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Limited Attention and Annual Earnings Announcements

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ABSTRACT

This paper examines market responses at different times of annual earnings announcements in Taiwan. Since accounting information is available on the Internet at almost no cost, we argue that there is still a cost of limited attention to investors. The empirical results show that the unexpected return changes at the outset of the earnings announcements season are insignificant. As the filings of annual reports intensify, investors become attentive to the massive earnings news and trade accordingly with an increase in unexpected return changes, culminating at the end of the earnings announcement season. We find a significant decrease in trading volume for good news and bad news announced after the statutory due date, which does not necessarily imply investor inattention since a consensus in the market decreases trading volume. We end by examining the trading activity of different types of investors during the earnings filing period. Overall, our findings suggest that the attention allocation by investors is not homogeneous during annual earnings announcements and support the hypothesis of limited attention.

1. INTRODUCTION

When financial reports are released to the market, changes in equilibrium prices or portfolio choice imply that announcements contain information which could possibly alter investors' beliefs (Stice, 1991). However, the empirical evidence of market reaction around earnings announcements dates demonstrates mixed results. Although these discrepancies in findings may be the result of differences in sample and methodology, they are also the result of changes in information technology that affect the timing and pervasiveness of obtaining accounting information.

According to the Securities and Exchange Law in Taiwan, listed companies must transmit their annual reports to MOPS (Market Observation Post System) in electronic file format within four months after the end of each fiscal year. Similarly, the U.S. SEC (Securities and Exchange Commission) launched its electronic filing system in 1996. The innovation of information technology has since then allowed the implementation of the EDGAR (Electronic Data Gathering, Analysis, and Retrieval) system in the U.S., a counterpart of MOPS in Taiwan, which provides the most comprehensive and detailed single source of financial information to investors available over the Internet (Griffin, 2003). Asthana and Balsam (2001) argue that EDGAR reduces the cost of obtaining financial reports, while it increases the speed and uniformity of those reports disseminated to the market.[1]

Early studies find limited market reaction to a pre-EDGAR 10-K report (e.g., Cready and Mynatt, 1991; Stice, 1991; Easton and Zmijewski, 1993), perhaps, because in the paper filing system the 10-K report becomes available over a period of days to the market, such that it is difficult to detect exactly when investors receive the 10-K report.[2] In turn, the electronic filing system provides condensed and accelerated information to the market, and theoretically, most investors can simultaneously view the reports via online, which has prompted market reaction to the filing of the 10-K

[1] Internet usage is increasing every year. For example, America Online reported that it had 26.7 million subscribers at the end of 2000 compared with 6.2 million at the middle of 1996 (Asthana et al., 2004). The reported Internet population in Taiwan was 10.6 million at the middle of 2009 compared with 3.01 million in 1998 (http://www.find.org.tw).

[2] In the paper filing system, Taiwanese investors interested in a firm's financial information had to purchase a newspaper or go to the Securities and Futures Information Center to read the accounting report. When investors did not know a priori on which newspaper and on what day the earnings were published, it generated much cost in time and attention during the search process.

report in the post-EDGAR period (e.g., Qi et al., 2000; Asthana and Balsam, 2001; Griffin, 2003).

In studies of market reaction to an earnings announcement, researchers generally agree that unexpected return changes imply information content. In contrast, researchers cannot draw a consistent conclusion regarding the interpretation of volume reactions (Verrecchia, 1981). Thus, Holthausen and Verrecchia (1990) argue that the informedness effect and consensus effect (the two information effects) usually occur jointly when financial information is released. This paper follows Holthausen and Verrecchia's economic rationale with regard to both return and volume effects at the time of earnings announcements. The informedness effect measures the degree to which investors become more knowledgeable about a company, resulting in an increase of unexpected return changes and trading volume. The consensus effect, on the other hand, measures the extent of agreement among investors, resulting in an increase of unexpected return changes, but a decrease in trading volume as investors' opinions become homogeneous.

Prior studies investigate investor response to electronic filing and argue that this would increase the market reaction due to the simultaneous and at almost no cost release of accounting information to all investors (Asthana and Balsam, 2001; Griffin, 2003). This paper differs from theirs in that we consider limits of cognitive resources during annual earnings announcements. Since the majority of listed firms in Taiwan have a fiscal year identical to the calendar year and most annual reports are filed close to the statutory due date, little evidence exists on the information processing during this period of intensive filing by the market.[3]

The filings are sparse at the beginning of earnings announcements season. As the filing season proceeds, investors' information gathering activity intensifies and their information sets grow (Sun, 2006). Thus, investors' attention to new earnings information is correlated with their information searching activities culminating at the end of the filing date.[4] This fact implies that investor attention is not homogeneous by displaying different market responses during the sequential release of accounting information. We refer to this as the limited attention hypothesis, and it is based on the

[3] In comparison with American companies, Asthana and Balsam (2001) show that 10-K filing dates appear from January through December, though most filing dates are clustered in March, April, September, and December. Thus, the demand of attention on earnings announcements has a distinct feature to that of the Taiwanese.

[4] Although the filing dates of listed firms are predictable to a large extent, the exact earnings announcement date of each firm is not known.

assumption that individual investors face searching and attention constraints during the earnings announcement season.

In this paper we examine the market response at different times of earnings announcements under three types of earnings news. Specifically, we divide the earnings announcements season into six intervals: before April, April $1^{st} - 10^{th}$, April $11^{th} - 20^{th}$, April $21^{st} - 25^{th}$, April $26^{th} - 30^{th}$, and after April. The choice of these six intervals, although arbitrary, is intended to examine the different market responses during the earnings announcement season. The intervals are mainly grouped into 10 calendar days in the month of April. Since earnings announcements are clustered in time, we further split the last 10 days of April into 5 days per interval.[5]

If early announcements cause investor inattention, the unexpected return changes should be tantamount to other non-announcement days. After some earnings are released that successively trigger investors' attention, the information gathering activities and market trading should eventually generate an increase in unexpected return changes and volume. If instead, limited attention does not affect the market's equilibrium prices or portfolio choice, the unexpected return changes and volume should be indifferent to other non-announcement days across different earnings announcements intervals.

We investigate whether the market responses of different earnings announcement intervals differ across good news, no news, and/or bad news.[6] The empirical results show that earnings announced around the last 10 days close to the statutory due date are more likely to attract investors' attention, in which the earnings information searching intensifies. While for earnings classified as no news, there are small but significant unexpected return changes for the first 20 days of April. We find significant decreases in trading volume for good news and bad news announced after the statutory due date. This evidence does not necessarily imply investor inattention since a decrease in trading volume suggests consensus in the market.

Theoretically, all investors face the same search problem when annual reports are filed on MOPS. However, institutional investors and individual investors respond

[5] The descriptive statistics of Table 1 in this paper report that the medians of earnings announcement dates cluster in the last 5 days of April. Thus, it is important to segregate the effect of mandatory filing deadlines surrounding the end of April from other days. Untabulated analysis shows that combining the two last five days into a 10-day interval (April $21^{st} - 30^{th}$) does not change the tenor of the results, but does provide less clear-cut information.

[6] We are grateful to the two anonymous referees that led to this analysis, strengthening the contribution of this paper.

differently to earnings news. While institutions use computers or pre-selection criteria to economize their cognitive resources, individual investors are less likely to devote such time and effort (Barber and Odean, 2008). Institutions and individual investors also differ in their decision processes to the same earnings news (Lee, 1992).

We examine the net buy-sell imbalance of different types of investors to shed light on their particular trading behavior during the earnings announcements season. Barber and Odean (2008) show that institutional investors tend to be net sellers and individual investors have a tendency to be net buyers on high attention days. Our findings corroborate Barber and Odean's argument in which investment trust investors and dealers in Taiwan become net sellers over the seven-day window $(-1, +5)$ for earnings announced as good news and bad news. While margin and non-margin investors buy stocks during the earnings filing period, their net buys, though significant, are scant in some intervals. Foreign institutional investors are the only net buyers under earnings classified as no news.

Hong and Stein (2007) argue that limited attention per se is not sufficient to generate interesting patterns in returns or volume; rather, it needs to be combined with the assumption that investors are unsophisticated and interpret the earnings news differently. Thus, this paper contributes to the existing empirical work on investors' attention allocation during annual earnings announcements season, market responses to earnings news, and the impact of information technology on the stock market.

2. RELATED STUDIES ON LIMITED ATTENTION

In comparison with the rationality assumption in traditional economics, Simon (1956) proposes the notion of bounded rationality, using the metaphor of a pair of scissors, where one blade represents the "cognitive limitations" of actual humans and the other is the "structure of the environment." The announcement of a company's earnings has changed from a paper filing system to an electronic filing system, which the latter provides costless and accelerated financial information to the market. Thus, studying only one blade is not enough, as it takes both for the scissors to cut.

A main feature of bounded rationality is limited attention. Since attention is a scarce resource, demanding tasks draw more resources (Kahneman, 1973). Many studies have shown that when primary and secondary tasks overlap temporally, the response to the secondary task suffers. Thus, poor performance on a secondary task may

reflect a depletion of resources (Milliken and Tipper, 1998). Pashler (1998) argues that the term attention not only refers to limitations in perceiving multiple stimuli, but also refers to more general limitations in mental functioning, such as in making decisions, storing information in memory, and planning actions. The allocation of attention is not a goal in and of itself; but rather it is driven by some primary goal that we have in ordinary life.

In a world where attention is a major scarce resource, information may be an expensive luxury, for it may turn our attention from what is important to what is unimportant (Simon, 1978). In financial markets, attention is a major factor in determining individual investors' stock buying (Barber and Odean, 2008). Moreover, individual investors may face a search problem when choosing from among thousands of stocks, thereby limiting their search to stocks that have recently caught their attention, with contrarian investors buying previous losers and momentum investors buying previous winners (Odean, 1999). Merton (1987) argues that individual investors tend to hold only a few different common stocks in their portfolios, since gathering information on stocks requires resources.

In contrast to the traditional approach in finance, several studies depart from rationality, assuming that investors have limited attention and cognitive processing power. For instance, there is a crowding-out effect wherein a salient disclosure distracts attention from another disclosure, and thereby reduces welfare (Hirshleifer et al., 2002). Investors with limited attention usually do not make full use of balance sheet information and solely focus on accounting profitability that neglects cash profitability information, showing predictability in the stock return (Hirshleifer et al., 2004). Hence, the consequences of limited attention and firms' reporting choices have effects on market prices (Hirshleifer and Teoh, 2003).

Stock market misreactions to different earnings components and post-earnings announcement drift anomalies are a consequence of limited investor attention (Hirshleifer and Teoh, 2006). Peng and Xiong (2006) find that investors process more market and sector-wide information than firm-specific information due to limited attention, which determines the cross-sectional patterns of stock returns. In addition, weekends distract investor attention temporarily with delayed stock responses on Friday announcements (Della Vigna and Pollet, 2009).

There are many events that attract investors' attention in the stock market. Barber and Odean (2008) pioneer the study of the trading behavior of investors in the presence of attention-grabbing events. They find that the buying behavior of individual investors

is influenced by abnormal trading volume, extreme stock returns, and news. Seasholes and Wu (2007) examine stocks in the Shanghai market and find stocks that hit upper price limits usually exhibit high returns, high trading volumes, and news coverage. They show that price limit events attract investors' attention inducing active individual investors to buy stocks.

