 Aggregate Market Attention around Earnings Announcements

William M. Cready and Abdullah Kumas*

April 2014

ABSTRACT:
This study examined the relation between the volume of earnings disclosures by firms and aggregate stock market trading activity. Although the relation between the trading activity experienced by disclosing firms and announcement volume is negative, consistent with the firm level evidence of Hirschleifer et al. (2009a), the relations between number of announcements and both overall trading and non-announcer volume are positive. Hence, while it is true that high numbers of announcement distract investor attention within the set of announcing firms, it is also true that investor attention to the market as a whole (i.e., aggregate attention) increases with number of announcements. Results also showed that the average aggregate surprise content of the announced earnings has a negative impact on overall volume. Finally, the strong positive relation between aggregate attention and number of announcements is mainly driven by large announcers.

JEL classification: G02 and G14

Keywords: Earnings Announcement, Attention Hypothesis, Information Transfer Hypothesis and Trading Volume

* Cready is from the Naveen Jindal School of Management, University of Texas at Dallas, 800 West Campbell Rd. Richardson/TX 75080; Email Cready: cready@utdallas.edu; Kumas is from the Robins School of Business, University of Richmond, 28 Westhampton Way, Richmond VA 23173; Email: akumas@richmond.edu. We would like to express our thanks to Ashiq Ali, Rebecca Files, Umit Gurun, Todd Kravet, Bin Li and Suresh Radhakrishnan for their insightful comments. We also want to acknowledge comments from seminar participants at the University of Texas at Dallas, University of Richmond, and AAA-SW 2014 conference.
1. Introduction

One of the strongest indicators of the beginning of the 1982 bull market was a spectacular rise in trading activity that started in August of 1982. Volume nearly doubled, rising from an average of roughly 50M shares per day during the first 7 months of 1982 to an average of over 90M shares over the last 4 months of the year. That is, attention to the aggregate market as reflected by trading activity was an important factor in this aggregate market phenomenon. Financial press, consistent with this phenomenon, reported numbers not only regarding daily price indexes, but also for aggregate market attention, presumably to portray a more complete picture of the overall stock market. The following Wall Street Journal article on June 17, 2012 typifies news citing aggregate investor attention as one of the most important elements in assessing the market performance:

And worries centered on Greece and Spain are reverberating around the world, sapping trading volumes. Last week saw the lowest average weekly NYSE composite volume in more than a year.... For the second quarter, average daily shares traded on the NYSE and Nasdaq Stock Market are down 1% and 10%, respectively, compared with the same period a year earlier, says Credit Suisse research.1

In this paper we provide some initial evidence on the relationship between earnings news and market attention as reflected by aggregate trading activity. We specifically examine how the number and magnitude of earnings announcements arriving at the market on a daily basis impact the aggregate market trading activity levels. While there is fairly extensive literature on the relationship between trading volume and earnings at the firm level, this analysis is the first to examine how these effects show up in terms of aggregate market volume. The main focus of this analysis is to determine how the number of announcements impacts trading activity in the group

1 The full article is available at: http://online.wsj.com/article/SB10001424052702303703004577472602453266894.html
of both announcing and non-announcing firms. Specifically, it seeks to determine the degree to which the quantity of earnings news impacts investor attention to the market as a whole.

A recent firm level analysis by Hirschleifer et al. (2009a) identified an offsetting attention effect in market responses to earnings news within only the subset of announcing firms. They found that the magnitudes of both price and volume responses to earnings decrease with the number of coincident earnings announcements, predicting an average negative relationship for announcers. With respect to the non-announcing firms, one possibility is that heavy announcement activity also distracts investor attention from non-announcing firms, consistent with the distraction effect on announcing firms documented by Hirschleifer et al. (2009a). A high number of announcement activities therefore leads to lower investor attention measured as the aggregate trading volume. Although one can assume that the firm level evidence should “add up” and lead to an overall negative relationship at the aggregate market level (i.e., both the announcers and non-announcers), there are couple of reasons why such an “add up” effect can be viewed as an unsettled question.

First, analyses by Kothari et al. (2006) and Cready and Gurun (2010) find that such “add up” effects are not present at the aggregate returns. That is, for example, the average positive earnings surprises on a day do not add up to the positive aggregate market movements despite the presence of a strong positive relationship between return and earnings surprises at the firm level. Second and most importantly, earnings news conveys information pertinent to the aggregate market. This has been extensively documented by earlier information transfer literature (Bowen et al., 1983; Cready & Gurun, 2010; Erwin & Miller, 1998; Foster, 1981; Gleason et al., 2008; Lang & Stulz, 1992). From this perspective, heavy earnings announcement activity days convey more aggregate earnings information to market participants and
consequently increase investor attention to both announcing and non-announcing firms. Therefore, aggregate market attention increases with the arrival of more daily news events.

After examining the association between number of daily earnings news and aggregate market volume, this study splits the whole sample into two disjoint set of firms (i.e., the announcers and non-announcers) and then conducts the same analysis for each set of these firms. That is, we separately test attention and transfer effects on the announcing and non-announcing firms. These tests provide much more direct insights about the relative importance of attention and transfer effects on the two components of aggregate volume.

This study also explores the relationship between the magnitude of earnings news and aggregate market attention. The firm level evidence documented by Hirschleifer et al. (2009a) shows increased investor attention for firms disclosing larger surprises. Similar to the arguments developed to investigate the impact of the number of announcements on aggregate market attention, an “add up” effect following the magnitude of surprises is possible for the set of announcing firms. However, it is a priori difficult to predict the overall effect on the aggregate market due to the presence of non-announcers. That is, according to the limited attention hypothesis, trading activity for the non-announcing firms should decline because these larger earnings surprises distract market attention from the non-announcers.

On the other hand, larger surprises may contain richer information than small surprises and therefore convey more aggregate market relevant information. This would lead to a positive relationship between the magnitude of the surprises and the non-announcer volume. The association between aggregate market attention and the aggregate surprise therefore becomes another unsettled issue. To the best of my knowledge, this study is the first to empirically investigate these unsettled questions. After analyzing the relation between magnitude of daily

3
earnings surprises and aggregate market volume, we explore the same relationships separately for the set of announcer and non-announcers to obtain much more direct information about the relative impacts of both effects-transfer and attention.

After studying the market volume reaction to the number and the magnitude of earnings news using the data from January 2, 1981 through December 31, 2009, we find at least three ways that we could contribute to the literature on this topic. First, categorically different from the firm-level evidence shown at Hirschleifer et al. (2009a), we document that aggregate market attention is further heightened on days with a greater number of earnings announcements. However, after dividing the firms into the announcers and non-announcers and investigating them separately, we find that while a higher number of announcements on a given day distracts investor attention from the announcers (which is consistent with the firm-level evidence of Hirschleifer et al. 2009a), it draws market attention toward the non-announcers. The initial finding simply suggests that while the distraction effects of the same day earnings announcements prevail among announcers, the information transfer effect of such announcements tends to dominate the distraction effect among the non-announcers and hence leads to the documented overall positive association between aggregate market attention and the number of the same day earnings announcements. Therefore, the initial analysis clearly provides direct insights about the relative importance of attention and transfer effects on the two components of aggregate volume.

Secondly, and again different from the findings at the Hirschleifer et al.’s (2009a) firm-level finding, we document that aggregate attention attenuates on days with extreme earnings surprises, which indicates that distraction effect of the magnitudes of the earnings news dominates the information transfer effect at the aggregate level. However, after examining the
announcers and non-announcers separately, we find that the abnormal volume for the announcing firms increases, albeit by a statistically insignificant amount, while the abnormal volume experienced by the non-announcers significantly weakens on large surprise days compared to low surprise days. That is, average news arrivals with less information content tend to generate less distraction for the overall market and, in particular, the non-announcing component of that market. Moreover, an intuitive pattern emerges after categorizing the announcing firms as large or small announcers. That is, we find that the market attention is magnified on days with a higher percentage of large announcers primarily due to their greater information transfer effects.

This paper is organized as follows: Section 2 provides the literature review on trade volume and related behavioral hypotheses, and Section 3 develops the testable hypotheses. Research design is discussed in Section 4. Details concerning the data and sample selection are described in Section 5. The results are discussed in Section 6, and Section 7 concludes and provides directions for future research.

2. Literature Review and Motivation

2.1 Attention Hypothesis

The phenomenon of human attention has amassed a large body of psychological research for over a century. This research has found that the human brain’s central cognitive-processing capacity has its limits (Pashler & Johnston, 1998), making attention a scarce cognitive source (Kahneman, 1973). Human subjects must therefore selectively choose where to direct their attention. For example, Cherry (1953) conducted an experiment on the separation of two simultaneously spoken messages to the left and right ears (dichotic listening) to explore how
people recognize what one person is saying while others are speaking at the same time (the cocktail party problem). The experimental subjects were instructed to repeat one of the messages while concurrently listening to the other messages. The striking finding was that when subjects are subsequently asked to repeat anything heard in the other ear, they can say very little in specific except that they hear some sounds.

A recent and growing body of literature in behavioral finance and accounting has brought the attention hypothesis developed in the social sciences to financial markets. Because investors have limited resources such as attention, they must try to optimally utilize their resources to lower their search costs and process all available information toward reaching a utility-maximizing decision. Investors’ attention is therefore more likely to be driven by attention-grabbing events such as earnings announcements, media coverage, IPOs, restatements, M&A announcements, and analyst forecasts. In general, these attention-grabbing incidents are likely to narrow the choice set and lead investors to trade on attention-grabbing stocks (attention hypothesis).

For this study, earnings announcement serve as an excellent candidate for the corporate event because of several reasons. First of all, earnings announcements are one of the most important, influential, and extensively publicized corporate events for any firm traded at public exchanges. Second, all publicly U.S. traded firms must make earnings announcements. Third, the announcement events occur frequently (four announcements per year, per firm) so that it provides an excellent avenue for research. Fourth, earnings release days generate substantial volume, and hence it is fair to assume that they draw a significant amount of investor attention.\(^2\) Fifth, earnings announcements are scheduled corporate events at known periods (Chen and

\(^2\) However, the reverse may not necessarily be true in practice. That is, investors may pay a lot of attention to a corporate event, and yet abstain from trading due to several reasons.
Mohan (1994)) and the amount of information released to the market increases during the earnings announcements (Beaver, 1968; Brown et al., 2009) and hence, a significant market response to earnings announcements takes place (see, Kothari (2001) for an excellent review). Collectively, earnings announcement events are one of the ideal candidates to explore market attention.

The literature shows that the attention-grabbing events attract more decision-makers such as investors, analysts, and regulators to the underlying stocks. For example, Lee (1992) concluded, “Small investor buy decisions are associated with news events which bring the security to small investors’ attention”. Graham and Kumar (2006) stated that certain types of investors tend to trade securities following specific attention-grabbing events such as dividend initiations. For example, Seasholes and Wu (2007) found that the attention of individual investors, particularly first-time buyers, is attracted by the attention-grabbing event of hitting a price limit at the Shanghai Stock Exchange. DellaVigna and Pollet (2009) also documented that Friday earnings announcements have a 15% lower immediate stock price response and a 70% higher delayed response in addition to an 8% lower abnormal volume response than non-Friday ones. The study attributed the documented post-earnings announcement drift to the likelihood of investors’ inattention on Fridays.

Finally, by distinguishing firms between announcers and non-announcers, Chakrabarty and Moulton (2012) showed that when a group of firms maintained by a specific market maker announces earnings, the liquidity for the non-announcers maintained by the same market maker is negatively affected. These effects are strongest when the announcers release their largest earnings news. The attention constraint binding on the market maker is offered as the main explanation for their finding. In a similar way, Hirshleifer et al. (2009a) documented that limited
investor attention leads to market underreaction. In particular, they showed that both price and volume reactions to earnings news are weaker, and post-earnings announcement drift is stronger when a greater number of same-day earnings announcements are made by other firms.

2.2 Information Transfer Hypothesis and Trade Volume

The main idea behind the information transfer hypothesis is that public disclosures provide information not only regarding the announcing firms, but also concerning the non-announcing firms. Beginning with Foster (1981), earlier research documented that stock market reactions to the non-announcing peer firms show an intra-industry information transfer occurring during these announcements. In addition, more industry-wide commonalities between the announcers and non-announcers strengthen this information transfer.

