Journal of Accounting and Economics 60 (2015) 36–55

Contents lists available at ScienceDirect

Journal of Accounting and Economics

journal homepage: www.elsevier.com/locate/jae

Market (in)attention and the strategic scheduling and timing of earnings announcements ☆

Ed deHaan [a], Terry Shevlin [b,*], Jacob Thornock [c]

[a] Graduate School of Business, Stanford University, USA
[b] Merage School of Business, University of California at Irvine, USA
[c] Foster School of Business, University of Washington, USA

ARTICLE INFO

Article history:
Received 3 December 2012
Received in revised form
4 March 2015
Accepted 11 March 2015
Available online 20 March 2015

JEL classification:
L20
M10
M41

Keywords:
Market attention
Earnings announcement timing
Earnings announcement scheduling
Earnings announcement notifications
Strategic disclosure

ABSTRACT

We investigate whether managers "hide" bad news by announcing earnings during periods of low attention, or by providing less forewarning of an upcoming earnings announcement. Our findings are consistent with managers reporting bad news after market hours, on busy days, and with less advance notice, and with earnings receiving less attention in these settings. Paradoxically, our findings indicate that managers also report bad news on Fridays, but we do not find lower attention on Fridays. Further, we find negative returns when the market is notified of an upcoming Friday earnings announcement, which is consistent with investors inferring forthcoming bad news.

1. Introduction

In this paper, we revisit a long-standing but still unresolved question: do managers "hide" bad earnings news by announcing during periods of low market attention? Or, conversely: do managers "highlight" good earnings news by announcing earnings during periods of high market attention? We posit three necessary conditions for an effective hiding/highlighting strategy. First, to be able to hide bad news, managers must change their earnings announcement ("EA") timing somewhat frequently. A deviation from a long-standing pattern of EA timing could attract attention to the very news the manager is trying to hide. Second, there must be variation in market attention that is predictable to the manager ex-ante—random variation in attention would not allow for strategic timing of bad or good news. Third, we must observe that

☆ We thank S.P. Kothari (editor), an anonymous referee, Gerry Berian, Asher Curtis, Jeffrey Doyle, John Kepler, Matt Magilke, Sam Melessa, Barry Star, Brady Twedt, Brady Williams, doctoral students at the University of Washington, and workshop participants at the University of Michigan, University of Rochester, University of North Carolina, and University of Technology Sydney for helpful suggestions. We appreciate insightful comments from Dominic Jones of IR Web Report and other investor relations professionals. Wall Street Horizon kindly provided data on earnings announcement timing. We thank Malcolm Bain for his generous assistance with the RavenPack data. Ed deHaan acknowledges support from the Stanford Graduate School of Business. Jake Thornock acknowledges support from the Foster School of Business. Terry Shevlin acknowledges support from the Merage School of Business.

* Corresponding author.
E-mail addresses: edehaan@stanford.edu (E. deHaan), tshevlin@uci.edu (T. Shevlin), thornocj@uw.edu (J. Thornock).

http://dx.doi.org/10.1016/j.jacceco.2015.03.003

managers do tend to announce more negative (positive) earnings news during periods of lower (higher) market attention. We also examine an additional potential strategy for reducing attention to bad news: by scheduling EAs with less advance notice or "lead-time."

We construct a novel database of over 120,000 precise EA dates and times to investigate the timing of EAs by hour and by weekday.[1] We find that firms frequently change the timing of their EAs: for example, within *any given year*, 81.6% of firms change their quarterly EA weekday at least once, and 25.6% change whether they report before, during, or after market hours. Although just 7.6% of all EAs happen on Fridays, 51.4% of firms have at least one Friday announcement during our sample period. Managers' intent is unobservable, but the majority of these changes in EA times are likely made for administrative, scheduling, or other benign reasons. The high frequency of benign changes is precisely the camouflage needed for managers to occasionally switch their EA timing for strategic purposes without raising alarm, consistent with the first condition.

We turn next to the second condition: that lulls and peaks in market attention must be ex-ante predictable in order for managers to shift bad (good) news into times where the market is paying less (more) attention. We examine three specific times during which prior research has speculated that market attention differs: before versus after the close of regular trading hours; on Mondays through Thursdays versus Fridays; and on "slow" versus "busy" news days, based on the total number of firms that are reporting earnings. We employ four empirical proxies to investigate temporal variation in market attention: (i) the number of earnings-related news articles; (ii) the speed with which analysts incorporate the earnings news into future earnings forecasts; (iii) EDGAR 8-K downloads; and (iv) abnormal Google search volume. The advantage of these attention measures is that they are user-oriented, related to information processing, and measured on a timely basis.

Our findings are consistent with attention being lower (higher) after (before) market close and on busy (slow) reporting days. Specifically, EAs after trading hours (on the busiest reporting days) are associated with a 7% (12%) decrease in news articles, a 7% (4%) decrease in the speed with which analysts update forecasts, a 19% (30%) decrease in EDGAR downloads, and a 0% (2%) decrease in Google searches, after controlling for firm fixed effects, non-stationary firm characteristics, and the sign and magnitude of the earnings news. However, our analyses generally indicate that attention is actually *no different* on Fridays than other weekdays. We also tie together our first two conditions by showing that the act of switching EA timing (condition 1) does not draw unwanted attention to bad news (condition 2). In sum, the data are consistent with the second condition that market attention is predictably lower after hours and on busy reporting days, but the same does not hold for Fridays.

Next, we examine the validity of the third necessary condition: that managers tend to release worse (better) earnings news after market close, on Fridays, and on busy reporting days (and vice-versa). Prior research has examined whether earnings news is worse after hours and on Fridays, but the results to date have been mixed (see Patell and Wolfson, 1982; Damodaran, 1989; Doyle and Magilke, 2009). Using our larger sample of precise EA times, we find that unexpected earnings (i.e., IBES earnings less analyst consensus, scaled by price) are 70% lower when firms choose to report earnings after hours, 190% lower on Fridays, and 100% lower on the busiest versus slowest reporting days. We also find evidence consistent with managers both switching to periods of low expected attention to hide bad news, as well as with switching to periods of higher expected attention to highlight good news.

In a final section, we examine variation in earnings news and market attention depending on the earnings announcement scheduling "lead-time;" i.e., how far in advance of the EA the firm schedules the date and time of the forthcoming EA. Using novel data on EA scheduling announcements for roughly 55,000 firm-quarters, we find that longer (shorter) lead-times are associated with better (worse) earnings news. In addition, we find that lead-times are positively associated with two of our four attention proxies, providing some evidence that firms are able to reduce attention to bad earnings news by providing less forewarning of the EA. We also find that three-day abnormal returns around the scheduling dates are significantly negative when the forthcoming EA is scheduled for a Friday, which is consistent with investors inferring that Friday EAs tend to contain negative news. Returns are insignificant for EAs scheduled for after hours or busy days, although we do observe a negative stock price drift in the interim period between the scheduling date and EA date.

We make several contributions to the academic literature. First, although it can be inferred from prior research that the existence of EA timing changes is non-zero, we contribute by quantifying how often changes occur, both in general as well as within a given firm. Further, we characterize changes in EA timing along several dimensions: by hour, by weekday, and in relation to the timing choices of other firms. We also provide evidence consistent with changes in EA timing not drawing the attention of market participants, an assumed condition that underlies prior research on strategic EA timing, but which has not been tested to date.

Our second contribution is to provide new and direct evidence on the existence of predictable variation in attention to EAs. We employ state-of-the-art proxies for market attention to investigate how and when attention to EAs appears to decline, and find evidence that adds to, confirms, and conflicts with the inferences from prior research. First, our evidence that market attention is lower after hours is new to the literature. Second, our evidence that market attention is lower on busy reporting days confirms Hirshleifer et al.'s (2009) inference based on evidence from stock price responses. Third, our

[1] Our sample is larger and likely more accurate than samples used in previous studies of EA timing. Most of the samples in prior research use private or hand-collected databases, so we do not make direct comparisons to particular papers. See Section 3 for further discussion of our sample construction and date/time validation.

evidence that attention to EAs is no different on Fridays as compared to Monday–Thursdays conflicts with evidence in DellaVigna and Pollet (2009), which suggests that lower earnings response coefficients (ERCs) on Fridays indicate lower investor attention.

Third, we contribute to the literature that investigates the determinants of managers' EA timing choices. Using an EA timing dataset that is larger and likely more precise than the data in previous studies, and using a comprehensive set of empirical tests, we find that earnings news does tend to be worse when released after hours, on Fridays, and on busy reporting days, as well as when released with less lead-time. We also find evidence consistent with managers *highlighting* good news by reporting during periods of *higher* expected attention, a finding that is new to this literature.

Finally, we introduce new evidence on the *scheduling* of EAs. We find that shorter scheduling lead times are associated with both worse earnings surprises as well as reduced market attention, which is again consistent with the notion that managers can influence attention to earnings news. We also find evidence to suggest that the act of scheduling is itself news to the market, as the scheduling of an EA for a Friday is associated with a negative market reaction.

In sum, we conclude that managers are likely able to limit attention to negative news by announcing earnings after hours, on busy days, and with less advance notice. However, since we find that attention is no different on Friday than other weekdays, we conclude that the preponderance of bad news on Fridays is driven by either managers having incorrect beliefs about market attention, or by some other motivation.

2. Institutional background, prior research, and hypothesis development

For the purposes of strategically timing the EA, an important question is: At what point does the manager know the earnings number? The answer to that question varies depending on the complexity of the firm and its quarter-end close process. However, the average firm closes the books quite rapidly. For example, KPMG (2012) reports that the average firm prepares a draft set of financial statements by five days after quarter-end, and Financial Executive Research Foundation (FERF, 2013) reports that most firms have finished the close process within 10 days after quarter-end. However, the quarter-end is not a hard deadline—firms often monitor financial results on a monthly or even daily basis, so many firms likely have a reasonable prediction of the quarterly results even before quarter-end. FERF (2013) also notes that firms often start preparing financial statements well in advance of quarter-end; e.g., Microsoft holds its first meeting to plan the financial statements for quarter t starting the day after the EA for quarter $t-1$.

After the consolidated financial results are drafted, the financial reporting team meets to review financial results and collaborate on the earnings press release. For example, Accenture finalizes the financials and tables approximately eight days after fiscal close, after which the team meets to discuss and sign-off on the EA (FERF, 2013). During these meetings, the CEO and team often decide on the timing of the EA, which is in part determined by executive schedules, competitor EA schedules, other corporate events, and the company's EA timing history. This timeline is borne out in our EA scheduling data (discussed below), which indicates that the median firm does not schedule their EA date/time until 14 days before the actual EA (or roughly 2 weeks after quarter-end), and 88% of firms do not schedule their EA until after quarter-end.

In summary, the timeline of events for many companies proceeds with the closing of the books, the preparation of the financials within 5–10 days, followed by the scheduling of the EA. Thus, it seems likely that most firms are aware of their earnings news before deciding upon a date and time for its release, which allows for the possibility of strategic EA timing.

2.1. Incentives for hiding bad news and highlighting good news

In today's information-rich environment, the idea that public companies can “hide” earnings news is potentially difficult to grasp. At the same time, though, limited attention theory predicts that the enormous amount of information available in recent years likely makes it easier for managers to hide bad news among the clutter (Hirshleifer et al., 2009; Lim and Teoh, 2010). Moreover, the cost of changing EA timing is likely very low (e.g., press wire fees do not vary depending on the time of the day), so a manager will likely do so even if he expects that it has only a small chance of being effective at altering attention. In this section, we provide several reasons why managers likely would want to limit (attract) attention to bad (good) earnings news, and why managers might have some expectation of getting away with it.

One incentive for managers to reduce (attract) attention to bad (good) news is that doing so might influence market price responses, at least in the short term. Anecdotal evidence indicates that inattention is associated with prices that do not fully impound all available public information (Huberman and Regev, 2001). Lim and Teoh (2010) speculate that some market anomalies such as post earnings announcement drift are potentially attributable to variation in market attentiveness. Moreover, even though managers likely understand that any pricing impact will be short-lived, they likely prefer gradual rather than sudden price declines because the latter can lead to negative media attention, price drops, and trading halts. Further, prior research shows that severe price drops increase the likelihood of shareholder litigation (Donelson et al., 2012).