Our paper differs in that we examine the different market responses to the timing of the six earnings announcements and across different earnings news signals. The evidence supports the limited attention hypothesis, in which investors' attention to the sequential release of earnings announcement are not homogeneous due to a limited cognitive resource. Despite this intuitive appeal of limited attention, evidence is still scarce. As with other empirical studies on limited attention, our paper provides indirect evidence since direct tests are unusual, because human attention and its allocation are difficult to measure in financial market settings (Corwin and Coughenour, 2008).

3. METHODOLOGY AND SAMPLE

Most investors' stock-buying decisions are driven by an attention-grabbing event, and earnings announcements surely attract the attention of investors. As information contained in the annual report is disseminated to the market, there is a condensed focus on these announcements, resulting in a change of return variability and trading volume (Holthausen and Verrecchia, 1990; Bamber and Cheon, 1995; Bamber et al., 1997). We employ SAAR (standardized absolute abnormal return), as used in previous literature, to measure the market response on return changes (e.g., Cready and Mynatt, 1991; Asthana and Balsam, 2001). Additionally, we also calculate SV (standardized volume) to measure the market response on the trading volume, as used in Asthana and Balsam (2001) and Asthana et al. (2004).

SAAR is obtained by subtracting the mean absolute abnormal return $\mu(|\mathrm{AR}|)$ during the non-announcement period $(-60, -11)$ from the absolute abnormal return $|\mathrm{AR}|$ during the earnings announcements period $(-1, +5)$, and then deflating by the standard deviation of absolute abnormal returns $\sigma(|\mathrm{AR}|)$ during the non-announcement period. The abnormal return is calculated by using the market model, with a 150-day $(-210, -61)$ estimation period. Thus, SAAR is defined as:

$$\text{SAAR} = \left(\frac{|\text{AR}| - \mu(|\text{AR}|)}{\sigma(|\text{AR}|)} \right). \tag{1}$$

SAAR is measured as an unsigned daily abnormal return because the primary concern of this study is with the magnitude of investors' response to the announcement of the annual earnings. Asthana and Balsam (2001) and Griffin (2003) posit that prior research uses the square of abnormal return as a form of measure, but the result is likely to be biased in favor of a few extreme stock returns. Hence, the use of standardized absolute return instead of standardized square return precludes the disturbance of extreme values and gives a more powerful test (Rohrbach and Chandra, 1989).

SV is obtained by subtracting the mean trading volume $\mu(\text{VOL})$ measured in shares during the non-announcement period $(-60, -11)$ from the trading volume VOL during the earnings announcements period $(-1, +5)$, and then deflating by the standard deviation of trading volume $\sigma(\text{VOL})$ during the non-announcement period. It is defined as:

$$\text{SV} = \left(\frac{\text{VOL} - \mu(\text{VOL})}{\sigma(\text{VOL})} \right). \tag{2}$$

If the release of annual earnings cannot attract investors' attention, then SAAR is expected to be indistinguishable from zero. On the contrary, if annual earnings attract investors' attention and have information content, then the return changes in the announcement period will be different from the non-announcement period. An earnings announcement is said to contain information if it can alter the beliefs of market participants in a systematic way (Beaver, 1998).

With the arrival of new information during the earnings announcements, Holthausen and Verrecchia (1990) identify two effects of new information: an informedness effect and a consensus effect. If information contained in the annual earnings increases informedness, then both the variance in unexpected return changes and trading volume will increase. However, if new information increases consensus, then the variance in unexpected return changes will increase, but trading volume will decrease. Note that the trading volume is influenced by both informedness and consensus effects, and it may shift upward or downward depending upon which effect dominates.

To examine whether different earnings timings have impacts on the stock market, we conduct the following multivariate tests:

$$\begin{aligned}\text{SAAR}_{it}(\text{SV}_{it}) = {} & \alpha + \beta_1 \text{DBGN}_{it} + \beta_2 \text{DMIDDLE}_{it} + \beta_3 \text{DPREND}_{it} \\ & + \beta_4 \text{DEND}_{it} + \beta_5 \text{DLATE} + \beta_6 \text{SIZE}_{it} + \beta_7 |\text{SUE}_{it}| \\ & + \beta_8 |\text{1Q\_SUE}_{it}| + \beta_9 \text{LEV}_{it} + \beta_{10} \text{LIQ}_{it} + \beta_{11} \text{INST}_{it} \\ & + \beta_{12} \text{WEEKEND}_{it} + \beta_{13} \text{SELECTION}_{it} + \varepsilon_{it}. \end{aligned} \tag{3}$$

The dependent variable is either SAAR or SV measured over the announcement of the annual earnings period for company i at filing date t. The dummy variables related to the different announcement timings are as follows: DBGN (1 = earnings announced during April $1^{\text{st}} - 10^{\text{th}}$, 0 = otherwise); DMIDDLE (1 = earnings announced during April $11^{\text{th}} - 20^{\text{th}}$, 0 = otherwise); DPREND (1 = earnings announced during April $21^{\text{st}} - 25^{\text{th}}$, 0 = otherwise); DEND (1 = earnings announced during April $26^{\text{th}} - 30^{\text{th}}$, 0 = otherwise); DLATE (1 = earnings announced after April, 0 = otherwise). We divide earnings announcements in the month of April into three intervals of 10 days, and the last 10 days in April are split into two five-day intervals.

3.1 Control Variables

In analyzing market response to earnings announcements, several firm characteristics and environmental information are taken as control variables. Thus, after controlling for possible influential factors, the multivariate tests allow us to examine if systematic behavioral biases are still encountered in the market. The control variables are firm size (SIZE), standardized unexpected earnings (SUE), standardized unexpected earnings of the current year's first quarter earnings (1Q_SUE), firm leverage (LEV), liquidity (LIQ), institutional holding (INST), annual earnings announced on Friday and weekends (WEEKEND), and self-selection parameter (SELECTION).[7] We also introduce the control for the year fixed effect.[8]

The electronic filing of annual reports helps firms transmit their financial infor-

[7] Prior studies have posited that trading volume is an indicator of the attention a stock is receiving (Barber and Odean, 2008), or an indicator of sentiment (Hong and Stein, 2007). However, there is no natural definition of trading volume. Thus, we do not formulate the predicted sign of control variables for standardized volume since trading volume also depends on investors' beliefs.

[8] There are many transitions in MOPS, which in turn lower the cost of obtaining financial information to investors. For example, in the pre-stage of MOPS, investors interested in a listed firm's financial reports had to go to a nearby brokerage office for retrieval. MOPS then offered free access over the Internet in July 1999, and investors can now read as well as download financial and operating information via online (see http://emops.tse.com.tw/emops_all.htm).

mation to more market participants. Thus, smaller firms generally convey more unexpected information and respond more than larger firms (Atiase, 1985; Bamber, 1987; Freeman, 1987). Firm size is measured as the log of the market value of common equity at two days prior to the annual reports' filing date, and we expect that firm size is negatively associated with return response.

Prior evidence finds that average abnormal returns associated with the release of financial reports published earlier (later) than expected are positive (negative), indicating that early (delayed) reports carry good (bad) news (Kross, 1981; Givoly and Palmon, 1982; Chambers and Penman, 1984; Kross and Schroeder, 1984). We expect that investors respond more strongly to firms with extreme unexpected earnings. The standardized unexpected earnings (SUE) is measured as the fourth quarter's EPS minus the EPS from four quarters ago, deflated by the standard deviation of EPS changes over the preceding eight quarters (see Chan et al., 1996). We use the absolute value of SUE to capture the magnitude of unexpected earnings as a control variable.

During the annual earnings announcement season, there exists competing information between the current year's first quarter earnings announcement and the last year's annual earnings announcement.[9] Since all investors have limited attention due to cognitive resource constraints, they must selectively allocate their attention. Several recent studies find that investors are not fully attentive to the accounting information (see, e.g., Hirshleifer and Teoh, 2003; Hirshleifer and Teoh, 2006), and investors are attracted by salient public news (Barber and Odean, 2008).

When competing announcements are on the same day or close to each other, investors must divide their attention and try to economize their cognitive resources by filtering away unimportant signals (Hirshleifer et al., 2009). Thus, if the unexpected earnings from the first quarter earnings announcement is greater (lower) than that of annual earnings announcement, then the unexpected earnings from the first quarter should be positively (negatively) associated with the market response over the earnings announcement season.

We measure the current year's first quarter standardized unexpected earnings (1Q_SUE) as the first quarter's EPS minus the first quarter's EPS of last year, deflated by the standard deviation of EPS changes over the preceding eight quarters (Chan et al., 1996). We use the absolute value to capture the magnitude of unexpected earnings

[9] When firms adopt the calendar year to their financial reporting, the filing statutory due dates for annual earnings filings and the first quarter earnings filings are both on the end of April (thanks to an anonymous referee).

from the concurrent first quarter earnings announcement as a control.

Firm leverage is an important indicator for a company's financial risk. A firm's debt level is associated with a different market response (Dhaliwal et al., 1991; Dhaliwal and Reynolds, 1994; Billings, 1999). When a firm's debt level is too high, there is a concern for future default and financial distress. In turn, a firm with a low debt level normally shows solid financial structure, and investors pay attention to this information. Firm leverage is measured as total debts deflated by total assets.

Lee et al. (2001) find that both information and liquidity trading play an important role in explaining the intraday pattern of trading volume. Since more liquid stocks may attract a larger group of investors, we include share turnover as a proxy variable to control for liquidity needs (Grullon et al., 2004). Liquidity is measured as an annual average of total monthly volume divided by shares outstanding.

Attention is not as a scarce resource for institutional investors since institutions can use computers or pre-selection criteria to reduce their attention demands (Barber and Odean, 2008). Dey and Radhakrishna (2007) find that institutions are most active in the immediate aftermath of an earnings announcement while individual investors are slow and overconfident to explain the differences between individual and institutional trading volume reactions.[10] Institutional holding is measured as a percentage of common shares held by institutions.

Friday announcements have less immediate stock return response in the U.S., in which weekends distract investor attention temporarily with a lower immediate response and a higher delayed response (Della Vigna and Pollet, 2009). Thus, we expect that firms announcing their annual earnings on Friday and weekends will have a delayed positive investor response. A weekend is measured as a dummy variable for firms whose annual earnings are announced on Friday or during the weekend.

Firms may deliberately choose the timing to announce their annual earnings in advancing or delaying the current year's filing date. Such an irregularity of filing date from year to year implies some latent private information. We address such a self-selection concern by calculating the selection parameter λ. This selection parameter is calculated from a probit model. The treatment indicator is a dummy that equals one for firms whose earnings announcement is advanced or delayed more than five days with respect to the previous year. Thus, we expect that the selection parameter is positively related to unexpected return changes. Detailed calculation of self-selection parameter

[10] Overconfidence can affect investors' attention allocation by reinforcing them to attend to specific pieces of information and/or ignore others (see, for example, Peng and Xiong, 2006).

is explained in Appendix.

3.2 Event Clustering

When earnings announcements are clustered in time, the assumption of cross-sectional independence in stock returns can yield biased estimates of standard errors that can lead to incorrect inferences (Bernard, 1987). MacKinlay (1997) suggests that the abnormal returns can be aggregated into a portfolio dated using event time and the security level analysis can be applied to the portfolio to deal with the cross correlation of the abnormal returns.

Following MacKinlay's (1997) suggestion, we form portfolios based on earnings announcements dates to control for cross correlation of returns on the same day in the multivariate tests. We employ the procedure developed by Newey and West (1987) to correct for heteroskedasticity and autocorrelation with 3 lags.