For example, a possible avenue for information flow is from early announcers to late announcers within an industry. Foster (1981) did not find support for the hypothesis that the timing of earnings release is a significant determinant of information transfer between peers when comparing market reactions to the early vs. late announcers. However, Freeman and Tse (1992) documented a positive information transfer between early and late announcing firms within the same industry even though the significance of this relationship varies across industries. Their evidence implied that late announcers’ earnings news can be predicted by utilizing the information released by early announcers.

---

3 The concept of “information transfer hypothesis” is mainly used in the accounting and finance literature to refer to either a positive or negative correlation in the stock returns of the announcers and non-announcers. However, this study uses stock market volume to examine market-wide information transfer caused by the earnings announcements.

4 Information spillover effect and contagious effects are other phrases used in the literature to refer to information transfer.
Ramnath (2002) examined whether or not investors and analysts completely incorporate first announcers’ earnings reports to revise their earnings expectations for late announcers within the same industry. He documented that both investors and analysts seem to underreact to earnings reports released by first announcers and raised serious doubts concerning the efficient use of publicly available information.\(^5\) Gleason et al. (2008) focused on accounting restatements and found that the share prices of non-restating firms within the same industry significantly decreased. The main motivation behind stock price declines is that restatements trigger investors to reassess the credibility of the financial information concerning non-restating firms operating within the same industry.

Finally, Thomas and Zhang (2008) showed that a systematic mispricing occurs during the earlier earnings announcements of peer firms. In particular, they documented a strong negative correlation between stock price changes of late announcers at earnings announcements by early announcers and stock price movements of late announcers during their own earnings announcements. They therefore concluded that stock market overreacts to the implications of the earnings news released by the early announcers for late announcers. However, the market will correct the overreaction when late announcers finally release their earnings.\(^6\)

This study employs daily trade volume in order to capture the attention of overall investors.\(^7\) Numerous papers have examined the firm-level trade volume response to earnings news since the seminal works by Ball and Brown (1968) and Beaver (1968). Several early papers

\(^{5}\) Pyo and Lustgarten (1990) investigated the information transfer hypothesis for management forecasts of earnings and found that under certain cases, forecast firms’ abnormal returns are associated with non-forecast firms’ abnormal returns.

\(^{6}\) Information transfer effects have also been shown in other contexts such as bankruptcy filings (Lang & Stulz, 1992), dividend initiations (Firth, 1996), internet hacker attacks (Ettredge & Richardson, 2003), and stock repurchases (Erwin & Miller, 1998).

\(^{7}\) However, there are other attention measures such as number of press coverage, number of analysts following and Google search index (see, Drake et al. 2012), which potentially aim to capture attention of the media, financial analysts and individual investors, respectively.
focused on the relationship between trading volume and earnings news at the firm level (see Morse (1981), Ataise & Bamber, 1994; Bamber, 1986, 1987; Utama & Cready, 1997). They mainly documented that the investor attention measured as the trading volume increases with the surprise during the days surrounding announcements.

The investor attention as measured by the trading activity may not necessarily be accompanied by significant price changes at the firm level. For example, Bamber and Cheon (1995) and Kandel and Pearson (1995) document that significant trade volume occurs during corporate announcements even in the absence of price changes. Therefore, one of the advantages of employing trade volume rather than return as a proxy for market attention is that the volume is likely to capture the amount of investor attention at the aggregate level even in the absence of a significant price change at the aggregate level. For example, assume half of the firms exhibit negative stock returns while the other half shows positive returns in a given day. Consequently, there is a significant likelihood that the aggregate return could be close to zero or slightly skewed to the either side (i.e., either positive or negative return) on that day and may not necessarily capture investor attention at the aggregate level.

Beyond its attention implications attaining an understanding of aggregate volume is also pertinent to more fully understanding aggregate market behaviors. While an emerging contemporaneous literature heavily focuses on aggregate price reactions to earnings characteristics (Bali et al., 2008; Cready & Gurun, 2010; Hirshleifer et al., 2009b; Kothari et al., 2006; Sadka & Sadka, 2009)\(^8\), to my knowledge, no prior study has investigated the relationship between volume and earnings characteristics at the aggregate level. However, as is true at the

---

\(^8\) They mainly examined aggregate price reaction to earnings surprises and documented a contemporaneous negative association between aggregate returns and aggregate earnings news given the previous firm-level studies showing that stock prices react positively to earnings news.
firm level, a better understanding of aggregate volume also provides valuable insights about markets and market participants.

Moreover, gaining additional insight about what drives aggregate market movements helps the government agencies better perform their goal of protecting the rights of unsophisticated (small) investors who might be informationally disadvantaged compared to institutional investors. One of the obvious ways to detect any suspicious action in the stock market is paying greater attention to high volume periods. For example, in her testimony concerning the severe market disruption on May 6, 2010, SEC Chairman Mary Shapiro noted the difficulty of efficiently monitoring the market during high volume days. High trading activity therefore may become an indicator of market disruption. A clear support to this prediction is in her testimony, “For example, the key day in the 1987 Market Break Study involved a trading session processing a little over 600 million shares in NYSE stocks. Last Thursday, the markets processed 10.3 billion shares in NYSE stocks alone.” This study accordingly aims to provide the first empirical evidence toward understanding some of the reasons driving daily aggregate market attention.

3. Hypothesis Development

The first part of this section develops hypotheses predicting how the overall market, the announcers and non-announcers reacts to the arrival of the daily number of earnings news and magnitude of the news; the second part develops hypotheses examining what types of announcements are distracting or transferring aggregate market relevant information. While the examination of the overall trading is of some descriptive interest the more pertinent issue is what

---

is going on among the announcers and especially among the non-announcers and hence this issue
is most directly addressed by examining announcers and non-announcers trading separately. The
bulk of the analysis therefore focuses on separate examination of the announcers and non-
announcers components of aggregate trading volume as these provide much more direct insights
about the relative importance of attention and transfer on the two components of aggregate
volume- non-announcer and announcer volume.

First, proposing the limited investor attention is the main reason Hirschleifer et al. (2009a)
documented that the magnitudes of both price and volume responses to earnings decrease with
the number of other coincident earnings announcements. The attention hypothesis therefore
suggests a negative association between the number of earnings announcements arriving at the
market on a daily basis and investor attention measured as trading activity for the set of
announcing firms.

Similarly, a reduced market attention to the set of non-announcing firms can be predicted
on trading days with heavy information load. That is, the difficulty that investors face in
processing multiple announcements arriving at the market on the same day is likely to distract
investor attention from the non-announcers. Combining the distraction effects of the number of
earnings news on the announcers and non-announcers therefore suggests that the aggregate
market attention on high news days is expected to be lower than that on low news days.

However, the information transfer effect plays an opposite role than the attention effect in
predicting the aggregate market attention to the high number of news days. First, the investor
attention is most likely directed toward the non-announcers due to information spillover. The
primary motivation behind this prediction in this context is that earnings announcements convey
information pertinent to other firms (Hirshleifer et al., 2009a) that can be relevant to the
aggregate market (Cready & Gurun, 2010). For example, Foster (1981) documented a significant information transfer between the earnings announcing firm and other firms within the same industry. Moreover, analyses by Freeman and Tse (1992), Pyo and Lustgarten (1990), Lang and Stulz (1992), and Gleason et al. (2008) called for a higher market volume reaction due to the information spillover across the market, primarily caused by the announcers. The firm-level evidence found in prior empirical literature therefore suggests that the days with higher numbers of earnings announcements convey more information regarding the aggregate market and consequently increase investor attention to the market as a whole (See Figure 1).

<table>
<thead>
<tr>
<th>Investor Attention to the Non-Announcers</th>
<th>Attention Effect (Number of News)</th>
<th>Transfer Effect (Number of News)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Decrease</td>
<td>Increase</td>
</tr>
</tbody>
</table>

Figure 1. The directional predictions for the relationship between number of earnings news arriving to the market on a daily basis and investor attention to the non-announcers based on the assumptions from the attention and information transfer effects.

Second, because the information transfer hypothesis is mainly developed for the set of non-announcing firms, it is less clear how information spillover alone explains investor attention toward the set of announcing firms. On the one hand, if information transfer can only occur from the announcers to the non-announcers, then the transfer effect on the announcers’ volume will be minimal. On the other hand, if the transfer can also happen among the announcing firms, then on average investor attention to the announcers will be increased. The information transfer story therefore offers either no association or a positive association between number of news events and investor attention to the announcers. Combining the information transfer effects on the announcers and non-announcers hence implies that the aggregate market attention on high news days is predicted to be greater than that on low news days.
Investor Attention to the Non-Announcers | Attention Effect (Number of News) | Transfer Effect (Number of News)  
--- | --- | ---  
Decrease | Increase  
Investor Attention to the Announcers | Decrease | Increase

Figure 2. The directional predictions for the relationship between number of earnings news arriving to the market on a daily basis and investor attention to the non-announcers and announcers based on the assumptions from the attention and information transfer effects.

However, the interplay of these two offsetting forces (the attention and information transfer effects) is not predictable a priori, thus, we do not have a prior expectation for which of these effects dominates in practice (See Figure 2). This argument leads to the first testable hypothesis stated in the null form:

**H1a: The aggregate market attention measured as trading activity is unrelated to the number of earnings announcements arriving at the market.**

In order to gain an overall perspective about the relation of announcement related distraction and volume we begin the analysis by examining the relation between number of announcements and overall per firm trading levels. As number of announcements has a direct positive impact on trading (i.e., each announcement adds to overall volume), while attention and information transfer effects are of a second order nature, it seems likely that this relation will be positive. Consequently, finding a positive relation is uninformative about the relative strengths of the attention and transfer effects as they exist among non-announcing firms as a group. In contrast, a negative relation indicates that a very strong attention effect is at work, an effect of sufficient strength that it dominates any offsetting transfer effect as well as the direct impact that number of announcements has on overall trading volume. However, how this attention effect plays itself out within the announcing and non-announcing firm groups would still not
be clear (e.g., it could be the case that, at least over some ranges of attention, that the attention effect has negative implications for overall trading within the announcing firm group.

Hence, while the analysis encompasses examinations of overall trading, these largely serve to link its findings to a readily observable construct-market volume. The bulk of the analysis focuses on separate examinations of the non-announcer and announcer components of the aggregate trading volume as these analyses allow us to obtain much more detailed insights to compare relative strengths of attention and transfer effects. Therefore, the next two research hypotheses briefly predict the relationships between the number of news and investor attention to the set of announcing and non-announcing firms separately.

As discussed above, attention effects suggest a reduction in the market attention to the non-announcers on trading days when heavy number of earnings announcements takes place. The primary reason is the difficulty that the market faces in evaluating multiple news events arriving at the market on the same day, which likely distract investor attention from the non-announcers (Hirshleifer et al., 2009a). But, incorporating the possibility of marketwide information spillover and hence increased investor awareness about the related stocks, the information transfer effect suggests an opposite prediction for the relationship. In particular, investor attention is most likely attracted toward the non-announcers since the announcers likely convey information pertinent to the other firms (i.e., the non-announcers).

However, the interplay of these two offsetting forces (the attention and information transfer effects) is not predictable a priori, therefore, we do not have a prior expectation for which of these effects dominates in practice. This argument leads to the following testable hypothesis stated in the null form:
**H1b:** The investor attention to the non-announcers as measured by trading activity is unrelated to the number of earnings announcements arriving at the market.

Even though the most pertinent part of the separate announcers and non-announcers volume analysis is what is going on among the non-announcers, this study also develops hypothesis predicting the above relationship for the announcers for the sake of completeness. That is, based on the limited investor attention from Hirschleifer et al. (2009a), investor attention to the set of announcing firms on average declines in response to the number of other coincident earnings announcements. On the other hand, the existing information transfer literature suggests that the direction of the transfer most likely takes place from the announcers to the non-announcers, which indicates that the transfer effects on the announcers’ volume will be minimal. However, the transfer may also happen among the set of announcing firms. For example, if the most announcing firms operate in related industries then on average investor attention to the announcers might be increased. The information transfer literature therefore offers either no association or a positive association between number of news events and investor attention to the announcers. Combining both the attention and transfer effects therefore leads to the following testable hypothesis stated in the null form:

**H1c:** The investor attention to the announcers as measured by trading activity is unrelated to the number of earnings announcements arriving at the market.