Even if there is no pricing benefit of increasing/decreasing attention to earnings news, other potential benefits are likely, such as career concerns, reputation management, and liquidity. First, several prior studies find that CEOs that have a strong reputation with external media benefit from better career outcomes such as higher compensation and more invitations to join boards (Milbourn, 2003; Falato et al., 2013; Rajgopal et al., 2006; Malmendier and Tate, 2009). Further, Farrell and Whidbee (2002) find that forced CEO turnover after poor performance is higher among firms with greater media coverage. A logical extension is that CEOs with greater visibility (whether from media coverage or other exposure) have better career outcomes. Thus, managers have an incentive to maximize the dissemination of good news and limit the dissemination of bad news so as to enhance their reputations and career prospects. Second, managers may be saving face from the judgment of other stakeholders. Blankespoor and deHaan (2015) discuss how stakeholders other than investors likely use media coverage as a signal of the quality of the firm and its CEO, so a positive media presence benefits the firm when transacting with such stakeholders. For example, skilled workers such as computer scientists may use media coverage as a signal of the quality of the firm or CEO, in which case firms with positive media coverage benefit from stronger employee demand. Finally, Barber and Odean (2008) discuss how some investors are more likely to trade in stocks that have first caught their attention. A logical extension of this argument is that investors will be less (more) likely to purchase stocks about which they have heard negative (good) news. Thus, even if prices are unaffected by individual traders, there is a plausible liquidity implication if EA timing affects market attention.

2.2. Prevalence of earnings announcement timing changes

There are a number of reasons to expect that EA times are relatively constant quarter-after-quarter. First, managers have a preference for being consistent with precedent in their voluntary disclosures (Graham et al., 2005; Chen and Mohan, 1994; FERF, 2013). This preference is most likely driven by an expectation that changing the announcement timing between periods will be interpreted as signaling something about the firm's earnings news. Several research firms make efforts to forecast in advance the predicted date of EA.[2] In addition, there is evidence that markets respond negatively when firms delay an expected reporting date (Chambers and Penman, 1984; Bagnoli et al., 2002; Duarte-Silva et al., 2013; So, 2014), suggesting that investors form expectations not only for the earnings news, but also for the *timing* of the earnings news release. Finally, Graham et al. (2005) find that 53% of surveyed executives “give no preferential treatment to disclosing good or bad news faster” (p. 63).

On the other hand, there are also a number of reasons to expect that EA times are highly variable. Research has also found evidence consistent with managers both accelerating and delaying EA timing for strategic purposes. Skinner (1994, 1997), Donelson et al. (2012), and Bowen et al. (1992) find evidence consistent with managers accelerating bad news releases to reduce litigation risk, minimize sharp price drops, and avoid negative reputation consequences from withholding information. To the contrary, other papers find evidence consistent with managers delaying the release of bad earnings news, possibly in order to further validate the data, to allow insiders to sell shares, or with the hopes that offsetting good news will come to light (Kross, 1981; Kothari et al., 2009; Chambers and Penman, 1984; Kross and Schroeder, 1984; Begley and Fischer, 1998; Bagnoli et al., 2002). Further, Chen and Mohan (1994) report that more than a third of survey respondents said they would change an EA date depending on the nature of the earnings news. However, as noted above, the most common reasons for changing the timing of EAs are likely benign, simply reflecting calendar conflicts or administrative conflicts. For example, IBM reports that, “earnings are announced on the fifteenth or sixteenth working day…” but that “the date of the EA can vary, because generally we will not make the announcement on a Friday, a Monday, or on a holiday” (FERF, 2013, p. 12).

Frequent, benign changes in EA timing are precisely the camouflage needed for managers to strategically change the EA timing. We put forth the following hypothesis about EA timing across periods where variation in market attention is thought to exist:

H1. Quarter after quarter, firms announce earnings news: at the same time of day; on the same weekday; and on similarly busy reporting days.

2.3. Variation in market attention

Prior research has posited that, at some point, the limited capabilities of humans to acquire and process information prevent them from absorbing the complete set of public information, in what is referred to as market “inattention” or “distraction” (see Lim and Teoh, 2010 for a review).[3] Patell and Wolfson (1982), among others, speculate that EAs that occur in the evening might receive less attention than similar news that is released earlier in the day. The premise for this speculation is presumably that market participants are not working once the market closes, or that they are distracted by

[2] For example, Zacks Investment Research forecasts the “expected report date,” which is released in advance to the public. Wall Street Horizon sells proprietary data on expected EA times.

[3] In this section, we discuss reasons why we expect attention may be lower after hours, on Fridays, and on busy days in any given quarter. Another consideration is whether a strategy to increase or decrease attention by changing EA timing could persist in a multi-period setting. There are two main reasons why we might expect to see continued differences in attention over multiple periods. The first is that the large number of benign changes observed in H1 likely provides strategic cover for firms even over several periods; i.e., a pooling equilibrium is possible because the pool of changes in EA timing is very large. The second reason is that market participants' inattention can be a rational choice, in which investors are subject to extremely high information search costs, as proposed in Lambert (2003, p. 390). By implication, these market participants are not necessarily “duped” by paying less attention to certain EAs, but rather are acting rationally within their constraints. Table IA.8 of the Internet appendix investigates whether a firm's recent history of strategic EA timing changes alters whether attention is lower (higher) after hours, on Fridays, or on busy days (before market close, on Monday–Thursday, or on slow days). In sum, consistent with the aforementioned arguments, we find that variation in attention persists even for firms that have a history of strategic EA timing.

other issues. However, Patell and Wolfson (1982) also note that the opposite could be true: that EAs in the evening could receive greater attention as more time is allowed for dissemination and interpretation before trading begins the following day. We investigate the following hypothesis (in the null form):

H2a. Attention to earnings is the same after market hours as during or before market hours.

DellaVigna and Pollet (2009) and Damodaran (1989), among others, theorize that market participants are distracted just before the weekend and, as a result, EAs on a Friday receive less attention than similar EAs on Monday through Thursday. However, because relatively few firms release earnings on Friday (in our sample, just 7.6 percent occur on a Friday), it is plausible that each individual announcement receives *more* attention than announcements on other days of the week. Further, the idea that market participants are systematically inattentive on Fridays is inconsistent with the work patterns for the typical investment banker, money manager, or analyst, who often work long hours and weekends. Thus, there are reasons both for and against expecting lower market attention on Friday.

Prior research has used the earnings-return relation to examine variation in market attention. For example, DellaVigna and Pollet (2009) find that ERCs are lower, PEAD is higher, and trading volume is lower on Fridays, which is consistent with lower attention. However, inferring a causal link between lower attention and muted stock price responses requires controversial assumptions about the earnings–returns relation, and also that the numerous other known determinants of ERCs are adequately controlled in empirical analysis.[4] Further, since the majority of trading activity is driven by computer algorithms that are likely unaffected by distraction on Fridays, there are reasons to question whether lower Friday ERCs are driven by behavioral biases. Thus, it is plausible that the differential market responses for Friday announcements observed by DellaVigna and Pollet (2009) are caused by other factors, and we argue that further investigation of attention on Fridays is warranted. We use alternative, user-based measures of market attention to investigate H2b (written in the null form):

H2b. Attention to earnings is the same on Friday as it is on Monday through Thursday.

Hirshleifer et al. (2009) find lower ERCs and greater PEAD on days with numerous EAs, which they interpret as indicating that attention to individual firm announcements is lower on days with high information flow. A plausible alternative explanation is that, since "earnings season" is highly anticipated and report dates are often known in advance, market participants arrange their schedules such that they can pay adequate attention to numerous firms' announcements. It is therefore plausible that there is equal or even greater attention paid to EAs on busy days relative to periods of low information flow, in which case the differential market responses on busy days are again driven by non-attention causes. As with above, we use alternative measures of market inattention to investigate H2c:

H2c. Attention to earnings is the same on days with many EAs as it is on days with few EAs.

2.4. Strategic timing of earnings news

Prior evidence is mixed on whether managers choose an EA time depending on the content of the news (e.g., Patell and Wolfson, 1982; Damodaran, 1989; Doyle and Magilke, 2009). There are several potential reasons for the mixed prior results. First, times have changed—the information environment is clearly different in the digital age than in prior eras. Indeed, we find that the timing of EAs has changed dramatically over the past decade—now, almost no firms announce earnings during market hours (Fig. 1, Panel B). Second, the studies use different research designs and samples. Finally, obtaining precise data of EA timings has been difficult.

EA timing is voluntary. Thus, if managers prefer to hide (highlight) bad (good) earnings news, they likely alter their EA timing in an attempt to take advantage of any possible differences in market attention. Specifically, we predict that managers will time bad (good) news for release in periods when they expect attention to be lower (higher). We also note that, if the cost of changing announcement timing is sufficiently low, managers will likely do so even if the expected probability of receiving different attention is low. Our hypotheses in the null form are as follows:

H3. Earnings news is no different: after market hours than it is earlier in the day; on Friday than it is on Monday through Thursday; and on days with many EAs than it is on days with few EAs.

[4] We raise several concerns about drawing a causal link between attention and stock price responses. First, the interpretation of lower earnings response coefficients (ERCs) as evidence of reduced attention assumes that market frictions and/or behavioral biases prevent other undistracted arbitrageurs and algorithmic traders from eliminating under-reactions by distracted investors. Second, to the extent that ERCs do in fact capture attention, it derives primarily from equity investors; the attention of other important market participants known to improve market efficiency, such as analysts and the business press, is ignored using an ERC methodology. Finally, Kothari (2001) explains several shortcomings in ERC methodologies and discusses the possibility for correlated omitted variables. Note that Melessa (2012) also finds evidence that lower Friday ERCs are likely not driven by lower attention, but rather by macroeconomic uncertainty. Accordingly, in Table IA.12 we present evidence that the result found in prior research of lower ERCs on Fridays is highly sensitive to empirical design choices, and that the lower ERCs on Fridays are likely driven by unobserved characteristics of the earnings news, and that market responses to other information announcements (i.e., analyst forecast revisions) are no different on Fridays than other days.

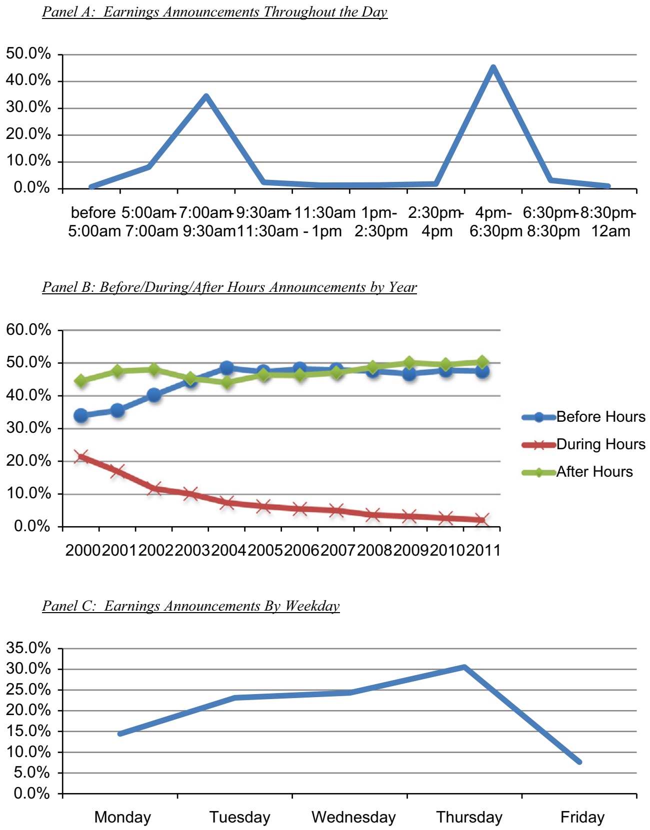

Fig. 1. Sample summary information—earnings announcements times and days. Panel A presents the percentage of EAs that occur throughout the day. Panel A requires that the observations have a time stamp that is corroborated by at least two sources to within five minutes of one another, reducing the sample to 118,351 observations. Panel B presents the trend in before/during/after hours EAs over the sample period sample. For sample consistency, Panel B requires that each firm is present in both 2000 and 2011. Panel C presents the percentage of EAs by day of week.