3.3 Data

The stock return, trading volume, and financial data are collected from the TEJ (Taiwan Economic Journal) database. We also collect listed companies' electronic filings of annual reports from MOPS (Market Observation Post System) for the fiscal years ending from 1998 to 2008, since 1998 is the first fiscal year in which annual reports appear in MOPS. In this electronic filing system, we collect by hand the filing date and time in which listed companies upload their annual reports. Banking and insurance industries are excluded from the sample due to special accounting treatment. There are a few companies that adopt the non-calendar fiscal year, and they were deleted from the sample.

Analysts' earnings forecasts are also extracted from the TEJ database. Unlike the Institutional Brokers' Estimate System (I/B/E/S) database which collects plentiful earnings estimates offered by analysts, the TEJ database primarily collects analysts' earnings forecasts from quarterly reports of Wealth Magazine and Commercial Times. The earnings estimates issued by Commercial Times are often cited in the China Times evening newspaper (Yu and Hong, 2006). The sources of earnings forecasts are publicly available information for the market.

Using the TEJ database, Lin and Wang (2004) find that analysts' earnings forecasts play a central role in investors' decisions. Thus, we use mean analysts earnings forecast as a measure of expected earnings to determine if the actual earnings are above

expected earnings (good news) or below expected earnings (bad news).

The event-window $(-1, +5)$ for the earnings announcements is evaluated over the seven-day period beginning one day before and ending five days after the electronic filing date in MOPS. We choose the seven-day period surrounding the filing date, because of a longer window, other than financial information being released to the market, and the attribution of the market response to the earnings announcement becomes more difficult. If the announcement date meets a holiday or weekend, then it is accommodated to the next immediate business day. The non-announcement period $(-60, -11)$, which begins 60 trading days before and ends 11 trading days before the announcement day 0, is constructed over 50 days to preclude the influence of the previous third quarter financial report.

3.4 Descriptive Statistics

According to the Securities and Exchange Law in Taiwan, listed companies must upload their annual reports to MOPS in electronic file format within four months after the end of each fiscal year. The majority of listed companies adopt a calendar year for their annual financial reporting, and about 86% of companies announce their earnings within the statutory filing date. Among those companies that have an announcement date in April, 83% cluster in the last 10 days of April. For companies that delay announcing annual earnings until May, 90.6% cluster in the first 10 days of May. We investigate further the causes for delayed announcements and find that among them, the most encountered issues are companies with a restatement of financial statements, a going-concern issued by auditors, and/or they are going private.

The original filing dates collected from MOPS are 6,351 firm-years, which are then reduced to 5,877 firm-years due to the sample selection criteria as follows: (1) it must be a listed company with at least 60 daily return data prior to the earnings announcement date; (2) the announcement of annual earnings must be within 12 months at the end of the fiscal year. Table 1 shows the industrial distribution of the sample companies and the descriptive statistics of the earnings announcement dates. The statistics indicate that announcement dates are clustered in April, and the median dates are around the statutory due date on April 30.

Table 2 shows the number of announcements per weekday. Most listed companies announce their annual earnings a few days before or on the statutory due date. This fact is similar to that of the U.S. companies (Griffin, 2003). For example, fiscal years of 1998, 2000, 2001, 2003, 2006, 2007, and 2008 encounter the highest percent-

Table 1 Industry Composition and Announcement Dates

Industries	No. of Obs. (firm-years)	Announcement Date		
		Median	Q1	Q3
Cement	84	4/29	4/27	4/30
Foods	207	4/28	4/24	4/30
Plastics	198	4/28	4/23	4/30
Textiles	526	4/29	4/25	4/30
Electronic & Machinery	325	4/28	4/23	4/30
Appliance & Cable	148	4/29	4/27	4/30
Chemicals, Biotech & Healthcare	308	4/27	4/22	4/30
Glass & Ceramics	70	4/30	4/27	5/02
Paper & Pulp	74	4/28	4/23	4/30
Steel & Iron	255	4/27	4/21	4/29
Rubber	94	4/27	4/19	4/30
Automobile	44	4/30	4/29	4/30
Electronics	1,990	4/28	4/23	4/30
Construction	332	4/28	4/20	4/30
Transportation	164	4/28	4/26	4/30
Tourism	61	4/21	4/09	4/27
Wholesale & Retail	116	4/29	4/27	4/30
Others	881	4/27	4/18	4/29
Total	5,877			

Notes: This table reports the annual earnings announcement dates over fiscal years 1998–2008.

age of announcements coinciding with the weekday of April 30$^{\text{th}}$. In our sample, the announcements are concentrated on Friday (21.17%) and Tuesday (19.72%).

Table 3 presents summary statistics for the key variables on filing day $t = 0$. The mean value for SAAR is 0.211 and its standard deviation is 1.384. SV shows a positive mean value of 0.442 with a standard deviation of 3.279. Firm size is presented as the log of the market capitalization. If we take the antilogarithm, the monthly mean size is 4,895 millions, and the median is about 4,465 millions. The SUE has a large spread from a minimum value of -8.532 to a maximum value of 55.346. In comparison with the first quarter announcements, the standardized unexpected earnings have a spread

Table 2 Number of Announcements per Weekday

Fiscal Year	MON	TUE	WED	THU	FRI	SAT	SUN	Total	Weekday of 4/30
1998	34 (10.79%)	37 (11.75%)	49 (15.56%)	61 (19.37%)	125 (39.68%)	8 (2.54%)	1 (0.32%)	315 (100%)	FRI
1999	34 (9.77%)	67 (19.25%)	34 (9.77%)	54 (15.52%)	57 (16.38%)	85 (24.43%)	17 (4.89%)	348 (100%)	SUN
2000	157 (36.85%)	31 (7.28%)	61 (14.32%)	60 (14.08%)	88 (20.66%)	20 (4.69%)	9 (2.11%)	426 (100%)	MON
2001	128 (26.12%)	175 (35.71%)	48 (9.80%)	57 (11.63%)	67 (13.67%)	10 (2.04%)	5 (1.02%)	490 (100%)	TUE
2002	99 (16.95%)	176 (30.14%)	147 (25.17%)	60 (10.27%)	93 (15.92%)	8 (1.37%)	1 (0.17%)	584 (100%)	WED
2003	103 (16.59%)	80 (12.88%)	104 (16.75%)	145 (23.35%)	182 (29.31%)	7 (1.13%)	0 (0.00%)	621 (100%)	FRI
2004	106 (16.96%)	113 (18.08%)	85 (13.60%)	116 (18.56%)	176 (28.16%)	23 (3.68%)	6 (0.96%)	625 (100%)	SAT
2005	60 (10.79%)	138 (24.82%)	92 (16.55%)	107 (19.24%)	149 (26.80%)	0 (0.00%)	10 (1.80%)	556 (100%)	SUN
2006	184 (31.56%)	58 (9.95%)	64 (10.98%)	92 (15.78%)	130 (22.30%)	37 (6.35%)	18 (3.09%)	583 (100%)	MON
2007	116 (17.87%)	147 (22.65%)	203 (31.28%)	75 (11.56%)	101 (15.56%)	5 (0.77%)	2 (0.31%)	649 (100%)	WED
2008	88 (12.94%)	137 (20.15%)	164 (24.12%)	208 (30.59%)	76 (11.18%)	6 (0.88%)	1 (0.15%)	680 (100%)	THU
All	1,109 (18.87%)	1,159 (19.72%)	1,051 (17.88%)	1,035 (17.61%)	1,244 (21.17%)	209 (3.56%)	70 (1.19%)	5,877 (100%)	

Notes: This table summarizes the number (percentage) of announcements per weekday. The last column reports the weekdays of April 30th in the year of earnings announced.

from a minimum value of -5.878 to a maximum value of 38.956. Firm leverage is presented as debt-to-assets ratio, and the mean debt level is 38.8%. Liquidity is measured as share turnover, and its mean value is 0.185. The mean percentage of common shares held by institutions is 37.5% with a standard deviation of 22.1%. The selection parameter which represents unobservable factors has a mean value of 1.076. Analysts forecast error has a mean of -0.418 and also shows a large spread from a minimum value of -56.694 to a maximum value of 13.150.

Table 3 Descriptive Statistics

	Mean	Std. Dev.	Min	Q1	Median	Q3	Max
SAAR	0.211	1.384	−3.657	−0.693	−0.104	0.719	14.424
SV	0.442	3.279	−2.794	−0.719	−0.283	0.587	134.240
Firm Size	8.496	1.365	3.526	7.563	8.404	9.291	14.274
SUE	0.211	2.406	−8.532	−0.795	0.000	0.763	55.346
1Q_SUE	0.014	1.417	−5.878	−0.609	−0.030	0.490	38.956
Leverage	0.388	0.166	0.001	0.268	0.384	0.493	0.986
Liquidity	0.185	0.174	0.000	0.060	0.131	0.257	1.317
Institutional Holding	0.375	0.221	0.000	0.192	0.352	0.533	0.989
Selection Parameter	1.076	0.122	0.705	1.009	1.064	1.126	4.245
Analysts Forecast Error	−0.418	2.333	−56.694	−0.708	−0.168	0.000	13.150

Notes: This table reports descriptive statistics for the key variables on announcement day $t = 0$. The standardized absolute abnormal return (SAAR) is obtained by subtracting the mean absolute abnormal return during the non-announcement period $(-60, -11)$ from the absolute abnormal return during the announcement period $(-1, +5)$, and deflated by the standard deviation of absolute abnormal returns during the non-announcement period. The abnormal return is calculated by using a market model, with a 150-day $(-210, -61)$ estimation period. The standardized volume (SV) is obtained by subtracting the mean trading volume, measured in shares, during the non-announcement period $(-60, -11)$ from the trading volume during the announcement period $(-1, +5)$, and deflated by the standard deviation of trading volume during the non-announcement period. Firm size is measured as the log of market value of common equity at two days prior to the annual earnings announcement date. SUE is measured as the fourth quarter's EPS minus the EPS from four quarters ago, deflated by the standard deviation of EPS changes over the preceding eight quarters. Leverage is total debts deflated by total assets. 1Q_SUE is measured as the first quarter's EPS minus the first quarter's EPS of last year, deflated by the standard deviation of EPS changes over the preceding eight quarters. Liquidity is measured as annual average of total monthly volume divided by shares outstanding. Institutional holding is the percentage of common shares held by institutions. The selection parameter is obtained by including an instrumental variable NOA (net operating assets) in the probit model, where the treatment indicator is a dummy that equals one for companies whose earnings announcements are advanced or delayed more than 5 days. Analysts forecast error is the difference between actual EPS and the mean analysts' forecasts of EPS for the fiscal year. The sample period is 1998–2008.

4. EMPIRICAL RESULTS

4.1 Filing Delay and Earnings News

Prior research, which is in the pre-EDGAR era, has found that there is an association between the timing of earnings announcements and abnormal return. Specifically, the release of annual reports earlier (later) than expected has on average, a positive (negative) abnormal return (Kross, 1981; Givoly and Palmon, 1982; Chambers and Penman, 1984; Kross and Schroeder, 1984). However, Bagnoli et al. (2002) argue that prior findings show only a weak association between good news and early announcements. On the other hand, the litigation environment and managerial reputational costs prompt managers to disclose bad news in a timely manner (Skinner, 1994). Sun (2006) finds that firms have little intention to advance good news announcements, but a strong intention to postpone their bad news announcements.