Next, we explore the market reaction to the magnitude of daily earnings surprises, which again involves the incorporation of the two competing forces— the attention and information transfer. However, the market’s response to the number of earnings news and magnitude of the news could be dramatically different. Following Ball and Brown (1968), and Beaver (1968),
numerous studies generally show that firm-level earnings surprises lead to positive abnormal trade volume reactions (Ataise & Bamber, 1994; Bamber, 1986, 1987; Utama Cready, 1997). The recent analysis by Hirschleifer et al. (2009a) also documented a higher investor attention to the firms disclosing larger surprises (the attention hypothesis). We therefore expect that as the announcers surprise the market more by disclosing larger news, they will accrue increased attention.

However, the association between the magnitude of daily surprises and investor attention to the non-announcers conventionally remains an unsettled issue due to the following reasons. First, the psychology literature defines attention as the cognitive process of selectively focusing on one aspect of the environment while ignoring the others (Anderson, 2004). In his definition of attention, James (1890) similarly stated, “It implies withdrawal from some things in order to deal effectively with others”. Investors may therefore selectively focus on information from certain securities announcing significant earnings surprises, attracting investor attention at the expense of ignoring other firms such as the non-announcers. In a similar vein, Peng and Xiong (2006), who study investor attention, stated, “Attention to one task necessarily requires a substitution of cognitive resources from other tasks”. Therefore, investors are likely to allocate their resources toward attention-grabbing stocks that require a potential substitution of resources from other tasks such as following the stocks of the non-announcers. We accordingly expect that the non-announcers would experience lower investor attention on the days when larger earnings surprises are released.

The main reason why the association between the magnitude of daily surprises and investor attention to the non-announcers remains an unsettled issue sharply contrasts with the attention story in that information transfer effects suggest increased market attention toward the
non-announcers on the trading days when large surprises are released. The primary argument is that the information content of a large earnings surprise is richer than that of a small surprise (Beaver, 1968). An earnings news event with a richer context is likely to convey more aggregate market-related information and spur investor attention toward the non-announcers as well (information transfer). In summary, the attention hypothesis requires lower investor attention to the set of non-announcing firms, while the information transfer hypothesis induces higher attention toward the non-announcers. Figure 3 clearly summarizes the positions taken by the both behavioral hypotheses - the attention and information transfer - predicting opposite directions for the set of non-announcing firms.

<table>
<thead>
<tr>
<th></th>
<th>Attention Effect (Magnitude of News)</th>
<th>Transfer Effect (Magnitude of News)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Investor Attention to</strong></td>
<td>Decrease</td>
<td>Increase</td>
</tr>
<tr>
<td><strong>the Non-Announcers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Investor Attention to</strong></td>
<td>Increase</td>
<td>Increase</td>
</tr>
<tr>
<td><strong>the Announcers</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 3. The directional predictions for the relationship between magnitude of earnings news and investor attention to the non-announcers and announcers based on the assumptions from the attention and information transfer effects.

Because the set announcing and non-announcing firms comprise the entire stock market on any given day, the aggregate market attention measured in the form of trading activity in response to the magnitude of earnings surprises is not clearly predictable. This uncertainty primarily stems from the non-announcing firms as summarized in Figure 3. Therefore, we do not have a prior prediction concerning the association between aggregate market attention and aggregate market surprise, leading to the next testable hypothesis stated in the null form:

**H2a**: The aggregate market attention measured as trading activity is unrelated to the magnitude of the earnings news arriving at the market.
After exploring the association between magnitude of daily earnings news and aggregate market volume, this study again splits the whole sample into two disjoint set of firms (i.e., the announcers and non-announcers) and then separately performs the same analysis for each set of these firms. Conducting separate analysis clearly provides much more direct insights about the relative importance of attention and information transfer effects on the two components of aggregate volume.

First, in order to gain a better understanding of relative strengths of the two effects—attention and information transfer—we start examining the market response to the magnitude of earnings news as measured by the trading activity at the non-announcing firms. On the one hand, information transfer effects suggest increased market attention toward the non-announcers on the trading days with larger surprises since the information content of a large earnings surprise is richer than that of a small surprise (Beaver, 1968). In other words, earnings news event with a richer context is likely to reveal more aggregate market-related information and that eventually draws investor attention to the non-announcers. On the other hand, attention effects propose an opposite association in which extreme earnings news attract the market attention to the announcers at the expense of the non-announcers. Hence, we do not have a prior prediction concerning the association between market attention to the set of non-announcers and aggregate market surprise, leading to the next testable hypothesis stated in the null form:

**H2b:** The investor attention to the non-announcers as measured by trading activity is unrelated to the magnitude of the earnings news arriving at the market.\(^{10}\)

\[^{10}\text{As it is clear from Figure 3, attention to the set of announcing firms intensifies on the days with larger earnings news and therefore I do not state a separate hypothesis for this prediction. However, the study provides the empirical tests results exploring the association between magnitude of the surprise and investor attention to announcers for the sake of completeness.}\]
The prior empirical evidence on the relation between firm size and earnings-related intra-industry information transfers is mixed.\textsuperscript{11} On the one hand, using firm size as a proxy for the amount of pre-disclosure information available about the firm, the prior literature shows that the amount of unexpected information contained in an accounting disclosure is inversely related to firm size. For example, referring to Atiase (1985)’s prediction that corporate earnings announcements form a bigger part of the aggregate information set for smaller firms, Bamber (1986, 1987) documented that earnings announcements made by small firms are more surprising and therefore lead to more trading activity than those made by larger firms.\textsuperscript{12}

Similarly, Han and Wild (2000) showed that price revaluations to earnings announcements are inversely related to announcing firms’ size. Their main argument is that information production and dissemination by private channels increase with firm size; a significant fraction of the information about large firms may be already transferred via private channels before the announcements. The amount of information transferred to the market by accounting disclosures such as earnings announcements is accordingly inversely related to firm size (the so-called size-related differential information hypothesis).

Conversely, although private parties may process and convey information concerning large firms prior to the public disclosures as argued by Han and Wild (2000), large firms are on average followed by more analysts, generate greater media coverage, and have more business segments than small ones. Therefore, a large firm’s earnings announcement has more implications for the overall market than a small firm’s announcement. Stated differently, when a

\textsuperscript{11} The prior literature has only examined the information transfer hypothesis within the same industry (intra-industry information transfers), and not at the aggregate market level.

\textsuperscript{12} Atiase’s (1985) differential information hypothesis implies that more information is available concerning large firms before their earnings announcements.
large firm releases its earnings figure, it may convey more information that is pertinent to the aggregate market.

For example, Asthana and Mishra (2001) found that the announcements of large firms contain more information concerning non-announcers than the announcements of small firms within an industry by using the absolute value excess returns of the announcing and non-announcing firms. Finally, due to the changes in technology, financial regulation, and investor composition, Barron et al. (2009) documented that the association between firm size and trading volume reactions to earnings announcements has recently reversed and become positive.

In the first part of the hypothesis development section, all quarterly earnings announcements and announcing firms were treated alike. However, as prior literature suggests, there are considerable differences among the announcing firms such as announcers being large vs. small. By incorporating these differences, the second part of this section therefore develops testable hypotheses predicting the types of earnings announcements that distract market attention more. Given these arguments suggesting opposite inferences, we do not have a prior prediction concerning the association between aggregate market attention and percentage of announcements made by large firms compared to small ones. This leads to the third testable hypothesis stated in the null form:

**H3: The aggregate market attention measured as trading activity is unrelated to the percentage of news arriving to the market that is released by large firms.**

4. Research Design

The research design in this paper was borrowed from several related studies employing change-based aggregate earnings expectation models. The empirical models include various
control variables (discussed in further detail below). To test the first hypothesis (i.e., \(H1a\)), we employ the following empirical specification:

\[
ABVOL\_ALL_t = \beta_0 + \beta_1 EW\_ANN_t + \beta_2 POSRET_t + \beta_3 NEGRET_t + \beta_4 LASTYEAR\_EW\_ANN_t + \beta_5 SPREAD_t + \beta_6 VIX_t + \beta_d D_t + \beta_y Y_s + \varepsilon_t
\] (1)

where:

\(ABVOL\_ALL_t\) is the value-weighted (based on daily market value) average abnormal volume for all firms traded on day \(t\),

\(EW\_ANN_t\) is the 3-day equal-weighted average percentage number of firms announcing earnings over the trading days \(t-1\) through \(t+1\) relative to day \(t^13\),

\(POSRET_t\) is Max(0, \(VWRET_t\)). Alternatively, it is the positive value-weighted CRSP market index return (\(VWRET_t\)) on day \(t\) where \(Max(\ , \)\) is the mathematical notation for the maximum function,

\(NEGRET_t\) is Min(0, \(VWRET_t\)). Alternatively, it is the negative value-weighted CRSP market index return (\(VWRET_t\)) on day \(t\) where \(Min(\ , \)\) is the mathematical notation for the minimum function,

\(LASTYEAR\_EW\_ANN_t\), is equal-weighted the percentage of firms announcing earnings from last year on the same trading day,

\(SPREAD_t\), is the value-weighted (based on daily market value) average spread across all firms traded on day \(t\).

\(^{13}\) In addition to \(EW\_ANN_t\), I also use the value-weighted (based on the market value of the firm at the end of the quarter) average number of firms announcing earnings, \(VW\_ANN_t\), over the trading days \(t-1\) through \(t+1\) relative to day \(t\) to control for the size effect of the announcing firms.
VIX is a measure of the daily implied volatility of the S&P500 index,

\( D_t \) is a vector of day of week indicator variables\(^{14} \),

\( Y_s \) is a vector of year indicator variables.

Moreover, in order to test the hypotheses of H1b and H1c, we replace the dependent variable of aggregate volume for all firms (\( ABVOL\_ALL_t \)) with aggregate volume for the announcers (\( ABVOL\_ANN_t \)) and non-announcers (\( ABVOL\_NON_t \)) in the empirical model (1), where:

\( ABVOL\_ANN_t \) is the value-weighted average abnormal volume for the set of announcing firms traded on day \( t \),

\( ABVOL\_NON_t \) is the value-weighted average abnormal volume for the set of non-announcing firms traded on day \( t \),

A detailed discussion for the construction of the each variable of interest is provided below. For example; investor attention to the set of announcing firms as measured by the abnormal volume for the announcers (\( ABVOL\_ANN_t \)) is computed in three steps. First, firm-level daily shares turnover is computed as the percentage of the firm \( i \)'s shares traded on day \( t \). In particular, \( \frac{VOL_{i,t}}{SHO_{i,t}} \) is the percentage of firm \( i \)'s shares traded on day \( t \) where \( VOL_{i,t} \) represents the number of shares traded from firm \( i \) on day \( t \) and \( SHO_{i,t} \) is the total number of shares outstanding for firm \( i \) on day \( t \) (Bamber, 1986, 1987).

\(^{14} \) Because earnings releases cluster by the day of the week (see Cready & Gurun, 2010; Hirshleifer et al., 2009a), I included a vector of four indicator variables for each day of the trading week.
Second, following Garfinkel and Sokobin (2006) and Dichev et al. (2012), we employ a short-window event study methodology around earnings announcements days that removes the normal level of trading activity during non-earnings announcements periods. This research design allows me to directly test for the effect of the numbers of news events happening in a given day on the investor attention to the set of earnings announcing firms. In particular, we compute the abnormal trade volume for a firm $i$ on the trading day $t$, $ABVOL_{i,t}$, as:

$$ABVOL_{i,t} = \frac{VOL_{i,t}}{SHO_{i,t}} - \left[ \frac{\sum_{\tau=t-11}^{t-41} VOL_{i,\tau}}{30} + \frac{\sum_{\tau=t+11}^{t+41} VOL_{i,\tau}}{30} \right] / 2$$

(2)

In other words, the daily abnormal trading volume for any firm $i$ on day $t$ is calculated as its daily shares’ turnover minus the average turnover for 30 days pre- (from $t-41$ through $t-11$) and post- (from $t+11$ through $t+41$) periods. In this research design, the trading activities during the pre- and post-announcement periods proxy for the normal level of investor attention.