3. Sample construction

Because the mixed results in the prior literature could be attributed to challenges in measuring EA timing, our objective is to construct a sample of EA days and times that is as accurate as possible. To do so, we obtain EA timing data from four independent sources—Compustat, IBES, RavenPack and Wall Street Horizon—and retain only those observations for which the EA days and times can be validated by at least two sources.[5] Information on the sample selection is shown in Table 1. To maximize sample size, we create separate samples for descriptive analysis (which does not require control variables) versus statistical testing.

We begin by intersecting Compustat and CRSP to identify all US public company quarterly EAs from 2000 through 2011, for a total of 233,827 observations.[6] We remove 19,496 observations for which IBES data are unavailable. To better ensure that the EA dates are accurate, we eliminate another 21,776 observations for which the Compustat and IBES EA dates differ. We drop 70 observations that have an EA on a Saturday or Sunday. The remaining sample of 192,485 firm-quarters is used for our descriptive analysis of EAs by day.

We use three sources to obtain data on EA times. Our first source of the announcement time stamp is IBES.[7] Our second source is RavenPack's database of news articles that appear in Wall Street Journal (all editions), Dow Jones Newswires, and Barron's. For each EA date, we locate in RavenPack the firm's press release or the first news article written specifically about the firm's earnings.[8] The time stamp of the press release or first news article is our second source of the EA time. Our third source of EA times is from Wall Street Horizon, although these data are only available

[5] We find that, depending on our sample, roughly 10% of earnings announcement dates and between 2% and 22% of earnings announcement times are mismatched between databases. Hence, our dataset likely provides more power and less noise than data used in prior studies. See Internet Appendix (Table IA.4) for further discussion of database error rates.

[6] We limit to our analyses to common stocks (i.e., CRSP 'shrcd' 10 and 11), which removes non-typical securities such as REITs, ADRs, and publicly-traded partnerships. We begin our sample period in 2000 as news data from RavenPack are not available prior to 2000.

[7] IBES has an unusual spike of EA times of 00:00:00. We set these likely errors to missing.

[8] Specifically, we retain only earnings press releases and news articles that RavenPack assigns a relevance score of 100, which indicates that the article is dedicated to only that particular firm.

Table 1
Sample refinement and summary statistics.

Panel A details the sample refinement. Panel B has summary statistics for the main control variables used in regression tests. Panel C has summary statistics for the *LEAD_TIME* variable, as defined in Appendix A. Panel D has summary statistics for the attention proxies, *ATTN*, as defined in Appendix A and discussed in Section 3. Panel E presents correlations between the *ATTN* proxies. *** Indicates significance at 1%; ** at 5%; and * at 10%, two-tailed.

Panel A: Sample refinement

Complete Sample—for descriptive analysis		
Firm-quarters for U.S. public companies with EA date from 2000 to 2011	233,827	
Less: observations with no IBES data	(19,496)	
Less: observations with different EA dates in Compustat and IBES	(21,776)	
Less: observations with a Saturday or Sunday announcement Date	(70)	
Observations with a corroborated EA date	**192,485**	
Time of day subsample—for descriptive analysis		
Less: observations without at least two EA time data points		(24,945)
Less: observations without a before/during/after timing corroborated by two sources		(16,434)
Observations with a corroborated before/during/after timing classification		**151,106**
Sample for statistical tests		
Less: observations with missing regression control variables	(47,431)	
Less: observations with abs(UE) > 1; stock price < $1; or reporting lag > 90 days	(3,644)	
Less: observations without before versus after market close timing corroborated by two sources	(17,834)	
Less: observations without news coverage data	(3,411)	
Observations for statistical tests by EA date and time of day	**120,165**	
Subset of observations with data on the EA scheduling date (2006–2011 only)	**54,946**	

Panel B: Summary statistics—control variables

	N	Mean	P25	Median	P75	Std. Dev.
SIZE	120,165	6.66	5.43	6.52	7.75	1.71
BTM	120,165	0.57	0.27	0.47	0.73	0.47
LEV	120,165	0.20	0.02	0.16	0.32	0.20
NUMEST	120,165	1.61	1.10	1.61	2.30	0.92
FQ4	120,165	0.26	0.00	0.00	1.00	0.44
REPLAG	120,165	3.37	3.14	3.37	3.61	0.37
INSTOWN	120,165	0.61	0.40	0.64	0.82	0.27
CAR	120,165	−0.0002	−0.0407	−0.0003	0.0411	0.0844
UE	120,165	−0.0010	−0.0010	0.0004	0.0022	0.0150
DELAY	54,946	0.234	0	0	0	0.424
DELAY_AMOUNT	54,946	0.463	0	0	0	3.544

Panel C: Summary statistics for LEAD_TIME

	N	Mean	P25	Median	P75	Std. Dev.
LEAD_TIME (untransformed)	54,946	15.7	7	14	22	10.5
Days Ahead:	**0**	**< =7**	**< =14**	**< =21**	**< =30**	**After Qtr-End**
Percentage of Obs	3.4%	26.2%	55%	74.8%	92%	87.9%

Panel D: ATTN summary statistics

	N	Mean	P25	Median	P75	Std. dev.
News Articles (untransformed)	120,165	4.5	2.0	4.0	6.0	2.9
NEWSCOUNT	120,165	1.30	0.69	1.39	1.79	0.65
Avg. Analyst Lag (untransformed)	115,456	3.1	1.7	2.3	3.6	2.2
ANALYST_SPD	115,456	−0.96	−1.28	-0.85	−0.51	0.54
Edgar 8K downloads (untransformed)	39,035	49.3	22.0	37.0	61.0	43.7
EDGAR	39,035	1.46	0.90	1.44	1.99	0.87
Avg. Google hits (untransformed)	40,057	1.15	0.83	1.00	1.22	0.68
GOOGHITS	40,057	0.012	−0.050	0.005	0.065	0.122

Panel E: ATTN Pearson (Spearman) correlation coefficients above (below) the diagonal

	NEWSCOUNT	*ANALYST_SPD*	*EDGAR*	*GOOGHITS*
NEWSCOUNT		0.109***	−0.001	0.069***
ANALYST_SPD	0.065***		0.074***	0.013**
EDGAR	0.002	0.082***		0.024**
GOOGHITS	0.061***	0.007	0.032***	

after 2005.[9] For our descriptive analysis of EA times, we require that the before/during/after-hours timing classification can be corroborated by at least two data sources. This criteria eliminates 41,379 observations, leaving a sample of 151,106 observations for our descriptive analysis of intraday announcements.

For our statistical tests, we drop 47,431 observations that do not have the control variables used in the regression tests below.[10] We also drop observations that have an absolute earnings surprise that exceeds the stock price, that have a stock price below $1 at period-end, that announce earnings more than 90 days after the fiscal period-end (which is the longest SEC reporting deadline during our sample period), or that do not have news coverage data. Our statistical analysis focuses on a binary classification of announcements before versus after the close of trading hours (as opposed to before/during/after-hours), so for our statistical tests we only require that before versus after market close timing classification can be corroborated by at least two data sources. The refined test sample includes 120,165 firm-quarter observations.

Fig. 1 provides descriptive information on intra-day and intra-week distributions of EAs. As depicted in Panel A, 34.6% of announcements happen immediately before U.S. market trading hours (i.e., 9:30 am to 4:00 pm; all times Eastern), while 45.4% happen immediately after trading hours. Just 7% of EAs happen during trading hours, on average. The remaining 13% of EAs happen early in the morning (i.e., before 7 am) or late at night (after 6:30 pm). Panel B shows that these percentages change over time—the proportion of firms announcing during trading hours decreases monotonically from 21.5% in 2000 to just 2.2% in 2011. Panel C shows that the frequency of EAs per day increases from 14.4% on Mondays to 30.5% on Thursdays, followed by a decline to just 7.6% on Fridays.[11]

Fig. 2 presents the typical distribution of EAs throughout the year. The data underlying Fig. 2 consists of the sum of all EAs on Compustat by week, sorted into deciles by calendar year to form the variable *EAFREQ_WEEK*. Fig. 2 plots the 10th and 90th percentiles of *EAFREQ_WEEK* over the 12-year sample period—the earnings season patterns are clearly visible. Fig. 2 shows that the "busiest" EA weeks are the same year-after-year—week 19 is always in the top two deciles of weekly EAs, while week 23 is always in the bottom two deciles—suggesting that earnings season is predictable ex ante to managers.

Wall Street Horizon also tracks the dates on which firms announce the scheduling of their EA.[12] We refer to these dates as "scheduling" dates, and we refer to the number of days between the scheduling date and the EA date as the scheduling "lead-time." We have scheduling data for 54,946 observations over the years 2006–2011. Panel A of Fig. 3 plots observed EAs by scheduling lead-times, and summary statistics are provided in Panel C of Table 1.[13] Several insights are worth mentioning. The average lead-time is 15.7 days, which is on average 17.3 days after the fiscal quarter-end. There are also concentrations of schedulings at 7, 14, and 21 days before the announcement, consistent with managers setting scheduling goals on weekly intervals. 3.4% of EAs are not scheduled until the day of the actual EA, 26.2% of schedulings occur within 7 days of the EA, and just 8% of schedulings occur more than 30 days before the EA. Finally, 87.9% of schedulings occur after the fiscal quarter-end. Thus, it appears likely that most managers have a reasonable understanding of their earnings news at the time when the EA is scheduled.

4. Empirical design and results

All of the variables discussed below are defined in Appendix A. Summary statistics for the main control variables are presented in Panel B of Table 1. Continuous variables are winsorized at 1% and 99%. Sample sizes vary across tests depending on data availability.

4.1. Analysis of Hypotheses 1—changes in earnings announcement timing

EA timing is identified along three dimensions: time of day; day of the week; and how "busy" the EA day is. Like Hirshleifer et al. (2009), we proxy for how busy a reporting day is by counting EAs per day on Compustat, sorted into deciles within our sample by calendar year. We label this variable *EAFREQ* (as opposed to counts of EAs by week, as used in Fig. 2).[14]

[9] Wall Street Horizon provides institutional investors with real-time calendars of corporate events, including estimated and actual earnings announcement times. Wall Street Horizon reports that its actual earnings announcement time data has an accuracy rate of 99.95%. http://www30.wallstreethorizon.com/our-process. Accessed 8.17.2012.

[10] Specifically, we drop observations with missing data for *UE*, *SIZE*, *BTM*, *LEV*, *NUMEST*, *CAR*, *FQ4*, *INSTOWN*, and *REPLAG*, all of which are defined in Appendix A and discussed below.

[11] In Table IA, we split the observations into good and bad earnings news and re-plot the graphs in Fig. 1. There is some visual evidence of a higher frequency of negative earnings unexpected earnings on Fridays and in the busiest reporting decile. However, the plots ignore the magnitude of the earnings news as well as covariates and, thus, should be interpreted with caution.

[12] Wall Street Horizon obtains most scheduling announcements from firms' press releases or websites, but some are obtained via direct communication with the firm. Wall Street Horizon considers a scheduled EA date to be "verified" only when the reporting firm describes the date as being final. All predicted or estimated EA timings are labeled "tentative." For our analysis we retain only announcements of "verified" EA timings because we are interested in final announcement timings that are chosen by the firm, not timings that are predicted by outsiders. Wall Street Horizon sells its scheduling data on a real-time basis to clients to inform investing decisions.

[13] The underlying numbers for this figure are reported in Table IA.10.

[14] Managers are likely unable to perfectly predict busy earnings days ex ante, which reduces their ability to strategically time earnings news based on *EAFREQ*. Still Fig. 2 shows that busy earnings weeks are quite predictable, and Fig. 1 shows consistent differences by weekday. In Table IA.6 of the Internet Appendix, we find that a regression of *EAFREQ* on binary variables for the weekday, calendar week, and calendar day explains about 90% of the variation in *EAFREQ*. Further, out-of-sample tests predict *EAFREQ* to within two deciles of the actual *EAFREQ* for 98.7% of observations. We interpret these results as being consistent with managers being able to predict with reasonable precision busy versus slow EA days.