To investigate whether our sample supports the good news early and bad news late hypothesis, we follow the test performed in Begley and Fischer (1998, p. 354) as follows:

$$\text{DEL} = \alpha + \beta_1 \text{Dgood} + \beta_2 \text{Dbad} * \text{FE} + \beta_3 \text{Dgood} * \text{FE} + \varepsilon, \tag{4}$$

where DEL is computed as the difference of reporting lag between the current year and previous year. A negative (positive) value for DEL indicates that the earnings announcement is earlier (later) than last year. Dgood is a dummy that equals one if the earnings announced are classified as good news. Dbad is a dummy that equals one if the earnings announced are classified as bad news. FE is the analyst forecast error measured as the difference between actual EPS and the mean analyst forecasts of EPS.

If good news is announced earlier than bad news and the magnitude of the news is unrelated to DEL, then we expect $\beta_1 < 0$ and $\beta_2 = \beta_3 = 0$. If we also consider the magnitude of the news, then we expect $\beta_2 < 0$ and $\beta_3 < 0$. Since a negative (positive) value for DEL indicates that the earnings announcement is earlier (later) than last year.

Panel A of Table 4 provides the summary statistics of earnings announcements advanced or delayed in comparison with previous year. Earnings announced during the last five days of April have the least days in DEL. Those earnings announced before

Table 4 Earnings Announcements Delay and Earnings News

Panel A: Summary Statistics of Earnings Announcements Delay (DEL)

	Earnings Announcements Season					
	Before	April $1^{st} - 10^{th}$	April $11^{th} - 20^{th}$	April $21^{st} - 25^{th}$	April $26^{th} - 30^{th}$	After
Good News	−21.229 [20.64]	−18.077 [17.17]	−4.316 [12.84]	−2.032 [23.63]	−0.212 [13.39]	9.444 [27.82]
No News	−28.026 [24.37]	−15.381 [14.93]	−3.259 [12.10]	−0.705 [9.76]	−1.895 [21.21]	12.366 [40.50]
Bad News	−16.602 [19.24]	−10.624 [17.24]	−5.301 [15.74]	−0.948 [10.17]	0.734 [10.40]	9.946 [21.00]

Panel B: Regression of DEL on Earnings News ($N = 5,146$)

Dependent Variable	Regression Coefficients				R^2	F-test
	Intercept	Dgood	Dbad*FE	Dgood*FE		
DEL	−1.084*** (−3.42)	0.380 (0.55)	0.044 (0.35)	−0.188 (0.32)	0.0001	0.2

Notes: This table reports an earnings announcement delay (DEL) over fiscal years 1999–2008. DEL is computed as the difference of reporting lag between current year and previous year. A reporting lag is the lag between year-end and the earnings announcement date. A negative (positive) value for DEL indicates that the earnings announcement is earlier (later) than last year. Standard deviations of DEL are shown in brackets. Actual EPS that is higher (lower) than the mean analyst forecasts is classified as good news (bad news). Announcements, for which there is either no analyst forecast or where the forecast is equal to the actual EPS, are considered as no news. Dgood is a dummy that equals one if the earnings announced are classified as good news. Dbad is a dummy that equals one if the earnings announced are classified as bad news. FE is the analyst forecasts error measured as the difference between actual EPS and the mean analyst forecasts of EPS. T-statistics are shown in parentheses. The symbol *** represents significance at 1% level.

April are advanced from 16.602 days for bad news to 28.026 days for no news, and those earnings announced after April are delayed from 9.444 days for good news to 12.366 days for no news.

Panel B of Table 4 shows the result of the regression (4). The dummy coefficients β_1, β_2, and β_3 are statistically insignificant and the R^2 of the regression is only 0.01%, which suggests that the determinant for DEL is due to factor other than unexpected earnings news.[11] For sensitivity analysis, we also perform the regression (4) using SUE instead of analyst forecast error which yields similar results with a R^2 of 0.03%.

[11] The result is somewhat consistent with Begley and Fischer (1998) in which their regression of R^2 is 4% but with statistical significance for dummy coefficients β_1 and β_2. They argue that the relation between news and timing is non-monotonic.

4.2 Market Response, Earnings News and Timing

We examine the market response surrounding earnings announcements from day -1 to day 5 to shed light on the process of information searching and attention by the market. If investors are inattentive to the release of earnings, the unexpected return changes of SAAR should be significantly negative or insignificantly positive. On the contrary, if investors are attentive to the release of earnings, becoming more knowledgeable with regard to their interested firm, the SAAR should be significantly positive. Since different earnings news may catch investors' attention at different times of earnings announcements, we then divide the earnings news into good news, no news, and bad news.

Panel A of Table 5 shows that the values of SAAR are significantly positive in the last 10 days of April, especially since the values of SAAR are statistically significant at a 1% level on day 0 and persist until day 4 on April $26^{\text{th}} - 30^{\text{th}}$. Before April 21^{st}, the values of SAAR are significantly negative or insignificantly positive. This result suggests that the abnormal returns are similar to the other non-announcement days implying investors' distraction to the earnings announcements. In the case of no prior earnings expectations, the significantly positive values of SAAR appear during the last 5 days of April (April $26^{\text{th}} - 30^{\text{th}}$ with statistical significance at 1% level from day 0 to day 5) and even after the statutory due date, as shown in Panel B of Table 5 for no news. In Panel C of Table 5, for those earnings announcements classified as bad news, we observe some significant positive values of SAAR between April $21^{\text{st}} - 25^{\text{th}}$ and April $26^{\text{th}} - 30^{\text{th}}$ with statistically significant values of SAAR at 1% level from day 0 (SAAR $= 0.255$) to day 5 (SAAR $= 0.104$) This phenomenon even persists after the statutory filing due date. As Hong et al. (2000) point out, bad news travels slowly.

Although abnormal volume could be a proxy variable for investor attention, an increase or decrease in trading volume is also subject to different interpretations of the earnings released by the market. An increase in trading volume suggests a disagreement among investors, whereas a decrease in trading volume implies a consensus of opinion in the market. Table 6 shows that the standardized volume SV at different times of earnings announcements and across the three earnings news, the majority of SV are significantly positive with some exceptions, such as on April $21^{\text{st}} - 25^{\text{th}}$ in Panel B of Table 6. This result is consistent with Asthana and Balsam (2001) in which they find increases in trading volume at the post-EDGAR period.

Table 5 Standardized Absolute Abnormal Returns at Different Times of Earnings Announcements

Day	Panel A: Good News						Panel B: No News						Panel C: Bad News					
	Earnings Announcements Season						Earnings Announcements Season						Earnings Announcements Season					
	Before	April $1^{st}-10^{th}$	April $11^{th}-20^{th}$	April $21^{st}-25^{th}$	April $26^{th}-30^{th}$	After	Before	April $1^{st}-10^{th}$	April $11^{th}-20^{th}$	April $21^{st}-25^{th}$	April $26^{th}-30^{th}$	After	Before	April $1^{st}-10^{th}$	April $11^{th}-20^{th}$	April $21^{st}-25^{th}$	April $26^{th}-30^{th}$	After
−1	0.274*	0.148	0.155	0.132	0.108**	0.040	−0.032	0.003	0.100	−0.155	0.053	0.225**	0.024	0.011	−0.098*	0.064	0.047*	0.100
	(1.87)	(0.82)	(1.24)	(1.49)	(2.54)	(0.53)	(−0.19)	(0.01)	(0.66)	(−1.51)	(1.02)	(1.98)	(0.36)	(0.13)	(−1.78)	(1.06)	(1.75)	(1.59)
0	−0.107	0.097	0.030	0.324**	0.247***	0.261***	0.085	0.200	−0.005	−0.139	0.258***	0.613***	0.124	−0.076	0.060	0.084	0.255***	0.371***
	(−0.82)	(0.57)	(0.25)	(2.58)	(5.08)	(2.61)	(0.47)	(0.77)	(−0.03)	(−1.17)	(4.26)	(4.93)	(1.53)	(−0.96)	(0.72)	(1.41)	(7.83)	(5.10)
1	−0.209*	−0.300***	0.112	0.343***	0.272***	0.138*	−0.096	−0.149	−0.037	−0.169	0.428***	0.129	0.140*	−0.100	0.006	0.118*	0.375***	0.276***
	(−1.88)	(−2.66)	(0.94)	(2.85)	(5.96)	(1.67)	(−0.55)	(−0.61)	(−0.27)	(−1.46)	(6.73)	(1.19)	(1.80)	(−1.26)	(0.09)	(1.73)	(9.60)	(3.32)
2	0.156	0.233	−0.119	0.248**	0.275***	0.109	−0.188	−0.035	−0.001	0.102	0.379***	0.273**	−0.001	−0.134*	−0.053	0.182**	0.321***	0.270***
	(1.31)	(1.43)	(−1.54)	(2.13)	(5.47)	(1.43)	(−1.18)	(−0.16)	(−0.00)	(0.84)	(5.42)	(2.51)	(−0.01)	(−1.80)	(−0.73)	(2.54)	(8.56)	(3.13)
3	0.027	−0.443***	−0.009	0.324***	0.161***	−0.039	0.301	0.217	−0.208**	0.311**	0.171***	0.429***	−0.106*	−0.022	0.100	0.108*	0.265***	0.156**
	(0.23)	(−3.94)	(−0.11)	(3.07)	(3.46)	(−0.52)	(1.53)	(1.08)	(−2.05)	(2.28)	(2.72)	(3.29)	(−1.94)	(−0.22)	(1.25)	(1.77)	(7.76)	(2.08)
4	−0.044	−0.384***	−0.080	0.215**	0.303***	0.141	−0.112	0.158	−0.280**	0.143	0.239***	0.449***	−0.053	−0.140*	0.111	0.234***	0.156***	0.336***
	(−0.41)	(−2.94)	(−0.69)	(2.10)	(5.43)	(1.59)	(−0.59)	(0.66)	(−2.32)	(1.15)	(4.07)	(3.36)	(−0.93)	(−1.80)	(1.44)	(3.58)	(4.88)	(3.95)
5	−0.015	−0.064	−0.039	0.358**	0.093*	−0.055	0.187	0.135	0.124	0.217	0.197***	0.473***	−0.069	0.017	0.048	0.314***	0.104***	0.179**
	(−0.13)	(−0.20)	(−0.41)	(2.33)	(1.72)	(−0.67)	(0.95)	(0.52)	(1.07)	(1.57)	(3.27)	(3.31)	(−1.20)	(0.18)	(0.58)	(4.07)	(2.93)	(2.19)
Average $(-1,+5)$																		
	0.012	−0.102	0.007	0.278***	0.208***	0.085***	0.021	0.075	−0.044	0.044	0.246***	0.370***	0.008	−0.063**	0.025	0.158***	0.218***	0.241***
	(0.25)	(−1.46)	(0.18)	(6.26)	(11.18)	(2.69)	(0.30)	(0.85)	(−0.88)	(0.95)	(10.59)	(7.90)	(0.33)	(−1.98)	(0.88)	(6.27)	(16.80)	(8.12)
N	71	47	129	165	793	233	44	28	69	86	527	175	307	181	349	482	1,777	414

Notes: This table reports the standardized absolute abnormal return (SAAR) at different times of annual earnings announcements. Actual EPS that is higher (lower) than the mean analyst forecasts is classified as good news (bad news). Announcements, for which there is either no analyst forecast or where the forecast is equal to the actual EPS, are considered as no news. N is the number of observations. The sample period covers from fiscal year 1998 to 2008. T-statistics are shown in parentheses. The symbols *, **, and *** represent significance at 10%, 5%, and 1% levels, respectively.