Finally, after finding the firm-level abnormal volume ($ABVOL_{i,t}$), we computed the value-weighted (based on daily market value) daily average abnormal trade volume for the announcers ($ABVOL_{ANN,t}$). Hence, a positive value for $ABVOL_{ANN,t}$ indicates that the announcers attract attention from investors. In particular, for example, the interpretation for an average abnormal volume of 0.005 is that the firms announcing earnings on day $t$ on average draw 0.5% more investor attention measured as trading activity compared to investor attention during the benchmark period (i.e., 30 days before and after the trading day $t$).

However, when it comes to the non-announcers (i.e., when we compute $ABVOL_{NON_t}$) we still use the same research design to measure the amount of investor attention paid to non-announcing firms, which directly allows me to quantify market attention on the non-announces.
Similarly, aggregate market attention to the all firms \((ABVOL\_ALL_t)\) traded on day \(t\) is computed in the same way.

The percentage of firms disclosing earnings on any trading day \(t\) is calculated as the ratio 
\[
\frac{NUM\_ANN_t}{NUM\_ALL_t}
\]
where \(NUM\_ANN_t\) is the number of firms announcing earnings on day \(t\), and \(NUM\_ALL_t\) is the number of all firms disclosing earnings during quarter \(q\) where the trading day \(t\) belongs to quarter \(q\). Therefore, the ratio \(\frac{NUM\_ANN_t}{NUM\_ALL_t}\) clearly computes the percentage of firms announcing earnings on a trading day from any given quarter.

However, Morse (1981) and Bamber (1987), among others, showed that the trade volume reaction to earnings surprises begins 1 day before and continues after the announcement day (lagged and anticipatory effects).\(^{15}\) To consider both effects, we use the percentage number of the announcers over the trading days \(t-1\) through \(t+1\) relative to day \(t\). In particular, following Anilowski et al. (2007) and Cready and Gurun (2010), we compute \(EW\_ANN_t\) as the 3-day average percentage number of firms announcing earnings over the trading days \(t-1\) through \(t+1\) relative to day \(t\). Similarly, using the quarter-end market value, \(VW\_ANN_t\) computes the value-weighted percentage number of firms announcing earnings over the trading days \(t-1\) through \(t+1\) relative to day \(t\). The 3-day average number of announcers variable also incorporates more earnings disclosures and thus improves announcements’ stability in the analysis.

Next, following Bamber (1987), we define the earnings surprise (news) from firm \(i\) on the trading day \(t\) in quarter \(q\), \(ES_{t,q}\), as:

\(^{15}\) Consistent with Anilowski et al. (2007), Cready and Gurun (2010) employ three-day earnings accumulation period (from \(t-1\) through \(t+1\) relative to day \(t\)) to construct average of earnings surprise indices because actual first earnings announcement days might be different than COMPUSTAT announcement days.
\[ ES_{i,q} = \frac{EPS_{i,q} - EPS_{i,q-4}}{\text{abs}(EPS_{i,q-4})} \]  

(3)

where \( EPS_{i,q} \) is the quarterly earnings per share before extraordinary items announced by firm \( i \) in quarter \( q \).\(^{16}\) Because both positive and negative firm-level surprises may generate substantial trading volume, we used the absolute value of surprises (i.e. \( |ES_{i,q}| \) ) to create daily equal-weighted and value-weighted (based on quarter-end market value) average of earnings surprises. After computing daily average of earnings surprises, we calculated the 3 days average of surprises from \( t-1 \) through \( t+1 \) relative to day \( t \). In particular, \( EW\_AES_t \) (\( VW\_AES_t \)) represents equal-weighted (value-weighted) average of absolute value of earnings surprises announced over trading days \( t-1 \) through \( t+1 \) relative to day \( t \).

This study explores the relationship between the magnitude of earnings news and aggregate market attention, namely \( H2a \), using the following empirical specification\(^{17}\):

\[
ABVOL\_ALL_t = \beta_0 + \beta_1 EW\_AES_t + \beta_2 EW\_ANN_t + \beta_3 POSRET_t + \beta_4 NEGRET_t + \\
\beta_5 LASTYEAR\_EW\_ANN_t + \beta_6 SPREAD_t + \beta_7 VIX_t + \beta_8 D_t + \beta_9 Y_s + \epsilon_t \]  

(4)

where:

\( EW\_AES_t \) is the equal-weighted average absolute value of the earnings surprise on trading day \( t \).\(^{18}\)

To test the third hypothesis, we split the announcers into two groups (i.e., large vs. small firms) based on the quarter-end firm-market value during each calendar quarter. Firms in

\(^{16}\) Graham et al.’s (2005) survey documented that 85% of executives believe that the first item in a press release is often a comparison of the current quarter EPS with the four-quarters lagged quarterly EPS.

\(^{17}\) Moreover, in order to test the hypothesis of H2b, I replace the dependent variable of aggregate volume for all firms (\( ABVOL\_ALL_t \)) with aggregate volume for the non-announcers (\( ABVOL\_NON_t \)) in the empirical model (4).

\(^{18}\) Coefficient estimates from using the value-weighted average magnitude earnings news are also provided in the results section.
the top decile of market value are classified as large firms; the remaining firms represent the small firms.\(^1^9\) The percentage of large firms releasing earnings on day \(t\) is computed as the number of large firms announcing on day \(t\) scaled by the total number of announcers on day \(t\). Then, the average percentage of large announcers over the trading days \(t-1\) through \(t+1\) relative to day \(t\) is computed to employ the following empirical model\(^2^0\).

\[
ABVOL\_ALL_t = \beta_0 + \beta_1 EW\_ANN_t + \beta_2 EW\_ANN_t \times LARGE\_ANN_t + \beta_3 EW\_AES_t + \beta_4 POSRET_t + \beta_5 NEGRET_t + \beta_6 LASTYEAR\_EW\_ANN_t + \beta_7 SPREAD_t + \beta_8 VIX_t + \beta_d D_t + \beta_y Y_t + \varepsilon_t
\]

(5)

where:

- \(Large\_ANN_t\), is simply the mean of 3 days percentage of large announcers among the all announcers over the trading days \(t-1\) through \(t+1\) relative to day \(t\).

The coefficient, \(\beta_2\), on the interaction term, \(EW\_ANN_t \times Large\_ANN_t\) tests whether the aggregate market pays more attention to the earnings announcements released by large firms.

Detailed discussions about the rationale behind the inclusion of the other control variables will be provided in detail below. For example; the early theoretical (e.g., Epps (1975) and Karpoff (1988)) and empirical (e.g., Jain and Joh 1988) literature document that trading volume and returns relation is steeper for positive returns than for negative returns. Their main argument is that volume is relatively high in bull markets and light in bear markets. That is, the

---

\(^1^9\) Firms in the small and large groups are categorically very different. For example, the mean market value of the large firms in the sample is $26.2 billion while that of small firms is only $1.3 billion. In addition, average market value of rank 9 decile firms is $5.1 billion, which indicates that even rank 9 decile firms are significantly different from the large firms.

\(^2^0\) For the sake of completeness, I replace the dependent variable of aggregate volume for all firms (\(ABVOL\_ALL_t\)) with volume for the announcers (\(ABVOL\_ANN_t\)) and non-announcers (\(ABVOL\_NON_t\)) in the empirical model (5) to explore the relation between number of large announcers and attention to the announcers and non-announcers. The findings will be discussed in the results section.
magnitude that the “bull” investors are optimistic is greater than the magnitude that “bear”
investors are pessimistic. In line with this view, Karpoff (1987)’s study on the asymmetric
relation between volume and positive and negative price changes provides an excellent review
supporting the inclusion of positive and negative market returns separately in the analysis.21
Therefore, following the further theoretical evidence on the relationship between price and
volume from Kim and Verrecchia (1991) and the empirical evidence from Atiase and Bamber
(1994), we separately control for the positive (\(POSRET_t\)) and negative market returns (\(NEGRET_t\))
in the empirical analyses.22

Next, both theoretical and empirical research show that investor opinion divergence is
one of the driving forces behind market attention measured as trading activity. For example, in
their theoretical paper Glosten and Milgrom (1985) showed that probability of information based
trading spurs bid-ask spread. In other words, heterogeneous investor beliefs will be reflected as
higher bid-ask spread. Moreover, Kim and Verrecchia (1991) stated, “Volume arises due to
differential belief revision”, and dispersion of opinion is shown as one of the determinants of
trade volume (Chordia et al., 2011). For example, if investors have disagreement over the
information released by the earnings announcement, then investors will likely engage in
asymmetric trades (i.e., some will buy and some will sell); hence this opinion divergence may
eventually be reflected as higher investor attention.

21 See Figure 3.1 for an illustration of an asymmetric volume response to the positive and negative news
22 See Chordia et al. (2002) for a similar usage of separate positive and negative market returns. Karpoff’s
(1987) literature review also showed that trading volume is generally positively associated with the
absolute magnitude of returns.
Therefore, we constructed a daily spread-based proxy for opinion divergence in two steps to control for the investor disagreement (see Garfinkel, 2009). First, firm-level daily percentage of bid-ask spread was computed as:

\[
PER\_SPREAD_i = \frac{(Ask_i - Bid_i)}{(Ask_i + Bid_i)/2} \tag{6}
\]

where \(Ask_i\) (\(Bid_i\)) is the firm \(i\)’s daily closing ask (bid) price. Second, aggregate daily percentage of bid-ask spread, \(SPREAD_t\), was computed as the value-weighted (based on daily market value) average spread across all firms traded on day \(t\).

Using NYSE data from 1988 Foster and Viswanathan (1993) show that intraday trading volume is high when returns are most volatile, which indicates that daily aggregate uncertainty most likely triggers investor attention to the market. Therefore, a measure of aggregate market volatility obtained from the CBOE daily volatility index (VIX) is included in the empirical model. Specifically, VIX is a measure of the implied volatility of the S&P500 index return and captures the markets expectation of future volatility (see, e.g., Williams (2009). VIX is widely used in the recent accounting and finance literature. For example, Kim et al. (2013) compute quarterly macroeconomic uncertainty by averaging daily VIX during the quarter and show that likelihood of management earnings forecast significantly decreases during high market uncertainty periods. In addition, Melessa (2012) show that higher market uncertainty affects market reaction to the corporate announcements. In my study, VIX is included in the regression model to account for the average daily volatility of the market.\(^{23}\)

\(^{23}\) VIX is also referred to as the fear index and is a measure of expected volatility over the next 30 days. A high value of VIX represents a volatile market and therefore means options will be more costly. Even though the index was mostly below 30 during 15 years up to 2008, it was nearly 90 in October 2008.
Finally, with the advent of the Internet and improved transparency in capital markets, investors can consistently predict the forthcoming number of firms announcing earnings on a particular day because firms are generally expected to release earnings on the same trading day as the prior year (see Begley and Fisher, 1998). Moreover, managers may prefer to maintain a consistency on the expected announcement date in order to avoid any negative consequences of missing the expected report date (Chambers and Penman 1984, Bagnoli et al. 2002). In line with these expectations, the percentage of firms announcing earnings from last year on the same trading day, $LASTYEAR\_EW\_ANN_t$, is included in the regression models to proxy for the investors’ expectation of the percentage of the firms likely going to announce earnings this year on the same trading day.