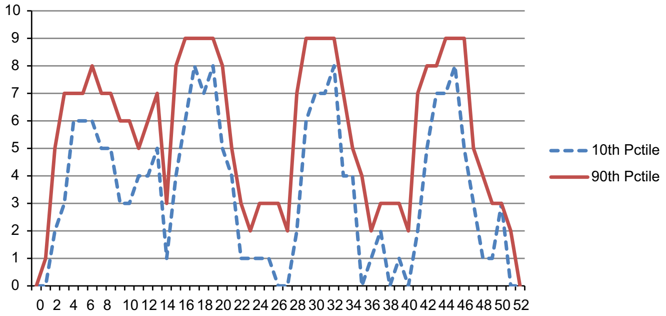

Fig. 2. Earnings season—the ranked frequency of earnings announcements by calendar week. The figure shows evidence on the predictability of earnings season. The variable *EAFREQ_WEEK* is calculated similarly as *EAFREQ*, except on a weekly instead of daily basis. Specifically, we count all the EA observations per week on Compustat, and then form *EAFREQ_WEEK* deciles (labeled 0–9) by calendar year. Below is a plot of the 10th and 90th percentiles of *EAFREQ_WEEK* observed in our sample over years 2000–2011. The earnings season patterns are clearly visible below.

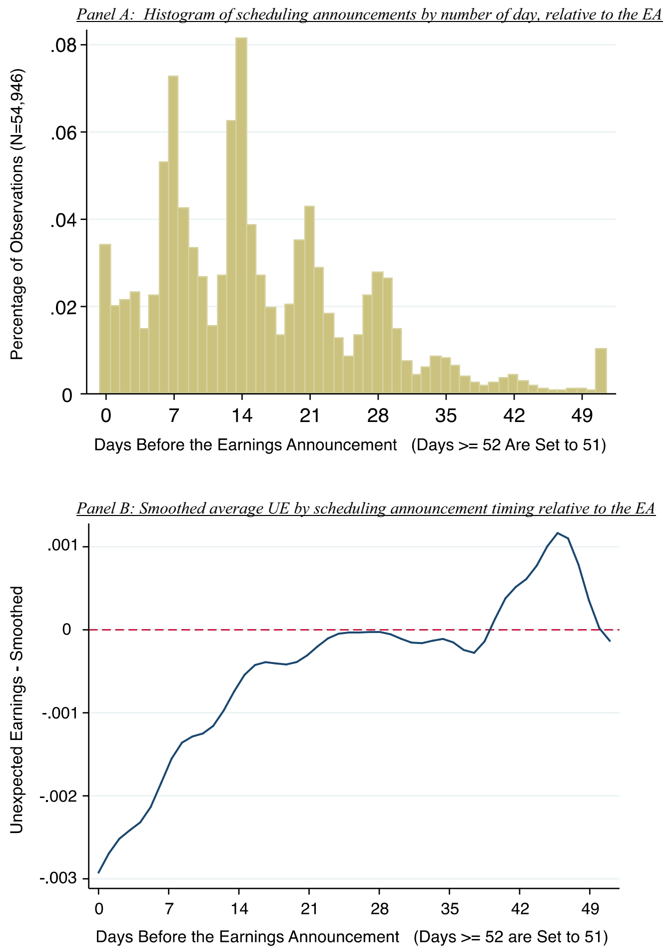

Fig. 3. Scheduling announcements figures. Panel A plots the frequencies of scheduling announcements by day relative to the EA. Scheduling announcements that occur more than 51 days before the EA are set to 51. Panel B plots smoothed average *UE* by how far in advance of the EA the scheduling announcement occurs. *UE* is smoothed using a Gaussian kernel function in order to reduce the effects of outliers in the days with few scheduling announcements.

Panels A–C of Table 2 present quarter-over-quarter transition matrices of EA times. Between any two consecutive quarters: 15% of firms change their before/during/after trading hours timing; 52.8% of firms change their EA weekday; and 80.5% change their *EAFREQ* decile. Over the entire sample period, 72.6% of our sample firms have at least one change in

Table 2
Frequency of changes in earnings announcement timing (H1).

Panels A–C present the quarter-over-quarter transition matrices of EA times during the day, by weekday, and by how busy the day is (*EAFREQ*). Panel D presents the frequency of EA timing changes within each fiscal year. We require that the firm has data for all four quarters to be included in Panel D.

Panel A: Transition matrix of before/during/after trading hours announcement times

	Previous quarter			
Current quarter	**Percent before hours**	**Percent during hours**	**Percent after hours**	**Total**
Percent before hours	36.7	1.5	4.0	42.3
Percent during hours	1.2	5.4	2.1	8.7
Percent after hours	4.0	2.2	42.9	49.0
Total	**42.0**	**9.1**	**48.9**	**100.0**
Sum of shaded = percent that change in any given quarter =				15.0%
Percentage of firms with at least one change in before/during/after-hours timing in our sample period				72.6%

Panel B: Transition matrix of announcement weekdays

	Previous quarter					
Current quarter	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Total**
Monday	5.6	2.7	2.3	2.5	1.3	14.3
Tuesday	2.9	10.4	4.1	4.6	1.1	23.1
Wednesday	2.2	4.5	11.8	4.8	1.0	24.4
Thursday	2.4	4.6	5.1	16.9	1.6	30.7
Friday	1.1	1.1	1.1	1.8	2.5	7.6
Total	**14.3**	**23.2**	**24.4**	**30.7**	**7.5**	**100.0**
Sum of shaded = percent that change in any given quarter =						52.8%
Percentage of firms with at least one Friday announcement in our sample period						51.4%

Panel C: Transition matrix of announcement timings by EAFREQ decile

	EAFREQ—Quarter $t-1$										
EAFREQ—Qtr t	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Total**
1	4.36	1.92	0.88	0.60	0.54	0.38	0.33	0.34	0.30	0.43	10.1
2	1.75	2.17	1.41	0.82	0.88	0.77	0.67	0.54	0.55	0.64	10.2
3	0.89	1.22	1.31	1.20	0.89	1.10	0.99	0.79	0.75	0.68	9.8
4	0.56	0.88	0.98	1.22	1.35	1.13	1.15	0.93	0.98	0.70	9.9
5	0.59	0.91	1.01	1.20	1.50	1.49	1.12	0.85	0.87	0.73	10.3
6	0.39	0.66	0.95	0.99	1.28	1.59	1.55	0.97	0.84	0.59	9.8
7	0.38	0.75	1.12	1.28	1.08	1.12	1.69	1.69	0.95	0.62	10.7
8	0.35	0.60	0.96	1.17	0.94	0.83	1.20	1.52	1.55	0.66	9.8
9	0.33	0.62	0.87	0.98	1.03	1.00	1.15	1.15	1.69	1.51	10.3
10	0.47	0.64	0.71	0.65	0.77	0.58	0.80	0.75	1.31	2.47	9.2
Total	**10.1**	**10.4**	**10.2**	**10.1**	**10.3**	**10.0**	**10.7**	**9.5**	**9.8**	**9.0**	**100.0**
Sum of shaded = percent that change in any given quarter =											80.5%
Percentage of firms with at least one change in *EAFREQ* in our sample period											99.0%

Panel D: Percentage of announcement changes within each fiscal year

	Number of changes					
Type of change	**0**	**1**	**2**	**3**	**4**	**Sum(1-4)**
Time of day	74.4	11.7	10.2	3.0	0.8	25.6
Day of week	18.4	14.5	28.4	24.8	13.9	81.6
EAFREQ decile	1.2	2.4	16.1	34.7	45.6	98.8

before/during/after hours timing and 99% of firms have at least one change in *EAFREQ* decile. Further, 51.4% of firms have at least one Friday EA during our sample period, which is unexpected given that only 7.6% of all EAs happen on a Friday. Panel D of Table 2 presents frequencies of announcement timing changes within each fiscal year. Within any given year: 25.6% of firms have at least one change in before/during/after market timing; 81.6% of firms have at least one change in EA weekday; and 98.8% of firms have at least one change in *EAFREQ* decile. In summary, the results in Table 2 indicate that changes in EA timing happen frequently enough that strategic changes likely do not draw the attention of market participants. Statistical tests linking changes in announcement timing and changes in attention are discussed below.

4.2. Analysis of Hypotheses 2—differences in market attention

We define attention simply as a user taking notice of a piece of information. We employ four measures of market attention (collectively *ATTN*), each of which has been vetted in prior research (e.g., Barber and Odean, 2008; Da et al., 2011; Drake et al., 2012, in press; Zhang, 2008).[15] Our *ATTN* proxies have several strengths. First, our measures are focused on the user, in that they measure the actions and/or choices of information users—if a user is taking action with respect to an EA, we assume that he/she is paying attention to it. Second, each measure is related to either the production of information (as in the case of news articles and analyst revisions) or the acquisition of information (as in the case of 8-K downloads and Google searches), which allows us to speak to what information market participants pay attention to. Third, these variables are measured on a timely basis, which makes them superior to less timely measures of attention such as quarterly advertising expense (e.g., Chemmanur and Yan, 2009). Fourth, unlike measures such as stock returns or trading volume, our *ATTN* variables do not rely assumptions of market equilibrium—an assumption that is debatable in tests of behavioral biases such as limited attention.[16] Finally, also unlike stock returns and trading volume, our proxies measure the attention of multiple types of market participants, which may differ from the attention of equity investors.

4.2.1. Attention proxies

The first proxy for attention, *NEWSCOUNT*, is the log of the number of earnings-specific news articles that appear in the RavenPack database within the 24-hour period starting with the firm's EA.[17,18] The logic for *NEWSCOUNT* is that the number of published articles correlates with the breadth of earnings news dissemination (i.e., fewer articles mean that fewer readers learn about the earnings news) as well as the depth of news dissemination (i.e., even those market participants who learn about the earnings news will acquire less information when fewer news articles are available) (Barber and Odean, 2008; Li et al., 2011).

Our second proxy, *ANALYST_SPD*, is the speed with which equity analysts impound earnings news into their future forecasts, in the spirit of Zhang (2008). Our intuition underlying this proxy is that greater analyst attention is associated with faster forecast updates. During times when analysts are distracted, we assume that it will take them longer to update their future forecasts.[19] We use the IBES detail file to collect data on all the analyst forecasts, *j*, that are updated within 30 days of the firm's EA. We then calculate the number of weekdays between the EA and forecast update. The inverse of the average of these lags measures how quickly analysts update their forecasts following the EA. Specifically, we calculate analyst updating speed, *ANALYST_SPD*, as follows[20,21]:

$$ANALYST\_SPD = -1 * \log\left(\frac{1}{j}\sum_{j=1}^{j}\left[1 + Weekdays\ until\ forecast\ update_j\right].\right) \tag{1}$$

The third measure of market attention is based on the number of 8-K downloads from EDGAR (e.g., Drake et al., in press). We measure investor EDGAR activity on EA days relative to that on other days. Thus, this measure is a proxy for attention to

---

[15] We note that our four proxies are not necessarily intended to be independent of one another, but are rather four related proxies for the same underlying construct of market attention.

[16] Using equilibrium-based measures of market activity as measures of attention requires that prices move when investors pay attention and/or that investors actually trade as a result of their increased attention. However, price movements and trading volume can occur in the absence of attention (e.g., market orders), and investors can pay attention to a stock and decide not to trade.

[17] There are four advantages of sourcing news data from RavenPack instead of other databases used in the literature: (i) RavenPack identifies articles that are written specifically about the firm's earnings, so we are able to reduce noise by excluding other articles about the firm; (ii) the RavenPack database includes articles from several major news sources, whereas prior papers have sometimes used only a single source; (iii) the RavenPack database allows us to quickly calculate the number of articles written about a firm, whereas competing databases (e.g., Factiva) restrict most users to manually downloading 100 articles at a time; and (iv) RavenPack takes steps to reduce the incidence of double-counting articles. Drake et al. (2014) find that RavenPack coverage and Factiva coverage are correlated at 0.70 among a randomly selected sample of EAs.

[18] We also consider subtracting from *NEWSCOUNT* the average number of earnings-specific articles that appear over the previous 7 weeks, but the average is zero for nearly all firm-quarters. Untabulated analysis using such a measure of "abnormal" *NEWSCOUNT* produces qualitatively and quantitatively similar results. Untabulated results using all available news articles in Ravenpack (i.e., not just earnings-specific news) also produce similar results.

[19] An important caveat applies to the analyst revision speed. Analyst updating speed is likely also determined by other factors, such as the complexity of the earnings news or of the underlying firm. It is possible that this proxy is, to some degree, capturing unobservable information processing frictions faced by the analyst. Our use of control variables and firm and year fixed effects likely partially but incompletely account for this possibility and we urge the reader to keep this caveat in mind when interpreting the analyst-based evidence.