Table 6 Standardized Volumes at Different Times of Earnings Announcements

Day	Panel A: Good News						Panel B: No News						Panel C: Bad News					
	Earnings Announcements Season						Earnings Announcements Season						Earnings Announcements Season					
	Before	April $1^{st}-10^{th}$	April $11^{th}-20^{th}$	April $21^{st}-25^{th}$	April $26^{th}-30^{th}$	After	Before	April $1^{st}-10^{th}$	April $11^{th}-20^{th}$	April $21^{st}-25^{th}$	April $26^{th}-30^{th}$	After	Before	April $1^{st}-10^{th}$	April $11^{th}-20^{th}$	April $21^{st}-25^{th}$	April $26^{th}-30^{th}$	After
-1	0.623***	0.531**	0.655***	0.518***	0.348***	0.098	0.788*	0.288	0.776***	0.384**	0.441***	0.827**	0.870***	0.519***	0.595**	0.537***	0.167***	0.025
	(2.72)	(1.97)	(3.11)	(2.68)	(3.02)	(0.75)	(1.83)	(1.17)	(3.53)	(2.12)	(3.05)	(2.56)	(6.43)	(4.15)	(2.54)	(4.70)	(3.63)	(0.28)
0	0.625**	0.631**	0.706***	0.827***	0.341*	0.278**	0.925*	0.742**	0.684***	0.391	0.308***	1.110***	1.028***	0.816***	0.585***	0.634***	0.216***	0.250
	(2.34)	(2.05)	(3.17)	(3.55)	(1.81)	(2.05)	(2.00)	(2.73)	(2.81)	(1.61)	(3.26)	(3.35)	(5.61)	(3.99)	(3.89)	(5.07)	(3.15)	(1.61)
1	0.622***	0.307	0.640***	0.920***	0.189***	0.360**	0.820*	1.166***	0.733**	0.304	0.528***	1.189***	1.128***	0.714***	0.599***	0.610***	0.292***	0.244**
	(3.13)	(1.39)	(2.71)	(3.46)	(2.06)	(2.59)	(1.70)	(2.90)	(2.22)	(1.60)	(3.93)	(3.61)	(5.67)	(5.23)	(3.92)	(3.42)	(4.55)	(1.94)
2	0.508*	1.013*	0.506**	0.989***	0.484***	0.595***	0.824	0.763**	0.751**	0.295	0.823***	1.067***	1.109***	0.950***	0.623***	0.719***	0.342***	0.310**
	(1.73)	(1.83)	(2.51)	(2.78)	(3.52)	(2.90)	(1.21)	(2.38)	(2.29)	(1.63)	(3.66)	(4.01)	(6.24)	(5.66)	(3.97)	(2.84)	(4.70)	(2.42)
3	0.645**	0.502	0.579*	1.088**	0.573***	0.336*	1.115**	1.426***	1.127**	0.301	0.708***	1.808***	1.506***	0.743***	0.622***	0.449***	0.454***	0.542***
	(2.10)	(1.24)	(1.83)	(2.31)	(3.28)	(1.97)	(2.62)	(3.08)	(2.53)	(1.50)	(3.14)	(3.60)	(4.48)	(4.58)	(4.47)	(3.39)	(5.66)	(3.30)
4	0.705**	0.263	0.367*	0.881***	0.548***	0.395**	1.408***	1.861***	0.591**	0.246	0.810***	1.594***	1.136***	0.871***	0.974***	0.436**	0.457***	0.589***
	(2.62)	(1.16)	(1.83)	(3.54)	(4.34)	(2.33)	(3.15)	(3.82)	(2.02)	(1.31)	(4.03)	(3.87)	(6.30)	(4.32)	(3.24)	(2.53)	(6.14)	(2.63)
5	0.716*	0.904*	0.326*	0.985**	0.466***	0.406*	1.054**	1.484***	0.683**	0.429	0.741***	1.991***	1.029***	1.076***	0.737***	0.742**	0.429***	0.470***
	(1.88)	(1.69)	(1.75)	(2.60)	(3.71)	(1.96)	(2.46)	(4.89)	(2.22)	(1.66)	(3.95)	(3.11)	(7.15)	(5.27)	(4.52)	(2.21)	(5.11)	(2.65)
Average $(-1, +5)$																		
	0.635***	0.593***	0.540***	0.887***	0.421***	0.352***	0.991***	1.104***	0.763***	0.336***	0.623***	1.369***	1.115***	0.813***	0.677***	0.589***	0.336***	0.347***
	(5.96)	(4.11)	(6.26)	(7.35)	(7.93)	(5.55)	(5.43)	(7.82)	(6.40)	(4.28)	(9.18)	(8.66)	(14.51)	(12.33)	(9.26)	(7.74)	(12.55)	(5.84)
N	71	47	129	165	793	233	44	28	69	86	527	175	307	181	349	482	1,777	414

Notes: This table reports the standardized volume (SV) at different times of annual earnings announcements. Actual EPS that is higher (lower) than the mean analyst forecast is classified as good news (bad news). Announcements, for which there is either no analyst forecast or where the forecast is equal to the actual EPS, are considered as no news. N is the number of observations. The sample period covers from fiscal year 1998 to 2008. T-statistics are shown in parentheses. The symbols *, **, and *** represent significance at 10%, 5%, and 1% levels, respectively.

4.3 Multivariate Analysis

4.3.1 Unexpected return changes

We first examine whether the different SAAR responses to the timing of earnings announcements are affected after controlling for firm characteristics, liquidity, institutional holding, unobservable private information, and other control variables. If investors' attention is equally distributed on the different timings of earnings announcements, we expect that the regression coefficients β_1 to β_5 should all be positively significant. If instead, investors have limited attention and only some intervals of earnings announced catch their attention, we expect that only the regression coefficient of the attentive interval should be positively significant.

In Table 7 we present the relation between market response SAAR and earnings timing in which the event-window is over days $(-1, +5)$ around annual earnings announcements. The first column of Table 7 shows the results for earnings classified as good news. The earnings announced on the last 10 days of April are statistically significant at 5% level on April $21^{\text{st}} - 25^{\text{th}}$ (DPREND $= 0.211$) and at 1% level on April $26^{\text{th}} - 30^{\text{th}}$ (DEND $= 0.244$), respectively.

For earnings classified as no news shown in the second column of Table 7, the pronounced SAAR response appears on the last 5 days of April (DEND $= 0.488$) and after the statutory due date (DLATE $= 0.342$) with statistical significance at the 1% level. There are small SAAR responses at the first 20 days of April which are positively significant at 10%. This fact is distinct to the other two earnings news. Since "no news" means that there is either no publicly analyst forecast, or where the actual earnings is equal to the forecast, this kind of neutral news triggers investors' attention differently to the good news or bad news.

The third column of Table 7 reports the results for earnings classified as bad news. The SAAR responses begin from the last 10 days of April (DPREND $= 0.190$ and DEND $= 0.263$) and still persist after April (DLATE $= 0.212$), which are statistically significant at 1% level. Overall, the findings in Table 7 for SAAR responses are generally consistent with those of Table 5.

Some predicted signs of control variables in the SAAR columns of Table 7 are consistent with our expectations, but with some exceptions. For example, we expect that the magnitude of SUE and leverage are positively related to SAAR. However, the results show a negative relation, though statistically insignificant. Additionally, the

Table 7 Multivariate Tests of Market Response at Different Times of Earnings Announcements

	Dependent Variable: SAAR			Dependent Variable: SV		
	Good News	No News	Bad News	Good News	No News	Bad News
Earnings Announcements at Different Times						
Intercept	−0.191	0.999**	0.217	4.219***	3.604	2.358***
	(−0.66)	(2.00)	(0.67)	(4.18)	(1.63)	(4.47)
DBGN	−0.072	0.312*	−0.028	−0.053	0.542	−0.023
	(−0.59)	(1.92)	(−0.46)	(−0.16)	(1.47)	(−0.15)
DMIDDLE	0.018	0.199*	0.114	−0.131	−0.090	0.074
	(0.22)	(1.70)	(1.57)	(−0.59)	(−0.25)	(0.44)
DPREND	0.211**	0.161	0.190***	−0.058	−0.393	0.051
	(2.49)	(1.32)	(3.24)	(−0.20)	(−1.12)	(0.27)
DEND	0.244***	0.488***	0.263***	−0.145	0.263	−0.062
	(3.19)	(4.52)	(4.87)	(−0.57)	(0.76)	(−0.44)
DLATE	0.042	0.342***	0.212***	−0.499**	−0.173	−0.281*
	(0.52)	(2.69)	(3.42)	(−2.43)	(−0.39)	(−1.81)
Control Variables (Predicted Sign)						
Firm Size (−)	−0.032	−0.148**	0.016	−0.046	−0.310	−0.034
	(−0.96)	(−2.14)	(0.41)	(−0.58)	(−1.07)	(−0.47)
|SUE| (+)	−0.020*	−0.017	−0.007	−0.045*	−0.118**	0.022
	(−1.69)	(−0.82)	(−0.25)	(−1.77)	(−2.09)	(0.41)
|1Q_SUE| (−)	−0.103**	0.010	−0.028**	−0.369***	0.016	−0.005
	(−2.53)	(0.19)	(−2.37)	(−3.75)	(0.08)	(−0.18)
Leverage (+)	0.154	−0.294	−0.292	0.110	1.675**	−1.381***
	(0.73)	(−1.13)	(−1.23)	(0.20)	(1.98)	(−2.96)
Liquidity (+)	0.194	1.116**	−0.120	−0.559	−1.303	−0.642**
	(1.08)	(2.37)	(−0.78)	(−1.24)	(−1.06)	(−2.00)
Institutional (+)	0.334	0.107	0.250	−0.515	−2.728**	0.408
	(1.42)	(0.36)	(1.22)	(−0.87)	(−2.19)	(1.07)
Weekend (+)	−0.090	0.183**	0.053	0.157	0.651**	−0.045
	(−1.53)	(2.31)	(1.13)	(0.84)	(2.16)	(−0.50)
Selection Par. (+)	0.496**	(0.051)	−0.246	−0.308	0.292	0.036
	(2.23)	(0.12)	(−0.59)	(−0.51)	(0.22)	(0.05)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
N	2,114	1,244	2,954	2,114	1,244	2,954
R^2	3.84%	9.18%	6.77%	15.00%	25.62%	19.34%

Notes: This table reports the regressions of standardized absolute abnormal return (SAAR) and standardized volume (SV) over days (−1, +5) around annual earnings announcements. DBGN (1 = earnings announced during April $1^{st} - 10^{th}$, 0 = otherwise); DMIDDLE (1 = earnings announced during April $11^{th} - 20^{th}$, 0 = otherwise); DPREND (1 = earnings announced during April $21^{st} - 25^{th}$, 0 = otherwise); DEND (1 = earnings announced during April $26^{th} - 30^{th}$, 0 = otherwise); DLATE (1 = earnings announced after April, 0 = otherwise). The descriptions of control variables can be found in Table 3. |SUE| is the absolute value of SUE. |1Q_SUE| is the absolute value of SUE pertains to the first quarter's earnings. The predicted sign of control variables is associated with SAAR. N is the number of portfolios formed based on earnings announcement dates. The sample period covers from fiscal year 1998 to 2008. Newey-West t-statistics are shown in parentheses. The symbols *, **, and *** represent significance at 10%, 5%, and 1% levels, respectively.

coefficients of unexpected earnings of the concurrent first quarter earnings announcement |1Q_SUE| show statistically negative results in both good and bad news over days $(-1, +5)$. Several explanations are provided. First, firms generally announce their first quarter earnings after the release of their annual earnings reports. Thus, a lag of a few days in announcing first quarter earnings has no significant effect over days $(-1, +5)$.[12] Second, when annual earnings news are circulated in the market, investors are distracted away from the first quarter earnings news, as posited by investor distraction hypothesis (Hirshleifer et al., 2009), thereby showing a negative association to the market response. Third, an annual earnings report provides more detailed and comprehensive information about a company than a first quarter earnings report, which triggers investors' selective attention.[13]

4.3.2 Trading volume

Prior research has found that the electronic filing system of annual reports lead to an increase in trading volume (Asthana and Balsam, 2001), as we find in Table 6 before controlling for several firm characteristics. Once we introduce those control variables, the values of standardized volume SV are no more positively significant as shown in Table 7. The latest filings for good news (DLATE $= -0.499$, at 5% level) and bad news (DLATE $= -0.281$, at 10% level) are negatively and statistically significant. A decrease in trading volume indicates an agreement in investors' beliefs (Kim and Verrecchia, 1991). For earnings classified as no news, there is no statistically significant coefficient at different times of earnings announcements, which suggests that the informedness effect of earnings announced countervails its consensus effect (Holthausen and Verrecchia, 1990).

