | (4.119) | (16.563) | (22.406) | (8.319) | (9.620) |
| *Diff 1 - 0* | -13.935 *** | 24.029 *** | -38.353 ** | 47.343 ** | -15.300 * | 28.462 *** |
| | (3.825) | (4.494) | (19.294) | (24.295) | (9.108) | (10.606) |