[20] As *ANALYST_SPD* is based on daily data, this metric is potentially biased upwards for EAs that occur after market hours relative to those that occur before or during market hours. We adjust for this bias by subtracting 1/3rd of a day (8 hours) from *ANALYST_SPD* for all after-hours EAs. 8 hours seems to be a reasonable adjustment as the majority of EAs happen either just before or just after market hours, or roughly 8 hours apart. Results using no adjustment or a 12-hour adjustment produce similar results.

[21] Zhang (2008) uses a measure of analyst responsiveness that is based on a dichotomous categorization of whether or not each analyst updates his forecast within two days of the EA. We employ our proxy because it allows for a continuous measure of updating speed rather than a dichotomous measure.

firm-specific earnings news. We compute abnormal EDGAR downloads as follows:

$$EDGAR = \log\left(\sum_{t=0}^{1} EDGAR_t\right) - \log\left(\frac{1}{7}\sum_{w=1}^{7}\sum_{t=-7w}^{-7w+1} EDGAR_t\right) \quad (2)$$

The first term is the sum of EDGAR 8-K downloads for two days around the EA (days 0, 1), while the second term is the trailing average EDGAR 8-K downloads for the same two weekdays over the preceding seven weeks. EDGAR data are available for the period 2008–2011.

Our final measure of market attention is Google search volume that occurs around the EA for a given firm's stock ticker, following Da et al. (2011) and Drake et al. (2013). The intuition underlying this proxy is that as a market participant searches the internet for firm-specific information, they are paying attention to the stock. Data on weekly Google search volume for firms' stock tickers is obtained from Google Trends, following the methodology in Drake et al. (2013). Google Trends reports a normalized measure of the number of searches for a given search term. We calculate abnormal Google search volume as follows:

$$GOOGHITS = \log\left(\frac{1}{2}\sum_{w=0}^{1} HITS_w\right) - \log\left(\frac{1}{7}\sum_{w=-8}^{-2} HITS_w\right) \quad (3)$$

where w is the week of the EA.[22] We use a two-week event period as data are on a weekly basis and using a one-week period would not capture any post-announcement attention from Friday announcers.[23] Google search data are available for the years 2004–2010.

Panel D of Table 1 provides summary information on the *ATTN* variables, in both raw and log transformed forms. Panel E shows statistically significant but qualitatively low correlations between our *ATTN* variables. The low correlations are similar to those found by Da et al. (2011) and are likely due to the proxies capturing different aspects of market attention. *NEWSCOUNT* likely most directly correlates with media attention. *ANALYST_SPD* is likely a direct measure of analyst attention, and Da et al. (2011) find that *GOOGHITS* is likely most directly related to retail investor attention. *EDGAR* likely captures earnings-related attention from multiple types of market participants.[24]

4.2.2. Regression tests of H2

We use the following regression to examine market attention for the three EA timing dimensions:

$$ATTN = \beta_0 + \beta_1 AFTER + \beta_2 FRIDAY + \beta_3 EAFREQ + \sum \beta_k CONTROLS + \sum \beta_k YEAR + \sum \beta_k FIRM + \varepsilon. \quad (4)$$

AFTER is a binary variable equal to one for EAs from 4 pm to midnight. *FRIDAY* is a binary variable for EAs on Friday. *EAFREQ* is the decile of the number of market-wide EAs that happen on day t. β_1, β_2, and $\beta_3 < 0$ would be consistent with attention being lower after hours, on Fridays, and on busy reporting days, respectively. These negative coefficients would be simultaneously consistent with attention being higher before market close, on Mondays through Thursdays, and on slow reporting days.[25]

Firm fixed effects (*FIRM*) control for stationary firm characteristics and restrict the analysis to within-firm variation in *ATTN*. Annual fixed effects (*YEAR*) control for common macroeconomic trends. Control variables (*CONTROLS*) capture non-stationary firm characteristics that likely correlate with market attention: the log of market value of equity (*SIZE*); leverage (*LEV*); book-to-market (*BTM*); the log of the number of analyst following the firm (*NUMEST*); an indicator for the fourth fiscal quarter (*FQ4*); the log of the number of days between the quarter-end and EA date (*REPLAG*); the *REPLAG* quadratic (*REPLAG_SQ*); and institutional ownership (*INSTOWN*). We also include controls for the sign and magnitude of the earnings news: unexpected earnings (*UE*); two-day abnormal returns (*CAR*), binary variables for negative unexpected earnings and returns (*UE*_NEG and *CAR_NEG*); and interactions of these binary variables with *UE* and *CAR*, respectively (*UE_NEG_INT* and *CAR_NEG_INT*). Standard errors are clustered by EA date to account for cross-sectional residual correlation.[26]

Table 3 presents results of estimating equation (4). Column 1, in which *NEWSCOUNT* is the dependent variable, shows that the coefficients on *EAFREQ* and *AFTER* are significantly negative, and that the coefficient on *FRIDAY* is insignificant. The coefficient of −0.073 on *AFTER* indicates that, ceteris paribus, there are 7.3% fewer articles written about earnings that are reported after trading hours relative to before or during trading hours. The coefficient of −0.012 on *EAFREQ* indicates that a

---

[22] For brevity, we refer readers to Drake et al. (2013) for a detailed description the Google Trends index. Note that we follow Da et al. (2011) in using weekly (as opposed to daily) Google search data to maximize the sample size.

[23] An unavoidable consequence of having only weekly data is that EAs that happen early in the week have a shorter (longer) pre-announcement (post-announcement) window than do EAs that happen later in the week.

[24] Our tests are agnostic as to whether variation in attention can alter stock prices responses (i.e., ERCs). Still, we provide evidence on the relation between our *ATTN* proxies and stock prices in Table IA.1 of the Internet Appendix. Specifically, we estimate a standard ERC model of two-day abnormal returns regressed on ranked unexpected earnings and an interaction between unexpected earnings and *ATTN*, along with typical control variables. We find that all four *ATTN* interaction variables are significantly positive, which is consistent with higher *ATTN* leading to larger ERCs.

[25] Table IA.2 of the Internet Appendix presents results of a changes form of Eq. (4), and Table IA.11 presents univariate analysis of only quarters with changes in *TIMING*. The results are similar to those discussed below.

[26] Clustering by both date and firm produces substantially unchanged results, which is consistent with our implicit assumption that the residuals in estimating equation (4) are not serially correlated (i.e., any serial correlation is largely unchanging over our sample period and, thus, effectively removed via the firm fixed effects).

Table 3
Tests of H2—variation in market attention.
OLS Model: $ATTN = \beta_0 + \beta_1 AFTER + \beta_2 FRIDAY + \beta_3 EAFREQ + \Sigma\beta_k CONTROLS + \Sigma\beta_k YEAR + \Sigma\beta_k FIRM + \varepsilon$.
ATTN is *NEWSCOUNT, ANALYST_SPD, EDGAR,* or *GOOGHITS* in columns 1–4, respectively. *AFTER* is a binary variable equal to one for EAs from 4 pm to midnight. *FRIDAY* is a binary variable equal to one for EAs on Friday. *EAFREQ* is the decile of the number of EAs that happen on day *t*. *FIRM* are firm fixed effects. *YEAR* are year fixed effects. *CONTROLS* are listed below and detailed in Appendix A. Standard errors are clustered by EA date. *** Indicates significance at 1%; ** at 5%; and * at 10%, two-tailed.

VARIABLES	(1) *NEWSCOUNT*	(2) *ANALYST_SPD*	(3) *EDGAR*	(4) *GOOGHITS*
AFTER	−0.073	−0.069	−0.194	−0.002
	[−12.60]***	[−12.69]***	[−10.59]***	[−0.83]
FRIDAY	−0.009	−0.002	0.147	−0.002
	[−1.00]	[−0.17]	[5.04]***	[−0.51]
EAFREQ	−0.012	−0.004	−0.030	−0.002
	[−7.77]***	[−4.52]***	[−7.76]***	[−4.03]***
SIZE	0.047	−0.031	−0.052	0.004
	[11.90]***	[−7.19]***	[−3.10]***	[2.12]**
BTM	0.064	0.019	−0.090	−0.001
	[11.03]***	[3.04]***	[−4.79]***	[−0.21]
LEV	0.042	−0.025	−0.549	−0.017
	[2.70]***	[−1.44]	[−8.28]***	[−1.99]**
NUMEST	0.090	0.076	0.085	−0.000
	[22.54]***	[17.48]***	[6.13]***	[−0.10]
CAR	−0.011	0.174	0.498	0.107
	[−0.30]	[4.52]***	[4.98]***	[6.72]***
CAR_NEG	−0.001	−0.003	−0.028	−0.004
	[−0.31]	[−0.61]	[−2.52]**	[−2.30]**
CAR_NEG_INT	−0.084	−0.328	−1.685	−0.238
	[−1.59]	[−5.95]***	[−11.20]***	[−9.60]***
UE	−0.258	−0.760	−0.716	0.481
	[−0.98]	[−2.29]**	[−1.10]	[3.84]***
UE_NEG	0.000	−0.006	−0.022	0.002
	[0.09]	[−1.57]	[−1.94]*	[1.06]
UE_NEG_INT	0.043	1.484	1.035	−0.613
	[0.13]	[3.66]***	[1.25]	[−4.10]***
FQ4	−0.015	−0.040	0.113	0.017
	[−2.25]**	[−7.84]***	[6.56]***	[7.13]***
REPLAG	0.153	0.328	−0.079	0.096
	[1.32]	[4.07]***	[−0.25]	[3.04]***
REPLAG_SQ	−0.018	−0.056	−0.019	−0.014
	[−1.11]	[−4.77]***	[−0.43]	[−3.16]***
INSTOWN	0.003	0.059	0.011	0.016
	[0.19]	[3.97]***	[0.19]	[2.29]**
Observations	120,165	115,456	39,035	40,057
Adjusted *R*-squared	0.522	0.266	0.336	0.151

one decile increase in *EAFREQ* is associated with 1.2% fewer news articles or, equivalently, a move from the slowest to busiest decile of days is associated with a $(1.2\% \times 10 =)$ 12% decrease in news articles. The results for *ANALYST_SPD* in column 2 are consistent with the *NEWSCOUNT* results. The results for *EDGAR* are presented in the third column—the negative coefficients on *AFTER* and *EAFREQ* are again consistent with lower attention after hours and on busy days, while the positive coefficient on *FRIDAY* is consistent with relatively *higher* attention on Fridays. Finally, for *GOOGHITS* (column 4), the coefficients on *AFTER* and *FRIDAY* are insignificant, while that on *EAFREQ* is significantly negative.[27]

In sum, the four *ATTN* proxies generally indicate that market attention is lower (higher) after hours and on busy days (before market close and on slow days). However, the results show that *FRIDAY* is either *not* associated with attention or is *positively* associated with attention.

The logic underlying H1 is that the *act of switching* EA timing must not raise concerns and attract attention. Next, we examine whether *changes* in EA timing (H1) are associated with different attention (H2):

$$ATTN = \beta_0 + \beta_1 AFTER + \beta_2 \Delta AFTER + \beta_3 FRIDAY + \beta_4 \Delta FRIDAY \\ + \beta_5 EAFREQ + \beta_6 \Delta EAFREQ + \sum \beta_k CONTROLS + \sum \beta_k YEAR + \sum \beta_k FIRM + \varepsilon. \quad (5)$$

If attention is lower after hours, on Fridays, and on busy days, we still expect the coefficients on *AFTER*, *FRIDAY*, and *EAFREQ* to be negative. The bolded coefficients on β_2, β_4, and β_6 are new from Eq. (4) and capture the incremental difference in *ATTN* for firms that switch their timing from the previous quarter. We focus on the sum of coefficients on the EA timing

[27] Table IA.9 of the Internet Appendix presents regression results with interactions between *AFTER*, *FRIDAY*, and *EAFREQ*. The interaction terms are largely insignificant, indicating that the effects are additive rather than interactive.

Table 4
Tests of H1 and H2—attention to changes in earnings announcement timing.

OLS Model: $ATTN = \beta_0 + \beta_1 AFTER + \beta_2 \Delta AFTER + \beta_3 FRIDAY + \beta_4 \Delta FRIDAY + \beta_5 EAFREQ + \beta_6 \Delta EAFREQ + \Sigma\beta_k CONTROLS + \Sigma\beta_k YEAR + \Sigma\beta_k FIRM + \varepsilon$.