In sum, our findings are consistent with the gradual information searching of the limited attention hypothesis. Investors are more likely to be inattentive at the outset of earnings announcements season. As the filings of annual reports intensify, investors become attentive to the massive earnings news and trade accordingly, culminating at the end of the earnings announcement season.

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[12] In Table 8 we examine the market response over several event-window lengths. Unreported coefficients of |1Q_SUE| show that they are significantly negative over the different event-windows under good news and bad news. An exception exists on the two-day window $(+1, +2)$, which are marginally insignificant.

[13] It is worth noting that annual earnings reports are audited by certified public accountants, whereas first quarter earnings reports are reviewed by certified public accountants.

4.4 Different Event-Window Lengths

For sensitivity analysis, we also examine the market response over several event-window lengths. Event-windows that include the market response of pre-announcement date are two-day $(-1, 0)$ and three-day $(-1, +1)$. For earnings classified as good news as shown in Panel A of Table 8, there is no information leakage in the pre-announcement period since the dummy coefficients are insignificant. The effects of dummy coefficients on SAAR for post-announcement, including the announcement day 0, are positively significant on the last 10 days of April over two-day $(0, +1)$, $(+1, +2)$ and three-day $(0, +2)$. The latter result is consistent with that of Table 7 which is over event-window $(-1, +5)$.

Panel B of Table 8 shows the transition of market response over different event-window lengths. There are significantly positive dummy coefficients on pre-announcement event-window $(-1, 0)$. Earnings announced on April $26^{\text{th}} - 30^{\text{th}}$ and after April also show significantly positive coefficients across all event-window lengths. The three-day $(+1, +2)$ presents significantly positive coefficients through the first 20 days of April.

Panel C of Table 8 shows the unexpected return changes for bad news. Earnings that are announced close or after the statutory due date and deemed as bad news have a significantly positive coefficient, except for event-window $(0, +1)$ that there is no unexpected return changes. If bad news travels slowly, then investors need 1 to 2 days to assimilate the information.

The results for multivariate tests of SV, as shown in Table 9, are similar to different event-window lengths, and they are also consistent with the event-window $(-1, +5)$ as reported in Table 7. Specifically, the findings in Panel A and Panel C of Table 9 suggest that there is an agreement in investors' beliefs for both good news and bad news announced after the statutory due date. On the other hand, Panel B of Table 9 shows that there is no extreme agreement or disagreement of investors' beliefs in the market, and thus, the effects of the dummy coefficient on SV are statistically insignificant.

Table 8 Multivariate Tests of Standardized Absolute Abnormal Return over Different Event-Window Lengths

	Panel A: Good News					Panel B: No News					Panel C: Bad News				
	Event-Window Lengths					Event-Window Lengths					Event-Window Lengths				
	$(-1,0)$	$(-1,+1)$	$(0,+1)$	$(+1,+2)$	$(0,+2)$	$(-1,0)$	$(-1,+1)$	$(0,+1)$	$(+1,+2)$	$(0,+2)$	$(-1,0)$	$(-1,+1)$	$(0,+1)$	$(+1,+2)$	$(0,+2)$
Intercept	−0.593	−0.582	−0.694	−0.323	−0.492	1.048	1.267**	1.275	0.916	0.892	−0.091	0.128	0.428	0.766	0.607
	(−1.20)	(−1.26)	(−1.20)	(−0.64)	(−1.10)	(1.37)	(1.98)	(1.58)	(0.97)	(1.17)	(−0.14)	(0.23)	(0.68)	(1.51)	(1.25)
DBGN	−0.030	−0.018	0.021	0.102	0.080	0.218	0.269	0.241	0.398*	0.302	−0.043	−0.017	−0.061	−0.021	−0.066
	(−0.14)	(−0.10)	(0.12)	(0.52)	(0.47)	(0.83)	(1.13)	(1.02)	(1.76)	(1.45)	(−0.39)	(−0.17)	(−0.45)	(−0.19)	(−0.67)
DMIDDLE	−0.139	0.053	0.191	0.090	0.042	0.282	0.273	0.164	0.400**	0.291*	0.061	0.064	0.089	0.072	0.084
	(−0.83)	(0.38)	(1.28)	(0.63)	(0.34)	(1.39)	(1.57)	(0.83)	(2.00)	(1.65)	(0.49)	(0.53)	(0.52)	(0.55)	(0.63)
DPREND	−0.021	0.160	0.379***	0.272*	0.260**	−0.253	−0.135	−0.181	0.238	0.005	0.059	0.093	0.071	0.203*	0.129
	(−0.14)	(1.24)	(2.66)	(1.89)	(2.07)	(−1.18)	(−0.85)	(−1.01)	(1.06)	(0.03)	(0.60)	(1.03)	(0.56)	(1.95)	(1.35)
DEND	0.049	0.201	0.423***	0.348**	0.346***	0.297*	0.396***	0.474***	0.720***	0.597***	0.135	0.185**	0.194	0.319***	0.247**
	(0.31)	(1.60)	(2.89)	(2.52)	(2.91)	(1.74)	(2.80)	(2.80)	(4.25)	(4.07)	(1.49)	(2.12)	(1.53)	(2.93)	(2.58)
DLATE	−0.092	0.029	0.227*	0.119	0.140	0.483**	0.407**	0.434**	0.335*	0.428**	0.172*	0.181*	0.186	0.217**	0.202**
	(−0.60)	(0.23)	(1.65)	(0.84)	(1.16)	(2.27)	(2.36)	(2.18)	(1.79)	(2.57)	(1.66)	(1.91)	(1.47)	(2.00)	(2.12)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	604	906	604	604	906	356	534	356	356	534	844	1,266	844	844	1,266
R^2	6.22%	5.15%	7.35%	4.79%	4.35%	12.19%	11.16%	12.13%	15.79%	12.66%	6.46%	6.74%	8.79%	9.47%	8.22%

Notes: This table reports the regressions of standardized absolute abnormal return (SAAR) at different event-window lengths around annual earnings announcement. DBGN (1 = earnings announced during April $1^{st} - 10^{th}$, 0 = otherwise); DMIDDLE (1 = earnings announced during April $11^{th} - 20^{th}$, 0 = otherwise); DPREND (1 = earnings announced during April $21^{st} - 25^{th}$, 0 = otherwise); DEND (1 = earnings announced during April $26^{th} - 30^{th}$, 0 = otherwise); DLATE (1 = earnings announced after April, 0 = otherwise). The descriptions of control variables can be found in Table 7. N is the number of portfolios formed based on earnings announcement dates. The sample period covers from fiscal year 1998 to 2008. Newey-West t-statistics are shown in parentheses. The symbols *, **, and *** represent significance at 10%, 5%, and 1% levels, respectively.

Table 9 Multivariate Tests of Standardized Volume over Different Event-Window Lengths

	Panel A: Good News					Panel B: No News					Panel C: Bad News				
	Event-Window Lengths					Event-Window Lengths					Event-Window Lengths				
	$(-1,0)$	$(-1,+1)$	$(0,+1)$	$(+1,+2)$	$(0,+2)$	$(-1,0)$	$(-1,+1)$	$(0,+1)$	$(+1,+2)$	$(0,+2)$	$(-1,0)$	$(-1,+1)$	$(0,+1)$	$(+1,+2)$	$(0,+2)$
Intercept	2.662**	3.032***	3.454**	4.948***	4.343***	6.022	5.319*	4.261	2.881	3.457	2.118**	2.324***	2.486***	2.483***	2.399***
	(2.11)	(2.63)	(2.54)	(2.95)	(3.22)	(1.45)	(1.67)	(1.42)	(0.89)	(1.22)	(2.46)	(3.16)	(2.81)	(3.00)	(3.24)
DBGN	−0.352	−0.364	−0.472	0.334	0.036	0.065	0.325	0.487	0.608	0.448	−0.022	−0.007	0.032	0.155	0.117
	(−0.84)	(−1.15)	(−1.36)	(0.57)	(0.08)	(0.12)	(0.68)	(0.97)	(0.94)	(0.87)	(−0.12)	(−0.05)	(0.17)	(0.81)	(0.72)
DMIDDLE	−0.179	−0.129	−0.171	0.126	−0.020	0.120	0.131	0.099	0.051	0.050	0.111	0.124	0.161	0.178	0.176
	(−0.53)	(−0.44)	(−0.52)	(0.37)	(−0.07)	(0.27)	(0.31)	(0.20)	(0.08)	(0.10)	(0.60)	(0.69)	(0.68)	(0.70)	(0.85)
DPREND	−0.270	−0.182	−0.201	0.088	−0.073	0.182	0.071	−0.093	−0.280	−0.198	0.127	0.144	0.142	0.273	0.217
	(−0.69)	(−0.56)	(−0.55)	(0.24)	(−0.23)	(0.35)	(0.16)	(−0.21)	(−0.47)	(−0.41)	(0.74)	(0.82)	(0.59)	(0.86)	(0.92)
DEND	−0.097	−0.204	−0.304	−0.115	−0.141	0.368	0.327	0.143	0.406	0.284	−0.118	−0.109	−0.122	−0.018	−0.064
	(−0.21)	(−0.58)	(−0.78)	(−0.37)	(−0.43)	(0.68)	(0.72)	(0.34)	(0.73)	(0.61)	(−0.78)	(−0.77)	(−0.65)	(−0.08)	(−0.38)
DLATE	−0.666**	−0.596**	−0.661**	−0.313	−0.497**	−0.209	−0.190	−0.006	−0.324	−0.169	−0.353**	−0.321**	−0.315*	−0.237	−0.283**
	(−2.14)	(−2.32)	(−2.29)	(−1.10)	(−1.99)	(−0.28)	(−0.31)	(−0.01)	(−0.49)	(−0.29)	(−2.47)	(−2.51)	(−1.96)	(−1.42)	(−2.03)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	604	906	604	604	906	356	534	356	356	534	844	1,266	844	844	1,266
R^2	15.38%	14.56%	14.69%	13.62%	13.41%	29.57%	26.95%	26.88%	28.05%	27.75%	27.04%	24.29%	25.23%	24.69%	25.47%

Notes: This table reports the regressions of standardized volume (SV) at different event-window lengths around annual earnings announcement. DBGN (1 = earnings announced during April $1^{st} - 10^{th}$, 0 = otherwise); DMIDDLE (1 = earnings announced during April $11^{th} - 20^{th}$, 0 = otherwise); DPREND (1 = earnings announced during April $21^{st} - 25^{th}$, 0 = otherwise); DEND (1 = earnings announced during April $26^{th} - 30^{th}$, 0 = otherwise); DLATE (1 = earnings announced after April, 0 = otherwise). The descriptions of control variables can be found in Table 7. N is the number of portfolios formed based on earnings announcement dates. The sample period covers from fiscal year 1998 to 2008. Newey-West t-statistics are shown in parentheses. The symbols *, **, and *** represent significance at 10%, 5%, and 1% levels, respectively.