5. Data Issues

The sample consists of all daily trade volume data from January 2, 1981 through December 31, 2009, subject to the following screens: (a) Trade volume, shares outstanding, earnings, and earnings announcement dates are available on CRSP and COMPUSTAT; (b) stock price is between $1 and $10,000 USD, inclusive; (c) the earning surprise measures are winsorized at the top and bottom one percentiles to control for extreme outlier effects before computing the aggregate surprises; and (d) trading days should have at least one earnings announcements. The daily trade volume, return, price, bid-ask spread, and shares outstanding data are from the CRSP. Quarterly earnings, shares outstanding and price data are obtained from the CRSP-COMPUSTAT merged database; and daily volatility index is published by the Chicago Board Options Exchange (CBOE). Finally, due to double-counting concerns for
NASDAQ stocks, we included only NYSE and AMEX stocks when computing aggregate daily volume metrics (see Chordia et al., 2011; Dichev et al., 2012).24

6. Results

6.1 Summary Statistics

Panel A of Table 1 reports descriptive information on the 3-day percent announcers indices and earnings surprise indices. First, in the final sample, the number of days where data are available for the volume and surprise indices is 7,204. If the data source reports no earnings announcement on a trading day, then we excluded that day from the final sample.25

Second, the equal and value-weighted 3 days average percentage number of firms disclosing their quarterly earnings (denoted by $EW_{ANN}$ and $VW_{ANN}$, respectively) is approximately 1.6%, while the maximum equal-weighted average percentage of firms announcing is around 8.8%. On average, 27 firms disclose their earnings on a regular trading day, while the maximum number of firms announcing earnings reaches to 220. Moreover, the 25th percentile number of announcers is five times greater than the 75th percentile number of announcers (i.e., 37 earnings announcements), clearly demonstrating an outstanding variation in the number of announcements over trading days. Consistent with DeGeorge et al. (1999), the number of positive earnings surprises, $NUM_{PosANN}$, is on average greater than the number of negative surprises, $NUM_{NegANN}$, on a given trading day (see Panel A of Table 1).26 The

---

24 For NASDAQ, the dealers are only supposed to count the other side of each transaction, as opposed to acting as an intermediary. This practice has therefore caused the trade volume to be double-counted during some periods. Even if the definition of volume has recently changed and includes only customer-to-customer transactions in NASDAQ (Anderson and Dyl, 2005), I still dropped NASDAQ to prevent any problems with having comparable results over the long time period employed in this study.

25 Appendix 1 provides detailed explanation for each variable used in this study.

26 Brown and Caylor (2005) also argued that negative earnings surprises have become scarcer.
summary statistics therefore support the view that a small negative earnings news is a bigger surprise than a small positive news (see Hirschleifer et al., 2009a).

Moreover, the mean (median) of equal-weighted earnings surprises, $EW_{ES}$, is 3% (8.7%), consistent with the prior aggregate market studies (see Table 1 in Kothari et al., 2006). While the median of the value-weighted absolute earnings surprise, $VW_{AES}$, jumps to 63%, that of the equal-weighted surprise, $EW_{AES}$, is nearly 98%.

Finally, Panel B of Table 1 shows that average daily number of shares turnover of the announcing firms is almost twice that of all firms (0.71% and 0.37%, respectively). However, value-weighted abnormal volume for all firms is 0.24 basis points and is significantly different from zero ($p = 0.04$). The weak significance is consistent with the notion that on a given trading day the investor attention to the overall market on average should not be different than any other day (i.e., 30 days pre- and post-benchmark periods). However, the average abnormal daily volume for the announcers is 0.30% (significant at a $p < 0.001$), indicating that on the announcement days, firms generally receive significantly more market attention compared to that on non-announcement days. Lastly, even though the investors are expected to pay less attention to the non-announcing firms, the magnitude of the average attention as measured by abnormal trading activity is not statistically significant ($p = 0.41$).\textsuperscript{27} Value-weighted average daily bid-ask spread is nearly 0.6%, while maximum daily spread is around 2%.

\textbf{6.2 Correlations}

Table 2 reports the Pearson correlations among selected variables of interest. The correlation coefficients are consistent with the main results of this study as discussed in Sections

\textsuperscript{27} While calculating the firm-level abnormal volume for non-announcers on day $t$ by using the equation (2), any day with an earnings announcement is excluded from the benchmark period (i.e., the days from $t-41$ to $t-11$ and $t+11$ to $t+41$). This guarantees the benchmark period to be a non-event period.
6.3 through 6.6. For example, the significant positive correlation (0.201, \( p < 0.001 \)) between percentage of announcers (\( EW\_ANN \)) and aggregate market attention measured as the abnormal volume for all firms (\( ABVOL\_ALL \)) suggests that information transfer effect dominates the attention effects at the aggregate level. However, when we separated the aggregate attention between announcers and non-announcers, a very intuitive correlation pattern emerged. we found a strong negative correlation (-0.09) between percentage of announcers and abnormal turnover for the announcers (\( ABVOL\_ANN \)), while a positive correlation (0.16) existed for the remaining set of non-announcing firms (\( ABVOL\_NON \)) with a \( p < 0.001 \). The preliminary evidence obtained from the correlation coefficients (-0.09 and 0.16) accordingly showed that the information transfer effect dominates in practice for the non-announcers, and the distraction effect prevails for the announcers.

Moreover, there is widespread evidence that the correlation between the average daily absolute surprises (\( EW\_AES \)) and attention to the announcers (the non-announcers) is positive (negative) and significant (\( p < 0.01 \)). In addition, the correlation between aggregate surprise (\( EW\_AES \)) and aggregate market attention (\( ABVOL\_ALL \)) is negative (coefficient = -0.027 and \( p = 0.01 \)), supporting the notion that larger surprises distract investor attention from the overall market. Finally, the percentage of announcing firms is not correlated with both spread and volatility indexes, which indicates that arrival of more news to the market is not related to investors’ opinion divergence and volatility of the market.

**6.3 Market Attention and Number of Announcements**

This study first explores the relation between the aggregate market attention and the daily number of coincident earnings announcements, namely \( H1a \). Models 1 through 8 in Table 3 consistently show that the daily arrival of more earnings announcements eventually is associated
with higher aggregate market attention. we accordingly conclude that among the two behavioral theories competing for H1a, the attention and information transfer effects, information transfer effects quantitatively explain the initial empirical result. For example, the coefficient of 1.029 on \( EW_{ANN} \) in Model 1 of Table 3 means that when 1% of the firms announce earnings, the aggregate daily abnormal trading activity is 1.029 basis points higher (the coefficient 1.029 multiplied by the percentage of firms announcing earnings 0.01).

Moreover, overall daily investor attention rises in response to an increase in the actual percentage of announcers on day \( t \) after controlling for the investors’ expectation of the percentage of firms disclosing their earnings on day \( t \), \( LASTYEAR_{EW_{ANN}} \) (the coefficient is 0.737 in Model 2 of Table 3). Furthermore, aggregate market attention is still higher on the days when investor disagreement measured as bid-ask spread heightens (Model 3 of Table 3) while inclusion of market-wide daily volatility index does not alter the interpretation and the tenure of the main result (Model 4 of Table 3).\(^{28}\)

Consistent with the prior literature, the market response as measured by trading activity to the positive price changes is significantly higher than that to the negative price changes (Karpoff, 1987). That is, the magnitude of coefficient on \( POSRET \) is significantly higher than on \( NEGRET \) with a p-value<0.10, which supports the commonly accepted argument that the optimism of the “bull” investors is greater than the pessimism of the “bear” investors.

Overall, the strong results indicate that an increase in the same-day number of earnings announcements conveys more information pertinent to the aggregate market, and hence spurs the aggregate market attention on that day.

\(^{28}\) Day of week and year dummy variables are included in each regression model.
A potential concern for the documented evidence when employing an equal-weighted metric measuring the percentage number of announcers is that size of the announcing firms is not incorporated into the metric. We addressed this issue by creating a new metric, the value-weighted percentage of announcers (VW_ANN), based on the quarter-end market value of firms releasing earnings. After employing the new value-weighted metric in the empirical model (Models 5 through 8 of Table 3), all of the coefficients on the variable of interest (i.e., VW_ANN) remain statistically significant at the 1% level and present results consistent with the evidence documented earlier in this study (i.e., the results from Models 1 through 4 of Table 3).

Although exploring the aggregate market attention in response to the arrival of daily news is some of the descriptive interest, the more pertinent issue is how this relationship separately shows up among the announcers and non-announcers portion of the aggregate market. In other words, disaggregating the overall attention to the announcers and non-announcers provides direct insights about the relative importance of attention and transfer effects on the two components of aggregate volume.

In particular, a closer inspection of Models 1 through 4 at of Table 4 reveals that investor reaction to the non-announcing firms on high earnings announcement days is more pronounced than that on low news days. In other words, investors are more attentive to the non-announcing firms on days with more competing announcements. A potential explanation for this documented positive relationship is that a high number of earnings disclosures transfers a sizeable amount of information from the announcers across the market, eventually leading to increased market attention toward the remaining set of non-announcing firms (i.e., the information transfer hypothesis). In particular, a 0.63 basis points higher trading volume is generally experienced by the non-announcers when 1% of firms release earnings (Models 1 and 2 of Table 4).
In addition, consistent with the firm-level evidence from Hirschleifer et al. (2009a), Models 5 through 8 of Table 4 suggest that when 1% of the firms announce their earnings, investor attention to the announcers as measured by the abnormal trading activity is 3.9 to 5.6 basis points lower (the coefficients -3.9 and -5.6 multiplied by percentage of firms announcing earnings 0.01). In terms of economic significance, for example, 3.9 basis points represent around 13% of the overall sample abnormal volume for the announcing firms (i.e., 3.9 bps divided by 30 bps from Table 1). Finally, including the both market returns, bid-ask spread and market-wide volatility do not change the tenure of the main results.

6.4 Market Attention and Earnings Surprises

This section investigates the relationship between the magnitude of the earnings surprises and aggregate investor attention. The main finding in this section shows that the aggregate market attention is distracted as the scale of the surprise becomes larger (Models 1 through 8 of Table 5). In particular, the coefficient of -0.011 on $EW_{AES}$ in Model 4 of Table 5 means that when the daily aggregate earnings surprise is 100% higher, the aggregate market attention as measured by abnormal trading activity is 1.1 basis points lower (p-value <0.01). The main evidence suggests, then, that among the two competing arguments based on the attention and information transfer hypothesis, the reduced aggregate market attention is primarily due to dominance of distraction of large scale news.

The inference drawn from the above finding is that when large earnings surprises are announced, investors are likely to pay more attention to the announcers while withdrawing their attention from the non-announcers (i.e., the attention hypothesis). Another possible interpretation of the finding is that extreme earnings surprises are likely to be idiosyncratic and therefore do not transfer any information concerning the non-announcers. In other words, information transfer
effects should not indicate a significant market attention towards the non-announcing firms on the large earnings surprise days.

In order to gain a better understanding of relative strengths of the two effects, we start examining the market reaction to the magnitude of earnings news for the announcing and non-announcing firms. Results showed that an increase in the scale of earnings surprises attracts investor attention to the announcers, and distracts investor attention from the non-announcers. For example, a 100% rise in the average magnitude of the daily surprise induces a reduction of 1.06 basis points in abnormal volume for the non-announcers (see Model 4 of Table 6). The evidence for the announcers is also consistent with early trade volume literature, although it is insignificant.

A general explanation for this finding is that investors generally have limited resources available to process information about the securities and will, therefore, allocate their resources to attention-grabbing events. Because large surprises can be classified as attention-grabbing events, the so-called “limited” investor attention is directed to the announcers and therefore the attention is distracted from the overall market. The evidence presented in Table 6 is also consistent with the psychology literature defining attention as the cognitive process of selectively focusing on one aspect of the environment while ignoring others (Anderson, 2004; James, 1890).

Panel B of Table 6 explore the relationship between the magnitude of the surprise and investor attention to the non-announcers and announcers by employing the value-weighted average earnings surprise measure, respectively. Similar to the previous evidence, we find that the market pays greater attention to the announcers, albeit by a statistically insignificant amount, as the size of the earnings surprise gets larger. However, the investor attention to the non-announcers strongly declines on days where large surprises are on average reported.
6.5 Market Attention and Large vs. Small Numbers of Announcements

This study also investigates size related distracting and transfer effects. In particular, we examine the association between market attention as measured by trading activity and the percentage of large number of announcers and find that the aggregate market attention is magnified during the periods of high number of large announcers (Models 1 through 3 of Table 7). This finding therefore suggests that earnings announcements made by large firms on average convey more information relevant to the aggregate market than those made by small firms. The aggregate level evidence is also consistent with the firm-level evidence from Asthana and Mishra (2001), which showed that large firms contain more information about the non-announcers than the small firms within an industry.

Moreover, the stronger information transfer effect by large firms is also in line with the commonly accepted notion that large firms are followed by more analysts, financial press and investors. The findings also highlight the importance of the recent evidence from Barron et al. (2009), which documented that the relation between volume and firm size has recently become positive.  