ATTN is *NEWSCOUNT, ANALYST_SPD, EDGAR,* or *GOOGHITS* in columns 1–4, respectively. *AFTER* is a binary variable equal to one for EAs from 4 pm to midnight. *FRIDAY* is a binary variable equal to one for EAs on Friday. *EAFREQ* is the decile of the number of EAs that happen on day *t*. Δ is the change operator. *CONTROLS*, which are the same variables reported in Table 3 and detailed in Appendix A, are untabulated for brevity. *FIRM* are firm fixed effects. *YEAR* are year fixed effects. Standard errors are clustered by EA date. *** Indicates significance at 1%; ** at 5%; and * at 10%, two-tailed.

VARIABLES	(1) *NEWSCOUNT*	(2) *ANALYST_SPD*	(3) *EDGAR*	(4) *GOOGHITS*
AFTER	−0.075	−0.080	−0.167	−0.001
	[−11.06]***	[−12.71]***	[−7.79]***	[−0.25]
Δ*AFTER*	0.002	0.010	−0.039	−0.000
	[0.30]	[1.72]*	[−2.13]**	[−0.18]
FRIDAY	−0.012	−0.010	0.159	−0.001
	[−0.99]	[−0.90]	[4.53]***	[−0.24]
Δ*FRIDAY*	0.005	0.010	−0.011	0.001
	[0.67]	[1.30]	[−0.51]	[0.18]
EAFREQ	−0.013	−0.004	−0.023	−0.002
	[−7.17]***	[−3.86]***	[−4.45]***	[−3.94]***
Δ*EAFREQ*	0.001	−0.000	−0.007	0.000
	[1.55]	[−0.07]	[−2.56]**	[1.55]
Observations	115,113	111,092	38,739	39,536
Adjusted *R*-squared	0.514	0.260	0.336	0.152
Coefficient sums:				
AFTER+Δ*AFTER*	−0.073	−0.070	−0.206	−0.001
	[−11.39]***	[−11.14]***	[−10.81]***	[−0.47]
FRIDAY+Δ*FRIDAY*	−0.007	0.000	0.148	0.000
	[−0.71]	[−0.02]	[5.12]***	[−0.16]
EAFREQ+Δ*EAFREQ*	−0.012	−0.004	−0.030	−0.002
	[−7.65]***	[−4.70]***	[−7.62]***	[−3.84]***

variables (e.g. $\beta_1+\beta_2$) in each regression to capture whether overall attention is lower during the predicted times. For example, $(\beta_1+\beta_2)<0$ indicates that firms that switch to after-hours still obtain less attention than if they reported before hours, even if $\beta_2>0$ unto itself.

Table 4 presents results of estimating Eq. (5). In column 1 for *NEWSCOUNT,* the coefficient on *AFTER* is still significantly negative, which (like the results in Table 3) is consistent with reduced attention for after-hours announcements. More to the point in linking H1 and H2, the coefficient sum of *AFTER*+Δ*AFTER* is significantly negative, which is consistent with the notion that *even those firms that switch into after-hours timing* receive less attention than if they had reported earlier in the day. Said differently, the results indicate that the act of switching does not generate excess attention that offsets the lower attention firms otherwise receive when reporting after hours. Similarly, the coefficient sum of *EAFREQ* and Δ*EAFREQ* is significantly negative, indicating that firms switching to busier days attract less attention than if they had reported on a slow day. The individual and summed coefficients for *FRIDAY* and Δ*FRIDAY* are insignificant, suggesting that firms switching to Fridays receive no different attention than if they had reported other days of the week. The results for *ANALYST_SPD, EDGAR*, and *GOOGHITS* in columns 2–4 are largely the same as those for *NEWSCOUNT*. Again, the overall results are consistent with attention being lower after hours and on busy days, both for switching firms and non-switching firms. However, Friday announcers receive no different or even higher attention, depending on the model specification.

4.3. Analysis of H3—strategic timing of earnings news

H3 posits that managers will strategically time the release of earnings news in an attempt to hide bad news or highlight good news. We use unexpected earnings (*UE*) to proxy for good versus bad news.[28] As shown in Panel B of Table 1, average *UE* is −0.001, or −0.1% of price.

Our hypothesis is that managers strategically choose the timing of the EA based on the earnings news, which could be tested by regressing *TIMING* on *UE* and control variables. A concern with such an analysis is that *AFTER, FRIDAY,* and *EAFREQ* are not chosen in isolation from one another, as would be implied by estimating separate models. Rather, Chen and Mohan (1994) find evidence to suggest that managers choose these timing variables simultaneously; for example, by releasing bad news after hours *and* on a busy day. In order to consider these timing choices simultaneously, our tests involve OLS "reverse

[28] Results are substantially unchanged if an unscaled version of *UE* is used. As tabulated in the Internet Appendix, Table IA.3, results are also similar if a dichotomous measure of meeting/beating analyst forecast is used. We do not use abnormal returns as a measure of news because returns are potentially endogenous to EA timing.

regressions" in which *UE* is the dependent variable and *AFTER*, *FRIDAY*, and *EAFREQ* are included as independent variables:[29]

$$UE = \beta_0 + \beta_1 AFTER + \beta_2 FRIDAY + \beta_3 EAFREQ + \sum \beta_k CONTROLS + \sum \beta_k YEAR + \sum \beta_k FIRM + \varepsilon, \tag{6}$$

All variables are as previously defined. Standard errors are again clustered by EA date.[30] If managers strategically time lower (higher) *UE* to be released after hours, on Fridays, and on busy days (and vice versa), we expect the coefficients β_{ii} through β_3 to be negative.

We also estimate a changes version of Eq. (6) to link H1 and H3, i.e., that changes in EA timing, as predicted in H1, are associated with changes in earnings news, as predicted in H3. The changes specification is the same as the levels specification in eq. (6) except that: (i) firm fixed effects are excluded because stationary firm characteristics are eliminated in the first-differenced variables; and (ii) standard errors are now clustered by both EA date and firm because, if the idiosyncratic errors from a levels model are serially uncorrelated, then first-differencing will induce serially correlated residuals (see Wooldridge, 2002, p. 283).

We report the results of estimating Eq. (6) in Table 5. The first (second) column reports the results using a levels (changes) form. We find that, across both the levels and changes specifications, the coefficients on *AFTER*, *FRIDAY* and *EAFREQ* are significantly negative. As compared to the unconditional average *UE* of -0.001, the negative *AFTER* coefficient of -0.0007 in column 1 of Panel C indicates that *UE* tend to be $(-0.0007/-0.001=)$ 70% worse after hours than average. The negative *FRIDAY* coefficient of -0.0019 indicates that *UE* tend to be $(-0.0019/-0.001=)$ 190% worse on Fridays, and the negative *EAFREQ* coefficient of -0.0001 indicates that *UE* decrease by $(-0.0001/-0.001=)$ 10% for each one-decile increase in *EAFREQ*.

The negative results for *AFTER* and *EAFREQ* are consistent with condition 3—that earnings news tends to be worse during periods of lower market attention. The negative signs on *FRIDAY*, indicating that worse news is reported on Fridays, are somewhat unexpected since we found the attention to be no different or even higher on Friday than Monday through Thursday. A likely explanation for this finding is that managers *perceive* attention to be lower on Fridays, but in fact, market participants exhibit no lower attention on Fridays than other days of the week. In summary, we believe that our finding that attention is higher on Fridays, even though earnings news is more negative on Fridays is an important contribution as it suggests that managers' ex ante perceptions of market attention can be different than ex post realizations.

4.4. Highlighting good news—further analysis

In this section, we more directly test the idea that managers *highlight* good news. The test follows the changes form of Eq. (6), except that we now separately identify the timing changes to hide bad news (i.e., going from periods of perceived high attention to periods of perceived low attention) from the timing changes to highlight good news (i.e., going from periods of perceived low attention to periods of perceived high attention). Specifically, we create binary variables, Δ*TIMING_HIDE*, that are equal to one when the firm switches to after hours from before hours, to Friday from Monday–Thursday, or to a busier day from a slower day. Similar, we create binary variables, Δ*TIMING_HIGHLIGHT*, that are equal to one when the firm switches from after to before hours, from Friday to Monday–Thursday, or from busier to slower days. We expect that the coefficients on Δ*TIMING_HIDE* to be negative if managers switch from perceived high to low attention to hide bad news. We expect the coefficients on Δ*TIMING_HIGHLIGHT* to be positive if managers switch from perceived low to high attention to highlight good news.

Regression results are reported in Table 6 and the evidence is consistent with highlighting good news, as well as with hiding bad earnings news. Specifically, the coefficients on Δ*AFTER_HIGHLIGHT*, Δ*FRIDAY_HIGHLIGHT*, and Δ*EAFREQ_HIGHLIGHT* are positive and significant, while the coefficients on Δ*AFTER_HIDE*, Δ*FRIDAY_HIDE*, and Δ*EAFREQ_HIDE* are negative. This evidence is the first in the literature to separate out the idea that managers highlight good news.

5. Analysis of EA scheduling announcements

5.1. Earnings announcement scheduling lead-time strategy

Managers likely consider numerous strategies in determining how and when to report their earnings. Thus far we have focused on EA timing choices, but another plausible way to reduce (increase) attention to earnings news is to decrease (increase) the amount of advance warning provided before the EA. In this section, we investigate whether EA timing "lead-times" are associated with attention and *UE*.[31]

[29] For robustness, Table IA.13 of the Internet Appendix tabulates separate logit regressions of *AFTER*, *FRIDAY*, and *EAFREQ* on *UE* and control variables. The *UE* coefficient is negative in all cases, which is consistent with the results of our "reverse regressions" that bad news tends to be reported after hours, on Fridays, and on busy days (and vice-versa). Table IA.11 also presents univariate analysis of only quarters in which there is a change in *TIMING*. Again, the results are largely consistent with those reported below.

[30] Estimating standard errors clustered by both EA date and firm produce similar results. See Table IA.3.

[31] Another possible strategy would be to delay bad news EAs in the hopes of being able to bundle the bad news with offsetting good news (Kothari et al., 2009). Analysis in Table IA.14 of the Internet Appendix provides little evidence of a strategy that bundles earnings news and management forecasts, or of a significant interaction between earnings news, manager forecast news, and *TIMING* choices.

Table 5
Analysis of H3—differences in timing and earnings news—"reverse regressions".

OLS Model: $UE=\beta_0+\beta_1 AFTER+\beta_2 FRIDAY+\beta_3 EAFREQ+\Sigma\beta_k CONTROLS+\Sigma\beta_k YEAR+\Sigma\beta_k FIRM+\varepsilon$

TIMING is one of *AFTER, FRIDAY*, or *EAFREQ. AFTER* is a binary variable equal to one for EAs from 4 pm to midnight. *FRIDAY* is a binary variable equal to one for EAs on Friday. *EAFREQ* is the decile of the number of EAs that happen on day *t. UE* is actual EPS less analyst consensus as per IBES, scaled by end of quarter price. *FIRM* are firm fixed effects. *YEAR* are year fixed effects. *CONTROLS* are listed below and detailed in Appendix A. Standard errors are clustered by EA date. *** Indicates significance at 1%; ** at 5%; and * at 10%, two-tailed. The table also contains a changes specification of the model. The changes specification is the same as the levels specification except that: (i) firm fixed effects are excluded; and (ii) standard errors are clustered by both date and firm.

VARIABLES	Levels specification *UE*	Changes specification (first difference) ΔUE
AFTER	−0.0007	−0.0008
	[−4.20]***	[−2.79]***
FRIDAY	−0.0019	−0.0015
	[−5.91]***	[−4.53]***
EAFREQ	−0.0001	−0.0001
	[−5.39]***	[−3.58]***
SIZE	0.0008	0.0016
	[4.96]***	[2.68]***
BTM	−0.0050	0.0018
	[−12.86]***	[1.77]*
LEV	−0.0057	−0.0182
	[−9.70]***	[−7.99]***
NUMEST	−0.0003	−0.0002
	[−2.66]***	[−0.87]
FQ4	0.0007	−0.0000
	[4.23]***	[−0.19]
REPLAG	0.0223	0.0164
	[7.81]***	[5.95]***
REPLAG_ SQ	−0.0038	−0.0028
	[−8.85]***	[−6.67]***
INSTOWN	−0.0009	−0.0026
	[−1.92]*	[−1.85]*
Observations	120,165	115,113
Adjusted *R*-squared	0.1351	0.0059

First, we augment eq. (4) by regressing the *ATTN* variables on the timing variables and on a lead-time variable, *LEAD_TIME*, computed as the logged lead-time (in days) between the scheduling date and EA date. An estimated coefficient on $LEAD\_TIME > 0$ would indicate the decreases (increases) in scheduling lead-time is associated with less (more) attention. Columns (1)–(4) of Table 7 report the results of this test. The coefficient estimates for *AFTER, FRIDAY,* and *EAFREQ* are largely unchanged from the previous analysis. The coefficient for *LEAD_TIME* is significantly positive for *ANALYST_SPD* and *EDGAR*, which is consistent with earnings news receiving less (more) attention when less (more) advance warning is provided.