4.5 Robustness Checks

4.5.1 OLS regressions

In our multivariate tests of regression (3), we employ the Newey-West procedure to correct standard errors for heteroscedasticity and autocorrelation. We also repeat the tests of Table 7, Table 8, and Table 9 using OLS regressions and the results are qualitatively similar.[14]

We present the correlation matrix of interested variables in Appendix Table A1. The correlation matrix shows small coefficients among variables and the maximum coefficient does not exceed 0.391. In addition, we also calculate the VIF (variance-inflating factor) in the OLS regressions, and the maximum VIF does not exceed 6.77.[15]

4.5.2 The Newey-West procedure

The Newey-West procedure is, strictly speaking, valid in large samples and may not be appropriate in small samples (Gujarati, 2003). We formed portfolios based on earnings announcements dates, and all the numbers of the portfolios are more than 50 in which the samples are reasonably large. The standard errors in the multivariate tests are corrected for heteroscedasticity and autocorrelation using the Newey-West procedure with 3 lags. The results do not change qualitatively if we replace 6 lags instead of 3 lags.

4.5.3 Standardized unexpected earnings

We include the absolute value of SUE as a control variable in the multivariate tests since it measures the magnitude of unexpected earnings. We also replace the original SUE with its sign instead of an absolute value which measures both the magnitude and direction of unexpected earnings, and the tenor of the results is unaffected.

4.5.4 Intra-Industry information transfers

Information from early earnings announcements in the industry may affect the stock price of other non-announcing firms. If the stock prices of late announcers fully reflect industry information when early announcers release their reports, there should be no stock price movement with implication of intra-industry information transfers when

[14] To save space, detailed results are not tabulated but are available upon request.

[15] As a rule of thumb, if the VIF of a variable exceeds 10 and has a high R^2, it raises concerns over possibility of multicollinearity. Although presenting partial correlations and values of VIF may be useful to detect multicollinearity, both are not free of criticism to be an infallible guide (Gujarati, 2003).

those late announcers subsequently report their earnings.[16]

Prior research has shown that the stock prices of non-announcers react to earnings announcements made by early announcers in the same industry (Foster, 1981; Freeman and Tse, 1992). Ramnath (2002) finds that investors and analysts underreact to the industry information conveyed by the first announcers' earnings news, leading to predictable stock returns for later announcers in the days following the first announcement.

Contrary to the underreaction argument, Thomas and Zhang (2008) show that investors overreact to the intra-industry transfers of early announcers' earnings for late announcers' earnings, and the overreaction is corrected when the late announcers actually release their earnings. Although Thomas and Zhang (2008) provide several explanations to this competing finding, they argue that the theory of investor overconfidence and limited investor attention suggested by Peng and Xiong (2006) is a promising explanation.

Intra-industry information transfers can be associated to investors' attention allocation, in which investors tend to process more market and sector-wide information than firm-specific information. However, empirical results garnered from Thomas and Zhang (2008) do not fit well with specific aspects of Peng and Xiong's (2006) theory.

To examine if the market response of late announcers reflects such intra-industry information transfers, we first re-estimate the multivariate tests in the electronic, textile and construction industries.[17] Unreported analysis shows that the market responses at different times of earnings announcement are not homogeneous as well. Next, we examine if early announcers with industry information have an impact on late announcers by computing unexpected return changes SAAR and trading volume SV during non-announcement periods in the spirit of Ramnath (2002). We also follow the restriction that the subsequent announcement dates be at least five days after the first announcer of the industry since firms in the same industry usually cluster their earnings announcements (Thomas and Zhang, 2008).

If non-announcer firms have significant market responses when the first firms of the industry announce their earnings, it implies some degree of intra-industry information transfers. Thus, we expect that the market response during non-announcement date is negatively related to the market response during the actual earnings announce-

[16] We thank an anonymous referee for bringing this issue to our attention.

[17] We chose the electronic, textile, and construction industries because of their bigger sample size to perform multivariate regressions.

ment date.[18] Untabulated results show that after controlling for the possible information transfers, the results remain qualitatively similar.

5. EARNINGS TIMING AND TYPES OF INVESTORS

5.1 Buy-Sell Imbalance

In this section, we study the trading behavior of each type of investor at different times of earnings announcements.[19] Lee (1992) finds that small individual investors and professional/institutional traders differ systematically in their reaction to earnings news, and several explanations are provided. One of the possible explanations is that individual investors buy decisions are associated with news events which bring the security to their attention. Another possibility is that individual investors rely heavily on advisors and brokers in their investment decisions.

Barber and Odean (2008) argue that individual investors on high attention days are buying and, other investors, whose decisions are less attention driven, must be selling. For every buyer there must be a seller. Thus, earnings information uploaded to MOPS must attract the attention of some groups of investors during the earnings announcements season. If different groups of investors are not affected by the announced earnings, their buy-sell imbalance should be passive and indistinguishable from zero. On the other hand, if the trading behavior of some investors is related to the attention-grabbing of earnings announced, their buy-sell imbalance should be significantly positive or negative. A positive buy-sell imbalance indicates that investors are net buyers, whereas a negative buy-sell imbalance indicates that investors are net sellers.

We are able to collect the daily buy-sell imbalance from the TEJ Database. The data include the trading activities of foreign institutional investors, investment trust investors, dealers, margin trading investors, and non-margin trading investors from January 2006 through December 2008. To examine the trading behavior of the aforementioned investors during earnings announcements season, we conduct the following

[18] However, as noted by Thomas and Zhang (2008), this procedure creates measurement errors since the market response during the non-announcement date may reflect information other than industry information transfers.

[19] We are grateful to an anonymous referee for providing this insight.

regression as follows: [20]

$$\begin{aligned} \text{BSI} = {} & \alpha + \beta_1 \text{DBGN} + \beta_2 \text{DMIDDLE} + \beta_3 \text{DPREND} + \beta_4 \text{DEND} \\ & + \beta_5 \text{DLATE} + \varepsilon, \end{aligned} \tag{5}$$

where BSI is the buy-sell imbalance; the dummy variables related to the different announcement timings are as follows: DBGN (1 = earnings announced during April $1^{\text{st}} - 10^{\text{th}}$, 0 = otherwise); DMIDDLE (1 = earnings announced during April $11^{\text{th}} - 20^{\text{th}}$, 0 = otherwise); DPREND (1 = earnings announced during April $21^{\text{st}} - 25^{\text{th}}$, 0 = otherwise); DEND (1 = earnings announced during April $26^{\text{th}} - 30^{\text{th}}$, 0 = otherwise); DLATE (1 = earnings announced after April, 0 = otherwise).

Table 10 presents the net buy-sell imbalance of different types of investors over the event-window $(-1, +5)$. Panel A of Table 10 shows the results for good news. Investment trust investors and dealers are net sellers with negative dummy coefficients, suggesting that they act as contrarians in the presence of good news. Investment trust investors become net sell from April $11^{\text{th}} - 20^{\text{th}}$ (DMIDDLE $= -0.018$, at 10% level) to the end of April with DPREND $= -0.039$ at 1% level and DEND $= -0.012$ at 10% level, respectively. Dealers are net sellers on April $21^{\text{st}} - 25^{\text{th}}$ (DPREND $= -0.010$, at 1% level) and after the statutory due date (DLATE $= -0.012$, at 5% level). On the contrary, non-margin investors show as net buyers on April $21^{\text{st}} - 25^{\text{th}}$ (DPREND $=$ 0.044, at 5% level).

Panel B of Table 10 reports the net buy-sell imbalance under no news situation. There is no significant net buy-sell imbalance except for foreign institutional investors in which they become net buy during the last 10 days of April with statistical significance on April $21^{\text{st}} - 25^{\text{th}}$ (DPREND $= 0.018$, at 5% level) and on April $26^{\text{th}} - 30^{\text{th}}$ (DEND $= 0.023$, at 1% level). The trading behaviors of other types of investors are less evident. This suggests that foreign institutions may have their own earnings forecasts unavailable to the market.

Panel C of Table 10 shows that when the earnings are announced and are classified as bad news, dealers are the only pronounced net sellers in the market. The negative dummy coefficients for dealers start from April $11^{\text{th}} - 20^{\text{th}}$ (DMIDDLE $= -0.007$, at 1% level) to the latest filings (DLATE $= -0.007$, at 5% level). While bad news is

[20] While our tests do not directly allow us to examine which type of investors use MOPS, we are able to examine the trading behavior during the MOPS filing period.

Table 10 Net Buy-Sell Imbalance of Each Type of Investor at Different Times of Earnings Announcements

	Panel A: Good News					Panel B: No News					Panel C: Bad News				
	Types of Investors					Types of Investors					Types of Investors				
	Foreign	Invest. Trust	Dealers	Margin	Non-Margin	Foreign	Invest. Trust	Dealers	Margin	Non-Margin	Foreign	Invest. Trust	Dealers	Margin	Non-Margin
Intercept	−0.006	0.009	0.004	−0.011	0.004	−0.008	0.001	−0.004	0.019	−0.008	0.006	−0.011*	0.003**	−0.008	0.010
	(−0.45)	(1.32)	(1.32)	(−0.99)	(0.23)	(−1.16)	(0.55)	(−1.19)	(0.85)	(−0.33)	(0.60)	(−1.84)	(2.07)	(−1.41)	(1.02)
DBGN	−0.023	−0.004	0.005	−0.025	0.049	−0.003	−0.002	0.003	0.014	−0.010	−0.003	0.004	−0.005	−0.009	0.013
	(−0.75)	(−0.54)	(0.90)	(−1.12)	(1.38)	(−0.30)	(−0.56)	(0.59)	(0.45)	(−0.31)	(−0.21)	(0.42)	(−1.62)	(−0.78)	(0.73)
DMIDDLE	0.030	−0.018*	−0.007	−0.007	0.004	0.010	0.000	−0.002	−0.027	0.015	−0.012	0.005	−0.007***	−0.001	0.013
	(1.60)	(−1.70)	(−1.57)	(−0.40)	(0.17)	(1.24)	(0.09)	(−0.33)	(−1.06)	(0.56)	(−1.07)	(0.68)	(−3.23)	(−0.12)	(0.93)
DPREND	−0.009	−0.039***	−0.010***	0.016	0.044**	0.018**	−0.003	−0.011	−0.027	0.026	0.002	0.009	−0.005***	−0.012	0.007
	(−0.58)	(−2.79)	(−2.72)	(0.92)	(1.98)	(2.12)	(−1.04)	(−1.21)	(−1.07)	(0.92)	(0.17)	(1.36)	(−2.72)	(−1.29)	(0.48)
DEND	0.020	−0.012*	−0.003	0.024	−0.028	0.023***	−0.003	0.004	−0.008	−0.017	0.018	0.001	−0.006**	−0.012	−0.002
	(1.35)	(−1.65)	(−0.93)	(1.58)	(−1.35)	(2.86)	(−1.09)	(1.13)	(−0.36)	(−0.67)	(1.37)	(0.20)	(−2.22)	(−1.55)	(−0.13)
DLATE	0.019	−0.009	−0.012**	−0.002	0.005	0.018	0.010	0.010	−0.017	−0.025	−0.014	0.011	−0.007**	0.030*	−0.021
	(1.16)	(−1.01)	(−2.40)	(−0.10)	(0.22)	(1.54)	(1.27)	(1.27)	(−0.64)	(−0.78)	(−0.70)	(1.27)	(−2.18)	(1.95)	(−0.96)
N	584	584	584	573	573	572	572	572	525	525	1,024	1,024	1,024	1,024	1,024
R^2	2.60%	4.40%	3.60%	1.49%	2.81%	2.66%	2.42%	1.75%	1.14%	1.19%	0.69%	0.37%	1.41%	1.51%	0.58%