As is discussed in the previous results sections, decomposing the aggregate market attention into the announcers and non-announcers is likely to provide much more detailed insights regarding the size related attention and transfer effects. For example, we find that the previously documented investor inattention to the announcers by Hirschleifer et al. (2009a) is mainly driven by small firms (see Models 7 through 9 of Table 7). A possible explanation is that unrelated news distracts investors more than related news (see Table VIII of Hirschleifer et al.,

Moreover, inferences drawn from Model 1 of Table 7 remain intact after controlling for the average surprise, expected number of announcements, bid-ask spread, market-wide volatility, and market return (Models 2 and 3 of Table 7).
and large firms are more likely to reveal more industry-related news than the small firms. The arrival of greater number of the same-day earnings announcements by small firms therefore distracts the investor attention from the set of announcing firms.

However, when it comes to the attention to the set of non-announcing firms, this study suggests that a significant amount of information pertinent to the non-announcers is conveyed by the greater number announcements of large announcers. Therefore, consistent with the information transfer hypothesis, we document that investor attention to the non-announcers is heightened (Models 4 through 6 of Table 7).

7. Concluding Remarks

This study’s results indicate that earnings information directly affects aggregate market attention. The attention hypothesis borrowed from behavioral finance and psychology and the information transfer hypothesis provide the key guidance to explore the association between earnings information and overall market attention. The limited investor attention view suggests that aggregate attention should be distracted on heavy number of news event days while information transfer hypothesis predicts a higher market attention on such days. However, the interplay of these two opposing views is not known a priori and hence leaves the overall effect as an unsolved question. This study is the first one that seeks to solve the aggregate level puzzle and thus offers contributions along numerous lines of inquiry.

Different from Hirschleifer et al.’s (2009a) firm-level evidence, we find that the aggregate market attention is higher on the days with a large number of earnings announcements, suggesting that the information transfer effects play the dominant role in practice. However, decomposing the aggregate volume into the announcers and non-announcers further explains this
relationship and provides a much more detailed insight to compare relative strengths of attention and transfer effects. Specifically, we find that investor attention as measured by trading activity to the announcing firms is significantly distracted on high number of announcement days. On the other hand, the remaining non-announcing securities experience a substantial upward market attention on these high news days. My findings therefore suggest that the distraction effect explains investor inattention toward the announcers while information spillover dominates the distraction effect and leads to an increased market attention toward the non-announcers.

This study also explores how the magnitude of earnings surprises moves the aggregate market attention. The empirical evidence indicates that surprise-related volume movements decline with the scale of the surprise at the aggregate level. However, disaggregating the overall market volume shows that extreme surprises weakly attract investor attention toward the announcing firms while strongly taking investor attention away from non-announcing firms.

Third, classifying the announcers as large and small firms and conducting the above analyses reveal that information transfer effects at the aggregate level are more pronounced on the days with higher number of large announcers while the investor distraction toward the announcers is largely due to the small number of firms; this is consistent with Hirschleifer et al.’s (2009a) results.

In conclusion, this study is the first attempt to explain the aggregate market attention as measured by aggregate trading activity in response to arrival of the same-day competing earnings announcements. The results generally show that the investors’ attention directed toward the two disjoint sets of firms, the announcers and the non-announcers, move in different directions following the arrival of news events.
REFERENCES


ATIASE, PK 1985 Predislosure information, firm capitalization and security price behavior around earnings announcements Journal of Account Research, 23 (1985), pp. 21–36 (Spring)


HIRSHLEIFER, D., S. LIM AND S. H. TEOH “Driven to distraction: extraneous events and underreaction to earnings news” Journal of Finance, 64 (2009a)


### Variable Definitions

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Price</strong></td>
<td>End of the day share price,</td>
</tr>
<tr>
<td><strong>VOL</strong></td>
<td>Daily volume of the security in millions,</td>
</tr>
<tr>
<td><strong>SHO</strong></td>
<td>Total shares outstanding in millions,</td>
</tr>
<tr>
<td><strong>TURNOVER_ALL (%)</strong></td>
<td>Value-weighted (based on closing day market value of stock) average percentage of shares traded (i.e. VOL/SHO) for all firms,</td>
</tr>
<tr>
<td><strong>TURNOVER_AN ( %)</strong></td>
<td>Value-weighted (based on closing day market value of stock) average percentage of shares traded (i.e. VOL/SHO) for announcing firms,</td>
</tr>
<tr>
<td><strong>TURNOVER_NON (%)</strong></td>
<td>Value-weighted (based on closing day market value of stock) average percentage of shares traded (i.e. VOL/SHO) for non-announcing firms,</td>
</tr>
</tbody>
</table>
| **ES**        | Seasonally differenced quarterly earnings per share (EPS) before extraordinary items scaled by the absolute value of earnings per share from four quarters before the earnings announcement. i.e. 

\[
ES_{t,q} = (EPS_{t,q} - EPS_{t,q-4})/abs(EPS_{t,q-4})
\]

| **ABVOL**     | Abnormal trading volume computed as the difference between the turnover on day t minus the average turnover of 30 days pre (from day t-40 to t-11) and post (from day t+11 to t+40) periods. i.e. 

\[
ABVOL_{t,q} = VOL_{t,q} - \left( \frac{\sum_{t-41}^{t-11} VOL_{t,q} / SHO_{t,q}}{30} + \frac{\sum_{t+11}^{t+40} VOL_{t,q} / SHO_{t,q}}{30} \right) / 2
\]

| **ABVOL_AN (%)** | Value-weighted (based on closing day market value of stock) abnormal trade volume of the firms announcing earnings on day t, |
| **ABVOL_NON (%)** | Value-weighted (based on closing day market value of stock) abnormal trade volume of the non-announcing firms on day t, |
| **ABVOL_ALL (%)** | Value-weighted (based on closing day market value of stock) abnormal trade volume of the all firms traded on day t, |
| **MVE**        | Quarter-end market value of equity in billions, |
| **EW_ES**      | Equal-weighted average earnings surprises announced over trading days t-1 through t+1 relative to day t |
| **VW_ES**      | Value-weighted (based on quarter end market value of stock) average earnings surprises announced over trading days t-1 through t+1 relative to day t |
EW_AES
Equal-weighted average of absolute value earnings surprises announced over trading days t-1 through t+1 relative to day t

VW_AES
Value-weighted average (based on quarter end market value of stock) absolute value of earnings surprises announced over trading days t-1 through t+1 relative to day t

EW_ANN (%)
Equal-weighted average percentage of firms announcing earnings over trading days t-1 through t+1 relative to day t,

Last year_EW_ANN (%)
Equal-weighted average percentage of firms announcing earnings last year on trading day t,

Last year_VW_ANN (%)
Value-weighted (based on quarter end market value of stock) average percentage of firms announcing earnings last year on trading day t,

VW_ANN (%)
Value-weighted average (based on quarter end market value of equity) percentage of firms announcing earnings over trading days t-1 through t+1 relative to day t,

Pos_ANN (%)
Average percentage of firms announcing positive earnings surprises among the announcers over trading days t-1 through t+1 relative to day t.

Large_ANN (%)
Average percentage of large announcers among the set of announcing firms over trading days t-1 through t+1 relative to day t,

VWRET
Value-weighted CRSP market index return constructed for NYSE/AMEX stocks on trading day t,

POSRET
Max(0,VWRET)

NEGRET
Min(0,VWRET)

NUM_ANN
Number of firms announcing earnings on day t,

NUM_ALL
Number of firms releasing earnings in calendar quarter q,

NUM_PosANN
Number of firms announcing positive earnings surprises on day t,

NUM_LargeANN
Number of large firms announcing earnings on day t,

SPREAD
Value-weighted (based on closing day market value of stock) average bid-ask spread across all firms on day t. The bid-ask spread for each firm i is computed as
\[
\frac{\text{Ask}_i - \text{Bid}_i}{(\text{Ask}_i + \text{Bid}_i)/2}
\]
where \(\text{Ask}_i\) and \(\text{Bid}_i\) are the firm i’s daily closing ask (bid) price,

VIX
Daily volatility index is published by the Chicago Board Options Exchange.
### TABLE 1
Sample Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std Dev</th>
<th>P25</th>
<th>Median</th>
<th>P75</th>
<th>Min</th>
<th>Max</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>EW_ANN</td>
<td>0.0163</td>
<td>0.0160</td>
<td>0.0044</td>
<td>0.0088</td>
<td>0.0235</td>
<td>0.0002</td>
<td>0.0900</td>
<td>7204</td>
</tr>
<tr>
<td>VW_ANN</td>
<td>0.0161</td>
<td>0.0225</td>
<td>0.0020</td>
<td>0.0054</td>
<td>0.0195</td>
<td>0.0000</td>
<td>0.1449</td>
<td>7204</td>
</tr>
<tr>
<td>NUM_ANN</td>
<td>27.2709</td>
<td>30.7035</td>
<td>7</td>
<td>14</td>
<td>37</td>
<td>1</td>
<td>220</td>
<td>7204</td>
</tr>
<tr>
<td>NUM_PosANN</td>
<td>16.7593</td>
<td>19.6810</td>
<td>4</td>
<td>9</td>
<td>22</td>
<td>0</td>
<td>142</td>
<td>7204</td>
</tr>
<tr>
<td>NUM_NegANN</td>
<td>10.5148</td>
<td>12.4122</td>
<td>2</td>
<td>6</td>
<td>15</td>
<td>0</td>
<td>112</td>
<td>7204</td>
</tr>
<tr>
<td>NUM_LargeANN</td>
<td>2.7259</td>
<td>4.4472</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>32</td>
<td>7204</td>
</tr>
<tr>
<td>NUM_SmallANN</td>
<td>24.5482</td>
<td>27.0635</td>
<td>6</td>
<td>13</td>
<td>34</td>
<td>0</td>
<td>198</td>
<td>7204</td>
</tr>
<tr>
<td>Large_ANN</td>
<td>0.0822</td>
<td>0.0717</td>
<td>0.0303</td>
<td>0.0661</td>
<td>0.1228</td>
<td>0</td>
<td>0.5278</td>
<td>7204</td>
</tr>
<tr>
<td>Pos_ANN</td>
<td>0.6045</td>
<td>0.1324</td>
<td>0.5257</td>
<td>0.6158</td>
<td>0.6910</td>
<td>0</td>
<td>1</td>
<td>7204</td>
</tr>
<tr>
<td>NUM_ALL</td>
<td>1667.4900</td>
<td>206.5625</td>
<td>1458</td>
<td>1756</td>
<td>1844</td>
<td>1272</td>
<td>1944</td>
<td>7204</td>
</tr>
<tr>
<td>EW_ES</td>
<td>0.0302</td>
<td>0.6101</td>
<td>-0.2094</td>
<td>0.0877</td>
<td>0.3441</td>
<td>-5.6386</td>
<td>4.8644</td>
<td>7204</td>
</tr>
<tr>
<td>VW_ES</td>
<td>0.1480</td>
<td>0.6123</td>
<td>-0.0886</td>
<td>0.1345</td>
<td>0.3735</td>
<td>-4.6531</td>
<td>5.4015</td>
<td>7204</td>
</tr>
<tr>
<td>EW_AES</td>
<td>1.0845</td>
<td>0.5345</td>
<td>0.7393</td>
<td>0.9894</td>
<td>1.2969</td>
<td>0.0536</td>
<td>5.9298</td>
<td>7204</td>
</tr>
<tr>
<td>VW_AES</td>
<td>0.7838</td>
<td>0.5673</td>
<td>0.4329</td>
<td>0.6300</td>
<td>0.9484</td>
<td>0.0522</td>
<td>5.8452</td>
<td>7204</td>
</tr>
</tbody>
</table>