Second, we examine whether the content of the earnings news varies with lead-time. Panel B of Fig. 3 plots average *UE* depending on how many days' lead-time is provided, and shows a pattern that shorter lead-times are associated with more negative earnings surprises.[32] The results in column (5) of Table 7 report the results of a regression of *UE* on *LEAD_TIME*. The model and controls are the same as the levels regression in Table 4, except that *LEAD_TIME* is now also included. The coefficients on *AFTER, FRIDAY*, and *EAFREQ* are similar to those in Table 4, except that the *AFTER* coefficient is no longer significant in this smaller sample. The positive *LEAD_TIME* coefficient is consistent with managers providing shorter lead-times for bad news. Overall, the data are generally consistent with a relation between the scheduled lead-time and both market attention and earnings news.

5.2. Returns to scheduling announcements

In this section, we investigate whether investors respond negatively (positively) to expected bad (good) news at the time when a firm schedules its EA for after hours, on Friday, or for a busy day (or vice versa). Table 8 tabulates results of regressing abnormal returns from around the EA scheduling date on *AFTER, FRIDAY,* and *EAFREQ*. We include our usual firm controls, firm fixed effects, and year fixed effects (i.e., as in Table 4). Where available, we also control for whether the firm's scheduled EA date is before or after the announcement date previously predicted by Wall Street Horizon (binary variable *DELAY*) as well as the number of days between the scheduled announcement date and the previous tentative date (continuous variable *DELAY_AMOUNT*). *DELAY* and *DELAY_AMOUNT* are included to control for whether the firm's scheduled EA date represents a delay or acceleration from the market's expected date, which is known to be an indicator of bad or good

[32] The plot of average *UE* in Fig. 3 is smoothed using a Gaussian kernel function in order to reduce the effects of outliers on days when very few firms schedule earnings (e.g., days 42–49).

Table 6
Further analysis of H3—highlighting good news.

The analysis below repeats the changes OLS model from Table 5, but separately identifies changes to hide bad news versus changes to highlight good news:

$\Delta UE=\beta_0+\beta_1\Delta AFTER\_HIDE+\beta_3\Delta AFTER\_HIGHLIGHT+\beta_3\Delta FRIDAY\_HIDE+\beta_4\Delta FRIDAY\_HIGHLIGHT+\beta_5\Delta EAFREQ\_HIDE$
$+\beta_6\Delta EAFREQ\_HIGHLIGHT+\Sigma\beta_k\Delta CONTROLS+\Sigma\beta_k YEAR+\varepsilon$

Δ*AFTER_HIDE* is a binary variable equal to one for firms that switch from before hours in the prior quarter to after hours in the current quarter. Δ*AFTER_HIGHLIGHT* is a binary variable equal to one for firms that switch from after hours to before hours. Δ*FRIDAY_HIDE* is a binary variable for firms that switch from Monday–Thursday to Friday, and Δ*FRIDAY_HIGHLIGHT* is a binary for firms that switch from Friday to Monday–Thursday. Δ*EAFREQ_HIDE* is a binary for firms that increase in *EAFREQ* by more than two deciles from the prior quarter. Δ*EAFREQ_HIGHLIGHT* is a binary for firms that decrease in *EAFREQ* by more than two deciles. *CONTROLS* are the same as in Table 5 and are untabulated for brevity. Standard errors are clustered by EA date and by firm. The bottom rows present differences in the absolute value of the Δ*TIMING_HIDE* and Δ*TIMING_HIGHLIGHT* coefficient estimates. *** Indicates significance at 1%; ** at 5%; and * at 10%.

VARIABLES	(1) ΔUE
Δ*AFTER_HIDE* (binary = 1 if change to after from before close; i.e., high to low attention)	−0.0008
	[−2.29]**
Δ*AFTER_HIGHLIGHT* (binary = 1 if change from after to before close; i.e., from low to high attention)	0.0007
	[2.03]**
Δ*FRIDAY_HIDE* (binary = 1 if change to Friday from Monday–Thursday; i.e., from high to low attention)	−0.0016
	[−3.87]***
Δ*FRIDAY_HIGHLIGHT* (binary = 1 if change from Friday–Monday–Thursday; i.e., from low to high attention)	0.0012
	[3.14]***
Δ*EAFREQ_HIDE* (binary = 1 if change to busy day from slow day; i.e., high to low attention)	−0.0004
	[−2.40]**
Δ*EAFREQ_HIGHLIGHT* (binary = 1 if change from busy to slow day; i.e., low to high attention)	0.0005
	[2.71]***
Observations	115,113
Adjusted *R*-squared	0.0058
Coefficient sums	
Difference in absolute value of *AFTER_CHG*	−0.0001
	[-0.20]
Difference in absolute value of *FRIDAY_CHG*	−0.0004
	[-1.03]
Difference in absolute value of *EAFREQ_CHG*	0.0001
	[0.31]

Table 7
Attention and scheduling lead-time.

OLS model: $ATTN\ or\ UE=\beta_0+\beta_1 AFTER+\beta_2 FRIDAY+\beta_3 EAFREQ+\beta_4 LEAD\_TIME+\Sigma\beta_k CONTROLS+\Sigma\beta_k YEAR+\Sigma\beta_k FIRM+\varepsilon$.

ATTN is *NEWSCOUNT*, *ANALYST_SPD*, *EDGAR*, or *GOOGHITS* in columns 1–4, respectively. *AFTER* is a binary variable equal to one for EAs from 4 pm to midnight. *FRIDAY* is a binary variable equal to one for EAs on Friday. *EAFREQ* is the decile of the number of EAs that happen on day *t*. *LEAD_TIME* is the logged number of days between the date on which the firm schedules the EA and the actual EA date. *FIRM* are firm fixed effects. *YEAR* are year fixed effects. *CONTROLS* are the same as those in Tables 3 and 4, as noted at the bottom of each column. Standard errors are clustered by EA date. *** Indicates significance at 1%; ** at 5%; and * at 10%, two-tailed.

VARIABLES	(1) *NEWSCOUNT*	(2) *ANALYST_SPD*	(3) *EDGAR*	(4) *GOOGHITS*	(5) *UE*
AFTER	−0.082	−0.092	−0.187	−0.002	−0.0005
	[−9.04]***	[−10.20]***	[−8.81]***	[−0.51]	[−1.44]
FRIDAY	−0.003	−0.015	0.190	0.005	−0.0010
	[−0.26]	[−1.20]	[6.13]***	[1.15]	[−1.96]**
EAFREQ	−0.008	−0.006	−0.030	−0.002	−0.0001
	[−7.16]***	[−5.31]***	[−7.64]***	[−3.27]***	[−3.33]***
LEAD_TIME	−0.002	0.006	0.030	−0.002	0.0007
	[−0.55]	[1.84]*	[3.48]***	[−1.24]	[6.03]***
Observations	54,946	54,131	34,941	27,088	54,946
Adjusted *R*-squared	0.612	0.303	0.338	0.177	0.1610
Year and firm FE	Yes	Yes	Yes	Yes	Yes
Controls: Same as	Table 3	Table 3	Table 3	Table 3	Table 4

news, respectively (So, 2014).[33] We also control for the scheduling lead-time and include an indicator for whether the scheduling took place after quarter-end. Standard errors are clustered by scheduling date.

[33] Wall Street Horizon maintains a two-year calendar of predicted EA dates. Dates that are predicted by Wall Street Horizon's algorithm are labeled as "tentative." We employ Wall Street Horizon's "tentative" date as a proxy for the market's expectation for earnings schedule timing. Our *DELAY* proxies are likely imprecise to the extent that Wall Street Horizon's expectations are not representative of average market expectations.

Table 8
Returns around earnings announcement scheduling dates.

OLS model: $CAR = \beta_0 + \beta_1 AFTER + \beta_2 FRIDAY + \beta_3 EAFREQ + \Sigma\beta_k CONTROLS + \Sigma\beta_k YEAR + \Sigma\beta_k FIRM + \varepsilon$.

CAR is cumulative abnormal return in the three-day period around the EA scheduling announcement (in columns (1) and (2)) or cumulative abnormal return from one day before the scheduling announcement through one day before the actual EA (in columns (3) and (4)). *AFTER* is a binary variable equal to one for EAs from 4 pm to midnight. *FRIDAY* is a binary variable equal to one for EAs on Friday. *EAFREQ* is the decile of the number of EAs that happen on day *t*. *FIRM* are firm fixed effects. *YEAR* are year fixed effects. *CONTROLS* are listed below and detailed in Appendix A. Standard errors are clustered by scheduling date. *** Indicates significance at 1%; ** at 5%; and * at 10%, two-tailed. Columns (1) and (2) include all observations. Columns (3) and (4) only include scheduling announcements that occur after quarter-end.

VARIABLES	(1) 3-Day CAR around scheduling	(2) 3-Day CAR around scheduling	(3) CAR through (EADATE−1)	(4) CAR through (EADATE−1)
	All observations	Scheduled after quarter-end	All observations	Scheduled after quarter-end
AFTER	0.0003	−0.0001	−0.0030	−0.0033
	[0.30]	[−0.11]	[−1.80]*	[−1.98]**
FRIDAY	−0.0028	−0.0037	−0.0041	−0.0052
	[−2.41]**	[−2.93]***	[−2.05]**	[−2.51]**
EAFREQ	−0.0001	−0.0002	−0.0004	−0.0006
	[−0.99]	[−1.17]	[−2.02]**	[−2.41]**
DELAY	−0.0001	0.0000	−0.0018	−0.0022
	[−0.12]	[0.00]	[−1.38]	[−1.61]
DELAY_AMOUNT	−0.0001	−0.0001	−0.0004	−0.0004
	[−0.85]	[−1.00]	[−2.60]***	[−2.13]**
LEAD TIME	−0.0001	−0.0002	0.0008	0.0009
	[−0.12]	[−0.39]	[0.99]	[1.15]
AFTER QE	0.0003	n/a	0.0047	n/a
	[0.31]		[2.09]**	
SIZE	−0.0038	−0.0049	−0.0215	−0.0219
	[−3.81]***	[−4.69]***	[−10.83]***	[−10.73]***
BTM	0.0038	0.0050	0.0100	0.0111
	[2.70]***	[3.40]***	[3.33]***	[3.54]***
LEV	0.0019	0.0004	0.0068	0.0042
	[0.61]	[0.12]	[1.20]	[0.71]
NUMEST	−0.0022	−0.0016	−0.0025	−0.0018
	[−2.84]***	[−1.97]**	[−1.93]*	[−1.32]
FQ4	0.0019	0.0019	0.0042	0.0050
	[2.16]**	[2.05]**	[2.55]**	[2.91]***
INSTOWN	−0.0058	−0.0040	−0.0120	−0.0103
	[−1.94]*	[−1.27]	[−2.27]**	[−1.84]*
REPLAG	0.0029	0.0049	−0.0160	−0.0111
	[0.21]	[0.30]	[−0.63]	[−0.40]
REPLAG_SQ	−0.0010	−0.0014	0.0013	0.0003
	[−0.53]	[−0.59]	[0.36]	[0.08]
Observations	54,946	48,283	54,946	48,283
Adjusted *R*-squared	0.020	0.020	0.024	0.024

Column (1) of Table 8 has three-day abnormal returns around the scheduling date as the dependent variable, calculated as the firm's buy-and-hold return less the value-weighted market return. The *FRIDAY* coefficient is significantly negative, and is consistent with a 28 basis point negative return upon the scheduling of an EA for a Friday. The results for *AFTER* and *EAFREQ* are insignificant. Column (2) is similar to (1) but only includes scheduling announcements that occur after quarter-end, a setting in which the manager likely has a more precise estimate of the earnings news at the point of the scheduling—the results are qualitatively unchanged. Thus, market participants appear to infer that EAs scheduled for Fridays tend to contain negative news, but not so for announcements scheduled for after hours or on busy days.