Notes: Dependent variables are the net buy-sell imbalance for foreign institutional investors, investment trust investors, dealers, margin trading investors, and non-margin trading investors at different times of earnings announcements over event window (−1,+5). The net buy-sell imbalance is defined as the number of purchase minus the number of sales scaled by the total number of trades. DBGN (1 = earnings announced during April $1^{st} - 10^{th}$, 0 = otherwise); DMIDDLE (1 = earnings announced during April $11^{th} - 20^{th}$, 0 = otherwise); DPREND (1 = earnings announced during April $21^{st} - 25^{th}$, 0 = otherwise); DEND (1 = earnings announced during April $26^{th} - 30^{th}$, 0 = otherwise); DLATE (1 = earnings announced after April, 0 = otherwise). N is the number of portfolios formed based on earnings announcements dates. The sample period covers from fiscal year 2006 to 2008. Newey-West t-statistics are shown in parentheses. The symbols *, **, and *** represent significance at 10%, 5%, and 1% levels, respectively.

released after the statutory due date, margin investors are the only net buyers in the market, with DLATE $= 0.030$ and statistically significant at 10%.

In sum, our findings are somewhat consistent with Barber and Odean's (2008) argument in that professional investors exhibit a lower tendency to buy on high attention days for extreme earnings news and individual investors tend to be net buyers on high attention days.

5.2 Sensitivity Analysis

For sensitivity analysis, we repeat the regression (5) over several event-window lengths. For good news earnings announced, investment trust investors are net sellers over the event-window $(-1, 0)$, and dealers are robust to be net sellers over two-day windows $(-1, 0)$ and $(+1, +2)$, and three-day windows $(-1, +1)$ and $(0, +2)$. When announced earnings are classified as no news, the trading behavior of each type of investor fluctuates according to different event-windows. For example, dealers are net buyers on the last five days of April in the pre-announcement days $(-1, 0)$, foreign institutional and non-margin investors are net buyers over the two-day window $(0, +1)$ and three-day window $(0, +2)$. However, margin traders are net sellers over two-day windows $(0, +1)$ and $(+1, +2)$ and three-day window $(0, +2)$. Finally, when earnings announced are classified as bad news, the heavy selling behavior is robust for dealers over two-day windows $(0, +1)$ and $(+1, +2)$ and three-day window $(0, +2)$. Margin traders are found to have an inconsistent trading behavior with net sell during the last 10 days of April, but net buy on the latest filing days over event-windows $(0, +1)$ and $(0, +2)$.[21]

6. CONCLUSION

Although the profitability of a company is pivotal to investors' investment decisions, the financial information contained in the annual earnings must capture investors' attention in order to create market reactions. In this paper we examine the hypothesis of limited attention that occur during annual earnings announcements season and explain how investor attention may affect the unexpected return changes and trading volume in the market.

The results for the market responses during different intervals in the annual earn-

[21] To save space, detailed results are untabulated but are available upon request.

ings announcements season support the hypothesis of limited attention. Despite the almost costless accounting information available on the Internet, our findings suggest that there is still a cost of limited cognitive resources. The unexpected return changes at the outset of earnings announcements season are insignificant. As the filings of annual reports intensify, investors become attentive to the massive earnings news and trade accordingly, culminating at the end of earnings announcements season.

This paper shows that the market responses for different timings of annual reports filings have distinct features under good news, no news, and bad news. The pronounced increase in unexpected return changes appear during the last 10 days for both good news and bad news, and are robust after controlling for several firm characteristics. However, earnings announcements classified as no news trigger investors' attention differently to the good news and bad news, with small, but significant unexpected return changes at the first 20 days of April and pronounced unexpected return changes after the last five days of April.

It is observed that there is an increase in trading volume after the implementation of electronic filings during earnings announcements season. Once we introduce several control variables, we find significantly negative abnormal volume after the statutory due date for both good and bad news. This result suggests that there is a consensus in investors' beliefs for delayed release of earnings. On the other hand, we find no statistical change in abnormal volume for no news, which suggests that the informedness effect of earnings announced countervails its consensus effect.

We also investigate the timing of earnings announced that has an effect on the imbalance in the number of purchases and sales by each type of investor. The results show that investment trust investors and dealers are more likely to be net sellers, while margin investors and non-margin investors tend to be small net buyers under both the good and bad earnings news. Foreign institutional investors are the only net buyers when there is no available earnings forecast on the market.

Further work on the attention-grabbing event in the content of the accounting earnings, as well as if managers strategically time the release of financial information could prove fruitful in improving our understanding of the usefulness of the financial information.

APPENDIX: The Calculation of Self-Selection Parameter

Managers may choose their preferred earnings announcement date and this implies some unobservable private information. We calculate the selection parameter from a probit model. The treatment indicator is a dummy that equals one for firms whose earnings announcement is advanced or delayed more than five days with respect to the previous year. The choice of five days is based on the reporting pattern of individual firms studied in Sun (2006). The probit model is as follows:

$$\begin{aligned}\Pr(Y = 1|\text{DEL} < -5 \text{ or DEL} > 5) = {} & \alpha + \beta_1 \text{NOA} + \beta_2 \text{SIZE} + \beta_3 \text{SUE} \\ & + \beta_4 \text{LEV} + \beta_5 \text{LIQ} + \beta_6 \text{INST} \\ & + \beta_7 \text{WEEKEND} + \varepsilon, \qquad \text{(A1)}\end{aligned}$$

where DEL is the reporting lag between current year and previous year; NOA is net operating assets; SIZE is firm size; SUE is standardized unexpected earnings; LEV is leverage; LIQ is liquidity; INST is institutional holding; and WEEKEND is earnings announced on Friday or the weekend.

We employ a two-stage estimation procedure proposed by Heckman (1979) to incorporate and control for unobservable private information. In the first step, the inverse Mills ratio is calculated from probit model (A1), which is the ratio of the probability density function over the cumulative distribution function. Then, the estimated selection parameter is included as an explanatory variable in the multivariate regressions.

To meet the exclusion restrictions, a variable is included in the probit model (A1), that we do not include in the multivariate regressions (3). We use NOA as an instrument because the correlation between NOA and variability in return changes SAAR in our sample is -0.008, which is not significantly different from zero; neither the correlation between NOA and standardized trading volume SV, which the correlation coefficient is 0.022.

This paper follows the definition of NOA as described in Hirshleifer et al. (2004, pp. 306–307). Investors with limited attention tend to overvalue firms whose balance sheets are bloated, and firms having high level of NOA may strategically choose to time the announcement of annual earnings. The level of NOA is defined as the difference

on the balance sheet between all operating assets and all operating liabilities, scaled by lagged total assets, as follows:

$$\text{NOA}_t = \frac{(\text{Operating Assets}_t - \text{Operating Liabilities}_t)}{\text{Total Assets}_{t-1}}. \tag{A2}$$

The definitions for operating assets and operating liabilities are as follows:

$$\text{Operating Assets}_t = \text{Total Assets}_t - \text{Cash and Short-Term Investment}_t. \tag{A3}$$

$$\begin{aligned}\text{Operating Liabilities}_t = {} & \text{Total Assets}_t - \text{Short-Term Debt}_t - \text{Long-Term Debt}_t \\ & - \text{Minority Interest}_t - \text{Preferred Stock}_t \\ & - \text{Common Equity}_t.\end{aligned} \tag{A4}$$

Table A1 Correlation Matrix

Variables	DEARLY	DBGN	DMIDDLE	DPREND	DEND	DLATE	SIZE	SUE	1Q_SUE	LEV	LIQ	INST	WKEND	SELECT
DEARLY		−0.059	−0.089	−0.105	−0.294	−0.112	0.055	−0.027	−0.008	−0.072	0.028	0.091	0.015	−0.070
DBGN	−0.059		−0.068	−0.081	−0.225	−0.086	−0.012	−0.013	0.019	−0.037	−0.021	0.012	−0.037	−0.028
DMIDDLE	−0.089	−0.068		−0.121	−0.338	−0.129	0.012	−0.013	−0.000	−0.074	−0.004	0.031	0.002	−0.018
DPREND	−0.105	−0.081	−0.121		−0.398	−0.152	−0.018	−0.033	−0.009	−0.064	0.001	−0.024	0.009	−0.032
DEND	−0.294	−0.225	−0.338	−0.398		−0.426	0.019	0.040	0.029	0.071	−0.001	0.004	0.087	0.053
DLATE	−0.112	−0.086	−0.129	−0.152	−0.426		−0.054	0.013	−0.039	0.098	−0.004	−0.085	−0.124	0.039
SIZE	0.058	−0.012	0.012	−0.024	0.021	−0.053		−0.037	0.014	−0.227	0.175	0.391	0.011	0.273
SUE	−0.020	−0.006	0.009	−0.024	0.032	−0.013	−0.001		0.120	0.077	0.005	−0.008	−0.022	0.098
1Q_SUE	−0.004	0.026	−0.002	−0.019	0.033	−0.040	−0.001	0.231		0.056	−0.027	−0.003	0.027	0.049
LEV	−0.075	−0.037	−0.077	−0.066	0.076	0.098	−0.175	0.044	0.046		−0.028	−0.053	−0.015	0.203
LIQ	0.018	−0.023	−0.015	0.000	0.004	0.008	0.239	0.026	−0.020	−0.004		−0.175	0.012	0.076
INST	0.082	0.010	0.025	−0.031	0.017	−0.084	0.386	−0.012	0.005	−0.041	−0.196		−0.018	−0.247
WKEND	0.015	−0.037	0.002	0.009	0.087	−0.124	0.009	−0.007	0.023	−0.016	0.008	−0.018		0.143
SELECT	−0.073	−0.024	−0.023	−0.032	0.061	0.031	0.251	0.111	0.039	0.265	0.139	−0.327	0.174	

Notes: Pearson correlation coefficients appear in the upper corner and Spearman correlation coefficients appear in the lower corner of the matrix.

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有限注意力與年度盈餘宣告

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摘　要

本研究檢測在台灣年度盈餘宣告中，不同時間點的市場反應。由於會計資訊幾乎在網路上可以不花成本取得，本文認為投資人仍有一項有限注意力的成本。本研究結果顯示，在盈餘宣告時期初始，並未有顯著未預期股票報酬的改變，隨著越多財務年報陸續公佈，投資人開始注意到眾多盈餘消息，因此進場交易造成未預期股票報酬變動之增加，其注意力隨著盈餘宣告時期過後而結束。本文發現於法定盈餘宣告期限之後，所公佈的好消息或壞消息，均呈現顯著的交易量減少，此結果未必意含著投資人未注意到，而是市場的一致性看法將會導致交易量減少。最後，本文檢測不同類型的投資人，其在盈餘公佈期間的交易活動。整體而言，本文的結果顯示投資人的注意力配置並非相同，因此支持有限注意力假說。