Panel A of Table 1 reports descriptive statistics for the daily aggregate level data for the announcing firms from January 2, 1981 through December 31, 2009. EW_ANN (VW_ANN) is the equal-weighted (value-weighted) average percentage number of firms announcing earnings over trading days t-1 through t+1 relative to day t, NUM-ANN is the number of firms announcing earnings on day t, NUM_PosANN (NUM_NegANN) is the number of firms announcing positive (negative) earnings surprises on day t, NUM_LgANN (NUM_SmANN) is the number of large (small) firms announcing earnings on day t, NUM_ALL is the number of all firms disclosing earnings in quarter-q where the trading day t belongs to quarter-q, Large_ANN (%) is average percentage of large announcers among the set of announcing firms over trading days t-1 through t+1 relative to day t, Pos_ANN (%) is average percentage of firms announcing positive earnings surprises among the announcers over trading days t-1 through t+1 relative to day t, EW_ES (VW_ES) is the equal-weighted (value-weighted) average earnings surprises announced over trading days t-1 through t+1 relative to day t where the surprise is the seasonally differenced quarterly earnings per share before extraordinary items scaled by the absolute value of earnings per share from four quarter before the earnings announcement and EW_AES (VW_AES) is the equal-weighted (value-weighted) average absolute value of earnings surprises.
TABLE 1-Continued
Sample Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Panel B: Aggregate Daily Data for All Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
</tr>
<tr>
<td>TURNOVER_ALL (%)</td>
<td>0.3790</td>
</tr>
<tr>
<td>TURNOVER_ANN (%)</td>
<td>0.7179</td>
</tr>
<tr>
<td>TURNOVER_NON (%)</td>
<td>0.3757</td>
</tr>
<tr>
<td>ABVOL_ALL (%)</td>
<td>0.0024</td>
</tr>
<tr>
<td>ABVOL_ANN (%)</td>
<td>0.3055</td>
</tr>
<tr>
<td>ABVOL_NON (%)</td>
<td>-0.0009</td>
</tr>
<tr>
<td>VWRET</td>
<td>0.0003</td>
</tr>
<tr>
<td>POSRET</td>
<td>0.0036</td>
</tr>
<tr>
<td>NEGRET</td>
<td>-0.0033</td>
</tr>
<tr>
<td>VIX</td>
<td>20.2799</td>
</tr>
<tr>
<td>SPREAD</td>
<td>0.0061</td>
</tr>
</tbody>
</table>

Panel B of Table 1 reports descriptive statistics for the daily aggregate level data for all firms from January 2, 1981 through December 31, 2009. TURNOVER_ALL (TURNOVER_ANN) is all (announcing) firms' value-weighted average percentage of shares traded (i.e. VOL/SHO). ABVOL_ANN is the value-weighted average abnormal trade volume of the firms announcing earnings on day t. ABVOL_NON is the value-weighted average abnormal trade volume of the firms not announcing earnings on day t. ABVOL_ALL is the value-weighted average abnormal trade volume of the all firms traded on day t. VWRET is the CRSP value-weighted market index return. POSRET (NEGRET) is the CRSP value-weighted positive (negative) market index return. VIX is daily volatility index published by the Chicago Board Options Exchange. SPREAD is value-weighted average bid-ask spread across all firms on day t where firm level bid-ask spread is computed as ask price minus bid price scaled by midpoint of bid and ask price.
Table 2 reports Pearson correlations between the indicated variables from January 2, 1981 through December 31, 2009. **EW_ANN (VW_ANN)** is the equal-weighted (value-weighted) average percentage number of firms announcing earnings over trading days $t-1$ through $t+1$ relative to day $t$, **NUM_ANN** is the number of firms announcing earnings on day $t$, **EW_AES (VW_AES)** is the absolute value of the equal-weighted (value-weighted) average earnings surprise, **ABVOL_ANN** is the value-weighted average abnormal trade volume of the firms announcing earnings on day $t$, **ABVOL_NON** is the value-weighted average abnormal trade volume of the firms not announcing earnings on day $t$, **ABVOL_ALL** is the value-weighted average abnormal trade volume of the all firms traded on day $t$, **VWRET** is the CRSP value-weighted market index return, **VIX** is daily volatility index published by the Chicago Board Options Exchange, **SPREAD** is value-weighted average bid-ask spread across all firms on day $t$ where firm level bid-ask spread is computed as ask price minus bid price scaled by midpoint of bid and ask price.
TABLE 3

Abnormal Trading Volume Response to Number of Earnings Announcements: Analysis for All Firms

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
<th>Model 6</th>
<th>Model 7</th>
<th>Model 8</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EW_ANN</strong></td>
<td>1.029***</td>
<td>0.737***</td>
<td>0.878***</td>
<td>0.874***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(15.33)</td>
<td>(5.07)</td>
<td>(4.96)</td>
<td>(4.96)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>VW_ANN</strong></td>
<td>0.703***</td>
<td>0.477***</td>
<td>0.641***</td>
<td>0.653***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(17.41)</td>
<td>(6.51)</td>
<td>(6.20)</td>
<td>(6.35)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(15.63)</td>
<td>(15.57)</td>
<td>(11.34)</td>
<td>(8.88)</td>
<td>(15.62)</td>
<td>(15.63)</td>
<td>(11.38)</td>
<td>(8.88)</td>
</tr>
<tr>
<td>LastYear_EW_ANN</td>
<td>0.306**</td>
<td>0.359**</td>
<td>0.369**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.26)</td>
<td>(2.23)</td>
<td>(2.32)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SPREAD</strong></td>
<td>3.117***</td>
<td>1.509*</td>
<td>3.198***</td>
<td>1.545*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(3.23)</td>
<td>(1.81)</td>
<td>(3.36)</td>
<td>(1.88)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>VIX</strong></td>
<td>0.0023***</td>
<td></td>
<td></td>
<td>0.0023***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(3.05)</td>
<td></td>
<td></td>
<td>(3.16)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LastYear_VW_ANN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.238***</td>
<td>0.302***</td>
<td>0.303***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(3.60)</td>
<td>(3.26)</td>
<td>(3.30)</td>
<td>(</td>
</tr>
<tr>
<td>Intercept</td>
<td>-0.0443***</td>
<td>-0.0454***</td>
<td>-0.114***</td>
<td>-0.127***</td>
<td>-0.0387***</td>
<td>-0.0398***</td>
<td>-0.114***</td>
<td>-0.127***</td>
</tr>
<tr>
<td></td>
<td>(-11.95)</td>
<td>(-12.03)</td>
<td>(-11.04)</td>
<td>(-10.38)</td>
<td>(-10.88)</td>
<td>(-11.12)</td>
<td>(-11.05)</td>
<td>(-10.44)</td>
</tr>
<tr>
<td>No. of Observations</td>
<td>7204</td>
<td>7204</td>
<td>4192</td>
<td>4192</td>
<td>7204</td>
<td>7204</td>
<td>4192</td>
<td>4192</td>
</tr>
<tr>
<td>Adj-R²</td>
<td>0.173</td>
<td>0.174</td>
<td>0.169</td>
<td>0.179</td>
<td>0.171</td>
<td>0.172</td>
<td>0.170</td>
<td>0.181</td>
</tr>
</tbody>
</table>

Table 3 presents coefficients estimates from the following regression:

\[
ABCDEFGHIJKLMNOPQRSTUVWXYZ
\]

where ABVOL_ALL (in basis points) is the value-weighted average abnormal volume for all firms traded on day \( t \), EW_ANN (VW_ANN) is the equal-weighted (value-weighted) average percentage number of firms announcing earnings over trading days \( t-1 \) through \( t+1 \) relative to day \( t \), POSRET (NEGRET) is the CRSP value-weighted positive (negative) market index return, LastYear_EW_ANN is equal-weighted average percentage of firms announcing earnings last year on trading day \( t \), SPREAD is value-weighted average bid-ask spread across all firms on day \( t \), VIX is daily volatility index, Dt (Ys) is a vector of indicator variables for each day of the trading week (each year). Numbers in parentheses are t-statistics calculated using standard errors per White (1980). ***, **, * denote statistical significance at the 1%, 5% and 10% levels respectively.
TABLE 4
Abnormal Trading Volume Response to Number of Earnings Announcements: Analysis for Announcers and Non-Announcers

<table>
<thead>
<tr>
<th></th>
<th>Non-Announcers (ABVOL NON)</th>
<th>Announcers (ABVOL ANN)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1</td>
<td>Model 2</td>
</tr>
<tr>
<td>EW_ANN</td>
<td>0.632***</td>
<td>0.628***</td>
</tr>
<tr>
<td></td>
<td>(3.61)</td>
<td>(3.61)</td>
</tr>
<tr>
<td>VW_ANN</td>
<td></td>
<td>0.420***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(4.13)</td>
</tr>
<tr>
<td>POSRET</td>
<td>4.805***</td>
<td>4.189***</td>
</tr>
<tr>
<td></td>
<td>(11.32)</td>
<td>(8.88)</td>
</tr>
<tr>
<td>NEGRET</td>
<td>-4.285***</td>
<td>-3.347***</td>
</tr>
<tr>
<td></td>
<td>(-10.40)</td>
<td>(-6.67)</td>
</tr>
<tr>
<td>Last year EW_ANN</td>
<td>0.325**</td>
<td>0.334**</td>
</tr>
<tr>
<td></td>
<td>(2.04)</td>
<td>(2.13)</td>
</tr>
<tr>
<td></td>
<td>(3.45)</td>
<td>(2.02)</td>
</tr>
<tr>
<td>VIX</td>
<td>0.00237***</td>
<td>0.00242***</td>
</tr>
<tr>
<td></td>
<td>(3.14)</td>
<td>(3.23)</td>
</tr>
<tr>
<td>LastYear VW_ANN</td>
<td>0.290***</td>
<td>0.291***</td>
</tr>
<tr>
<td></td>
<td>(3.18)</td>
<td>(3.23)</td>
</tr>
<tr>
<td>Intercept</td>
<td>-0.114***</td>
<td>-0.128***</td>
</tr>
<tr>
<td></td>
<td>(-11.28)</td>
<td>(-10.60)</td>
</tr>
<tr>
<td>Observations</td>
<td>4192</td>
<td>4192</td>
</tr>
<tr>
<td>Adj-R²</td>
<td>0.155</td>
<td>0.166</td>
</tr>
</tbody>
</table>

Table 4 presents coefficient estimates from the following regression:

\[
\text{ABVOL}_{\text{NON}}(t) = \beta_0 + \beta_1 \text{EW}_\text{ANN}_t + \beta_2 \text{POSRET}_t + \beta_3 \text{NEGRET}_t + \beta_4 \text{LASTYEAR}_\text{EW}_\text{ANN}_t + \beta_5 \text{SPREAD}_t + \beta_6 \text{VIX}_t + \beta_7 D_t + \beta_8 Y_s + \epsilon_t
\]

where \(\text{ABVOL}_{\text{ANN}}(\text{ABVOL}_{\text{NON}})\) (in basis points) is the value-weighted average abnormal volume for announcing (non-announcing) firms traded on day \(t\), \(\text{EW}_\text{ANN}\) (\(\text{VW}_\text{ANN}\)) is the equal-weighted (value-weighted) average percentage number of firms announcing earnings over trading days \(t-1\) through \(t+1\) relative to day \(t\), \(\text{POSRET}\) (\(\text{NEGRET}\)) is the CRSP value-weighted positive (negative) market index return, \(\text{LASTYEAR}_\text{EW}_\text{ANN}\) is equal-weighted average percentage of firms announcing earnings last year on trading day \(t\), \(\text{SPREAD}\) is value-weighted average bid-ask spread across all firms on day \(t\), \(\text{VIX}\) is daily volatility index, \(D_t\) (\(Y_s\)) is a vector of indicator variables for each day of the trading week (each year). Numbers in parentheses are t-statistics calculated using standard errors per White (1980). ***, **, and * denote statistical significance at the 1%, 5% and 10% levels respectively.
### TABLE 5