In columns (3) and (4), we calculate long-window abnormal returns starting one day before the scheduling date and ending one day before the EA. Here, the scheduling returns are negative for all three timing variables, *AFTER*, *FRIDAY*, and *EAFREQ*, which is consistent with either investors gradually inferring negative news from the scheduled EA date/time, or with investors learning about the negative news from other sources prior to the EA. Overall, we interpret these results as further corroboration that announcements after hours, on Fridays, and on busy days tend to contain negative news, and vice versa.

6. Conclusion

We posit and test three conditions that are necessary to support the theory that managers strategically time EAs to hide bad news or highlight good news: (i) managers must change their EA timing frequently enough that to do so would not attract unwanted attention; (ii) there must be ex-ante predictable variation in market attention; and (iii) earnings news must be worse (better) during periods of expected lower (higher) market attention. Our findings support condition 1—firms frequently change the timing of their EAs between days of the week, before and after hours, and on busy versus slow reporting days. We find evidence to both support and contradict condition 2; that is, our results are consistent with attention being lower after hours and on busy days, but not on Fridays. With regards to condition 3, we provide new evidence that earnings news indeed tends to be worse (better) during periods of expected low (high) attention. In our final analysis, we find that shortening the advance notice of a forthcoming EA both results in lower attention and is indicative of worse earnings news, and we also find that equity investors respond negatively to the announcement that an EA will take place on a Friday.

Collectively, our results shine new light on the long-standing question: do managers "hide" bad earnings news by announcing during periods of low market attention? And similarly, do managers "highlight" good news by announcing during periods of higher market attention? In short, our evidence is consistent with managers taking advantage of low (high) attention after hours and on busy days (before close of trading and on slower days) to release unfavorable (favorable) earnings news. However, given that attention is the same or higher on Fridays than other days, it is unlikely that managers are able to effectively hide bad news by reporting immediately prior to the weekend. Instead, the preponderance of bad news on Fridays is possibly due to managers incorrectly perceiving attention as lower on Friday.

Appendix A. Variable definitions

All continuous variables are winsorized at 1% and 99%.

Variable	Definition
AFTER	Indicator for earnings announcements after 4 pm.
AFTER_QE	Indicator variable if the firm's EA scheduling date is after quarter-end.
ANALYST_SPD	The inverse of the logged average number of days it takes analysts to update their future forecasts following the EAs. See Section 4.2.1 for further discussion.
ATTN	The set of proxies for attention: *NEWSCOUNT, ANALYST_SPD, EDGAR, GOOGHITS*.
BTM	Book to market, calculated as total common stockholders' equity divided by market value of equity.
CAR	Two-day cumulative abnormal returns around the EA date. Days (0, +1) for earnings released prior to the ending of regular trading. Days (+1, +2) for earnings released after regular trading hours. The market adjustment is based on the value-weighted return per CRSP.
CAR_NEG	Indicator for $CAR < 0$.
CAR_NEG_INT	Interaction of *CAR***CAR_NEG*.
DELAY	Indicator if the verified EA date is a delay from the date predicted by Wall Street Horizon.
DELAY_AMOUNT	Difference between the firm's verified EA date and the date predicted by Wall Street Horizon.
EAFREQ	The decile rank of the frequency of EAs per day, calculated across all of Compustat. Deciles are formed within sample by calendar year.
EDGAR	Abnormal EDGAR 8-K downloads over the two-day period around the EA (days 0,1). See Section 4.2.1 for further discussion.
FIRM	The set of firm fixed effects.
FQ4	Indicator variable for the firm's fourth fiscal quarter.
FRIDAY	Indicator for EAs on Friday.
GOOGHITS	Abnormal Google search volume in the two weeks surrounding the EA (weeks 0,1). See Section 4.2.1 for further discussion.
INSTOWN	Institutional ownership. Calculated as the sum of institutional shares as per Thomson Reuter's 13F database, scaled by shares outstanding at quarter-end per CRSP.
LEAD_TIME	Number of days between the EA scheduling date and actual EA date. Logged in regressions.
LEV	Leverage, calculated as total debt over total assets.
LOSS	Indicator for firms with negative earnings, as reported by IBES.
NEWSCOUNT	The log of the number of earnings-specific news articles from RavenPack falling within a 24-hour period starting with the EA. See Section 4.2.1 for further discussion.
NUMEST	The natural log of the number of analysts contributing to the most recent analyst forecast consensus available in IBES prior to the EA.
REPLAG	The log of the number of days between fiscal period-end and the EA date.
REPLAG_SQ	REPLAG squared.
SIZE	The natural log of market value of equity at the end of the period.
TIMING	The set of EA time categories: AFTER, FRIDAY, EAFREQ.
UE	Unexpected earnings, calculated as actual quarterly EPS per IBES less the most recent analyst forecast consensus per IBES, scaled by period-end stock price per Compustat. Consensus forecasts released more than 100 days before the EA are eliminated.
UE_DEC	Decile rank of UE, calculated by year.
UE_NEG	Indicator for $UE < 0$.
UE_NEG_INT	Interaction of UE*UE_NEG.
YEAR	The set of calendar year fixed effects.
Δ*AFTER_HIDE*	Indicator if the EA time switches from before to after hours.
Δ*AFTER_HIGHLIGHT*	Indicator if the EA time switches from after to before hours.
Δ*EAFREQ_HIDE*	Indicator if the EA time increases by more than two deciles in EAFREQ.
Δ*EAFREQ_HIGHLIGHT*	Indicator if the EA time decreases by more than two deciles in EAFREQ.
Δ*FRIDAY_HIDE*	Indicator if the EA time switches from Monday–Thursday to Friday.
Δ*FRIDAY_HIGHLIGHT*	Indicator if the EA time switches from Friday to Monday–Thursday.

Appendix B. Supplementary Information

Supplementary data associated with this article can be found in the online version at http://dx.doi.org/10.1016/j.jacceco.2015.03.003.

References

Bagnoli, M., Kross, W., Watts, S.G., 2002. The information in management's expected earnings report date: a day late, a penny short. Journal of Accounting Research 40 (5), 1275–1296.
Barber, B.M., 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.
Begley, J., Fischer, P.E., 1998. Is there information in an earnings announcement delay? Review of Accounting Studies 3 (4), 347–363.
Blankespoor, E., deHaan E., 2015. CEO Visibility: Are Media Stars Born or Made? Working Paper.
Bowen, R.M., Johnson, M.F., Shevlin, T., Shores, D., 1992. Determinants of the timing of quarterly earnings announcements. Journal of Accounting, Auditing & Finance 7 (4), 395–422.
Chambers, A.E., Penman, S.H., 1984. Timeliness of reporting and the stock price reaction to earnings announcements. Journal of Accounting Research 22 (1), 21–47.
Chemmanur, T., Yan, A., 2009. Advertising, attention, and stock returns. SSRN eLibrary.
Chen, C.R., Mohan, N.J., 1994. Timing the disclosure of information: management's view of earnings announcements. Financial Management, 63–69.
Da, Z., Engelberg, J., Gao, P., 2011. In search of attention. The Journal of Finance 66 (5), 1461–1499.
Damodaran, A., 1989. The weekend effect in information releases: a study of earnings and dividend announcements. Review of Financial Studies 2 (4), 607–623.
DellaVigna, S., Pollet, J.M., 2009. Investor inattention and Friday earnings announcements. The Journal of Finance 64 (2), 709–749.
Donelson, D.C., McInnis, J., Mergenthaler, R.D., Yu, Y., 2012. The timeliness of bad earnings news and litigation risk. The Accounting Review 87 (6), 1967–1991.
Doyle, J.T., Magilke, M.J., 2009. The timing of earnings announcements: an examination of the strategic disclosure hypothesis. Accounting Review 84 (1), 157–182.
Drake, M., Jennings, J., Roulstone, D., Thornock, J., 2013. The mechanisms of information transfer. Available at SSRN 2157727.
Drake, M.S., Guest, N.M., Twedt, B., 2014. The media and mispricing: the role of the business press in the pricing of accounting information. The Accounting Review 89 (5), 1673–1701.
Drake, M.S., Roulstone, D.T., Thornock, J.R., 2012. Investor information demand: evidence from google searches around earnings announcements. Journal of Accounting Research 50 (4), 1001–1040.
Drake, M.S., Roulstone, D.T., Thornock, J.R., 2015. The determinants and consequences of information acquisition via EDGAR. Contemporary Accounting Research. http://dx.doi.org/10.11/1911-3846.12119, in press.
Duarte-Silva, T., Fu, H., Noe, C.F., Ramesh, K., 2013. How do investors interpret announcements of earnings delays? Journal of Applied Corporate Finance 25 (1), 64–71.
Falato, A., Li, D., Milbourn, T., 2013. CEO Pay and the Market for CEOs. Working Paper.
Farrell, K.A., Whidbee, D.A., 2002. Monitoring by the financial press and forced CEO turnover. Journal of Banking & Finance 26 (12), 2249–2276.
Financial Executives Research Foundation, 2013. The Last Mile of Finance – How Organizations are Performing Record to Report. Morristown, NJ.
Graham, J.R., Harvey, C.R., Rajgopal, S., 2005. The economic implications of corporate financial reporting. Journal of Accounting and Economics 40 (1–3), 3–73.
Hirshleifer, D., Lim, S.S., Teoh, S.H., 2009. Driven to distraction: extraneous events and underreaction to earnings news. The Journal of Finance 64 (5), 2289–2325.
Huberman, G., Regev, T., 2001. Contagious speculation and a cure for cancer: a nonevent that made stock prices soar. The Journal of Finance 56 (1), 387–396.
Kothari, S.P., 2001. Capital markets research in accounting. Journal of Accounting and Economics 31 (1–3), 105–231.
Kothari, S.P., Shu, S., Wysocki, P., 2009. Do managers withhold bad news? Journal of Accounting Research 47 (1), 241–276.
KPMG, 2012. The Last Mile of Finance: Building Tranformation Momentum with Technology.
Kross, W., 1981. Earnings and announcement time lags. Journal of Business Research 9 (3), 267–281.
Kross, W., Schroeder, D.A., 1984. An empirical investigation of the effect of quarterly earnings announcement timing on stock returns. Journal of Accounting Research 22 (1), 153–176.
Lambert, R.A., 2003. Discussion of 'limited attention, information disclosure, and financial reporting'. Journal of Accounting and Economics 36 (1), 387–400.
Li, E.X., Ramesh, K., Shen, M., 2011. The role of newswires in screening and disseminating value-relevant information in periodic SEC reports. The Accounting Review 86, 669.
Lim, S.S., Teoh, S.H., 2010. Limited Attention. Behavioral Finance: Investors, Corporations, and Markets. John Wiley.
Malmendier, U., Tate, G., 2009. Superstar CEOs. The Quarterly Journal of Economics 124 (4), 1593–1638.
Melessa, S., 2012. Monthly Employment Reports and the Pricing of Firm-level News. Working Paper. University of Iowa.
Milbourn, T.T., 2003. CEO reputation and stock-based compensation. Journal of Financial Economics 68 (2), 233–262.
Patell, J.M., Wolfson, M.A., 1982. Good news, bad news, and the intraday timing of corporate disclosures. Accounting Review, 509–527.
Rajgopal, S., Shevlin, T., Zamora, V., 2006. CEOs' outside employment opportunities and the lack of relative performance evaluation in compensation contracts. Journal of Finance 61 (4), 1813–1844.
Skinner, D.J., 1994. Why firms voluntarily disclose bad news. Journal of Accounting Research 32 (1), 38–60.
Skinner, D.J., 1997. Earnings disclosures and stockholder lawsuits. Journal of Accounting and Economics 23 (3), 249–282.
So, E.C., 2014. Time Will Tell: Information in the Timing of Scheduled Releases. Working Paper.
Wooldridge, J., 2002. In: Econometric analysis of cross section and panel dataThe MIT Press, Cambridge, Massachusetts.
Zhang, Y., 2008. Analyst responsiveness and the post-earnings-announcement drift. Journal of Accounting and Economics 46 (1), 201–215.