**Abnormal Trading Volume Response to Earnings News: Analysis for All Firms**

<table>
<thead>
<tr>
<th>Dependent Variable: Abnormal Volume (ABVOL_ALL)</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
<th>Model 6</th>
<th>Model 7</th>
<th>Model 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>EW_AES</td>
<td>-0.00545*</td>
<td>-0.00529*</td>
<td>-0.00740*</td>
<td>-0.0114***</td>
<td>-0.00617***</td>
<td>-0.00605***</td>
<td>-0.00869***</td>
<td>-0.00992***</td>
</tr>
<tr>
<td>(1.75)</td>
<td>(-1.69)</td>
<td>(-1.75)</td>
<td>(-2.71)</td>
<td></td>
<td>(+2.64)</td>
<td>(+2.59)</td>
<td>(+3.02)</td>
<td>(+3.42)</td>
</tr>
<tr>
<td>VW_AES</td>
<td>0.00617***</td>
<td>0.00605***</td>
<td>0.00869***</td>
<td>0.00992***</td>
<td></td>
<td>(14.95)</td>
<td>(15.12)</td>
<td>(15.04)</td>
</tr>
<tr>
<td>(26.07)</td>
<td>(26.04)</td>
<td>(26.03)</td>
<td>(26.02)</td>
<td></td>
<td>(+2.64)</td>
<td>(+2.59)</td>
<td>(+3.02)</td>
<td>(+3.42)</td>
</tr>
<tr>
<td>EW_ANN</td>
<td>1.018***</td>
<td>0.737***</td>
<td>0.884***</td>
<td>0.882***</td>
<td>1.021***</td>
<td>0.740***</td>
<td>0.891***</td>
<td>0.889***</td>
</tr>
<tr>
<td>(15.63)</td>
<td>(15.57)</td>
<td>(15.51)</td>
<td>(15.46)</td>
<td></td>
<td>(+14.20)</td>
<td>(+14.13)</td>
<td>(+10.35)</td>
<td>(+6.57)</td>
</tr>
<tr>
<td>(15.63)</td>
<td>(15.57)</td>
<td>(15.51)</td>
<td>(15.46)</td>
<td></td>
<td>(+14.20)</td>
<td>(+14.13)</td>
<td>(+10.35)</td>
<td>(+6.57)</td>
</tr>
<tr>
<td>LastYear_EW_ANN</td>
<td>0.296**</td>
<td>0.345**</td>
<td>0.347**</td>
<td>0.295**</td>
<td>0.341**</td>
<td>0.348**</td>
<td>0.348**</td>
<td>0.348**</td>
</tr>
<tr>
<td>(2.19)</td>
<td>(2.14)</td>
<td>(2.19)</td>
<td>(2.18)</td>
<td></td>
<td>(2.11)</td>
<td>(2.19)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spread</td>
<td>3.321***</td>
<td>1.669**</td>
<td>3.345***</td>
<td>1.713**</td>
<td></td>
<td>(3.43)</td>
<td>(2.03)</td>
<td></td>
</tr>
<tr>
<td>(3.40)</td>
<td>(1.98)</td>
<td>(1.98)</td>
<td>(1.98)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VIX</td>
<td>0.00254***</td>
<td>0.00240***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3.32)</td>
<td>(3.17)</td>
<td>(3.17)</td>
<td>(3.17)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-0.0397***</td>
<td>-0.0409***</td>
<td>-0.109***</td>
<td>-0.121***</td>
<td>-0.0409***</td>
<td>-0.0420***</td>
<td>-0.108***</td>
<td>-0.120***</td>
</tr>
<tr>
<td>(8.66)</td>
<td>(8.81)</td>
<td>(10.79)</td>
<td>(10.52)</td>
<td></td>
<td>(10.21)</td>
<td>(10.31)</td>
<td>(10.45)</td>
<td>(9.95)</td>
</tr>
<tr>
<td>No. of Observations</td>
<td>7204</td>
<td>7204</td>
<td>4192</td>
<td>4192</td>
<td>7204</td>
<td>7204</td>
<td>4192</td>
<td>4192</td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>0.174</td>
<td>0.175</td>
<td>0.170</td>
<td>0.182</td>
<td>0.175</td>
<td>0.175</td>
<td>0.171</td>
<td>0.182</td>
</tr>
</tbody>
</table>

Table 5 presents coefficients estimates from the following regression:

\[
ABVOL_{\text{ALL}} = \beta_0 + \beta_1 EW_{\text{AES}} + \beta_2 EW_{\text{ANN}} + \beta_3 POSRET + \beta_4 NEGRET + \beta_5 LastYear_{\text{EW_ANN}} + \beta_6 Spread + \beta_7 VIX + \beta_8 D_t + \beta_9 Y_s + \epsilon_t
\]

where \(ABVOL_{\text{ALL}}\) (in basis points) is the value-weighted average abnormal volume for all firms traded on day \(t\), \(EW_{\text{AES}} (VW_{\text{AES}})\) is the equal-weighted (value-weighted) absolute value of the earnings surprise where the surprise is the seasonally differenced quarterly earnings before extraordinary items scaled by the absolute value of earnings per share from four quarter before the earnings announcement, \(EW_{\text{ANN}} (VW_{\text{ANN}})\) is the equal-weighted (value-weighted) average percentage number of firms announcing earnings over trading days \(t-1\) through \(t+1\) relatively to day \(t\), \(POSRET\) (\(NEGRET\)) is the CRSP value-weighted positive (negative) market index return, \(LastYear_{\text{EW_ANN}}\) is equal-weighted average percentage of firms announcing earnings last year on trading day \(t\), \(Spread\) is value-weighted average bid-ask spread across all firms on day \(t\), \(VIX\) is daily volatility index, \(D_t (Y_s)\) is a vector of indicator variables for each day of the trading week (each year). Numbers in parentheses are t-statistics calculated using standard errors per White (1980).***, ***, and * denote statistical significance at the 1%, 5% and 10% levels respectively.
### TABLE 6
Abnormal Trading Volume Response to Earnings News: Analysis for Announcers and Non-Announcers

<table>
<thead>
<tr>
<th>Dependent Variable: Abnormal Volume</th>
<th>Non-Announcers (ABVOL_NON)</th>
<th>Announcers (ABVOL_ANN)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1</td>
<td>Model 2</td>
</tr>
<tr>
<td>EW_AES</td>
<td>-0.00483</td>
<td>-0.00468</td>
</tr>
<tr>
<td></td>
<td>(-1.54)</td>
<td>(-1.49)</td>
</tr>
<tr>
<td>EW_ANN</td>
<td>0.804***</td>
<td>0.545***</td>
</tr>
<tr>
<td></td>
<td>(11.89)</td>
<td>(3.80)</td>
</tr>
<tr>
<td>POSRET</td>
<td>4.636***</td>
<td>4.631***</td>
</tr>
<tr>
<td></td>
<td>(15.58)</td>
<td>(15.52)</td>
</tr>
<tr>
<td>NEGRET</td>
<td>-3.892***</td>
<td>-3.881***</td>
</tr>
<tr>
<td></td>
<td>(-14.30)</td>
<td>(-14.23)</td>
</tr>
<tr>
<td>LastYear_EW_ANN</td>
<td>0.273**</td>
<td>0.312**</td>
</tr>
<tr>
<td></td>
<td>(2.05)</td>
<td>(1.96)</td>
</tr>
<tr>
<td>Spread</td>
<td>3.495***</td>
<td>1.818**</td>
</tr>
<tr>
<td></td>
<td>(3.59)</td>
<td>(2.17)</td>
</tr>
<tr>
<td>VIX</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-0.0362***</td>
<td>-0.0372***</td>
</tr>
<tr>
<td></td>
<td>(-7.93)</td>
<td>(-8.08)</td>
</tr>
<tr>
<td>No. of Observations</td>
<td>7204</td>
<td>7204</td>
</tr>
<tr>
<td>Adj-$R^2$</td>
<td>0.163</td>
<td>0.163</td>
</tr>
</tbody>
</table>
Abnormal Trading Volume Response to Earnings News: Analysis for Announcers and Non-Announcers

<table>
<thead>
<tr>
<th>Dependent Variable: Abnormal Volume</th>
<th>Non-Announcers (ABVOL_NON)</th>
<th>Announcers (ABVOL_ANN)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1</td>
<td>Model 2</td>
</tr>
<tr>
<td><strong>Panel B: Value-Weighted Earnings Surprise</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VW_AES</td>
<td>-0.00567**</td>
<td>-0.00555**</td>
</tr>
<tr>
<td></td>
<td>(-2.44)</td>
<td>(-2.39)</td>
</tr>
<tr>
<td>EW_ANNU</td>
<td>0.806***</td>
<td>0.547***</td>
</tr>
<tr>
<td></td>
<td>(12.03)</td>
<td>(3.82)</td>
</tr>
<tr>
<td>POSRET</td>
<td>4.628***</td>
<td>4.624***</td>
</tr>
<tr>
<td></td>
<td>(15.61)</td>
<td>(15.55)</td>
</tr>
<tr>
<td>NEGRET</td>
<td>-3.873***</td>
<td>-3.862***</td>
</tr>
<tr>
<td></td>
<td>(-14.26)</td>
<td>(-14.20)</td>
</tr>
<tr>
<td>LastYear_EW_ANNU</td>
<td>0.272**</td>
<td>0.308*</td>
</tr>
<tr>
<td></td>
<td>(2.04)</td>
<td>(1.93)</td>
</tr>
<tr>
<td>Spread</td>
<td>3.524***</td>
<td>1.859**</td>
</tr>
<tr>
<td></td>
<td>(2.04)</td>
<td>(1.93)</td>
</tr>
<tr>
<td>VIX</td>
<td>0.00245***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(3.26)</td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-0.0370***</td>
<td>-0.0380***</td>
</tr>
<tr>
<td></td>
<td>(-9.34)</td>
<td>(-9.44)</td>
</tr>
<tr>
<td>No. of Observations</td>
<td>7204</td>
<td>7204</td>
</tr>
<tr>
<td>Adj-R²</td>
<td>0.163</td>
<td>0.164</td>
</tr>
</tbody>
</table>

Panel B of Table 6 presents coefficients estimates from the following regression:

\[
ABVOL_{NON}(ABVOL_{ANN}) = \beta_0 + \beta_1VW_{AES} + \beta_2EW_{ANN} + \beta_3POSRET + \beta_4NEGRET + \beta_5LASTYEAR_{EW_{ANN}} + \beta_6SPREAD + \beta_7VIX + \beta_8D + \beta_9Y + \epsilon,
\]

where ABVOL_{NON} (ABVOL_{ANN}) (in basis points) is the value-weighted average abnormal volume for announcing (non-announcing) firms traded on day t, EW_{AES} (VW_{AES}) is the equal-weighted (value-weighted) absolute value of the earnings surprise where the surprise is the seasonally differenced quarterly earnings per share before extraordinary items scaled by the absolute value of earnings per share from four quarter before the earnings announcement, EW_{ANN} (VW_{ANN}) is the equal-weighted (value-weighted) average percentage number of firms announcing earnings over trading days t-1 through t+1 relative to day t, POSRET (NEGRET) is the CRSP value-weighted positive (negative) market index return, LastYear_{EW_{ANN}} is equal-weighted average percentage of firms announcing earnings last year on trading day t, SPREAD is value-weighted average bid-ask spread across all firms on day t, VIX is daily volatility index, Dt (Y) is a vector of indicator variables for each day of the trading week (each year). Numbers in parentheses are t-statistics calculated using standard errors per White (1980). ***, **, and * denote statistical significance at the 1%, 5% and 10% levels respectively.
Table 7 presents coefficients estimates from the following regression:

\[ \text{ABVOL}_{t, \text{ALL}} = \beta_0 + \beta_1 \text{EW}_{t, \text{ANN}} + \beta_2 \text{EW}_{t, \text{ANN}} * \text{LARGE}_{t, \text{ANN}} + \beta_3 \text{POSRET}_{t} + \beta_4 \text{NEGRET}_{t} + \beta_5 \text{LASTYEAR}_{t} + \beta_6 \text{SPREAD}_{t} + \beta_7 \text{VIX}_{t} + \epsilon_t \]

where the dependent variables (in basis points) are the value-weighted average abnormal volume for all, announcing and non-announcing firms traded on day \( t \), \( \text{EW}_{t, \text{ANN}} \) is the equal-weighted average percentage number of firms announcing earnings over trading days \( t-1 \) through \( t+1 \) relative to day \( t \), \( \text{Large}_{t, \text{ANN}} \) is average percentage of large announcers among the set of announcing firms over trading days \( t-1 \) through \( t+1 \) relative to day \( t \), \( \text{POSRET} \) (\( \text{NEGRET} \)) is the CRSP value-weighted positive (negative) market index return, \( \text{LastYear}_{t} \) is equal-weighted average percentage of firms announcing earnings last year on trading day \( t \), \( \text{SPREAD} \) is value-weighted average bid-ask spread across all firms on day \( t \), \( \text{VIX} \) is daily volatility index, \( \text{Dt} (Y_s) \) is a vector of indicator variables for each day of the trading week (each year). Numbers in parentheses are t-statistics calculated using standard errors per White (1980). *** ', ** ', and * ' denote statistical significance at the 1%, 5% and 10% levels respectively.