

Informed trading before earnings shock

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Abstract

This paper investigates whether institutional investors trade profitably around positive or negative earnings surprises. Using unique Korean data over the period of 2001-2010, we find that the trading volume decreases only before the negative events due to information asymmetry among investors. We also find that institutions sell their stock prior to earnings shock whereas individual and foreign investors do not anticipate the bad news. Hence, institutional trade imbalance is positively related to the announcement abnormal returns of the negative events. The evidence is consistent with our conjecture that domestic institutions exploit their superior information around the negative earnings surprises.

JEL classification: G10; G30

Keywords: Information Asymmetry; Earnings surprises; Trading volume; Trade imbalance; Institutional investors

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I. Introduction

Informed trading around earnings announcements has been one of the main topics in finance and accounting literature. It has been generally accepted that information asymmetry between institutional and individual investors increases before scheduled corporate events. When assessing the value of a firm, investors should collect and interpret information regarding the future earnings or cash flows of the firm. Since earnings announcements convey new information to the market, some investors would actively seek information in pre-disclosure period, which might be reflected in the concentration of their trading activities prior to the events. In addition, investors can differ in their information acquisition abilities or resources as well as in their information processing skills. Consequently, information asymmetry among investors tends to increase before earnings announcements and decrease after the announcements because private information becomes public at the time of the announcement. Kim and Verrecchia (1991) suggest that since some investors are asymmetrically informed before the scheduled announcement, they may respond to it differently.

In this research, we divide earnings announcements into positive and negative events. Many firms tend to actively leak positive information through investor relations, media and other means prior to earnings announcements when they anticipate positive earnings surprises. In the survey literature of Graham, Harvey and Rajgopal (2005), some of the interviewed executives claim that they delay in releasing bad news in order to further study and interpret the information. Withholding the bad news may also be related to managers' concern over their career. Kothari, Shu and Wysocki (2009) find the magnitude of negative stock price reaction to bad news

disclosures to be greater than the magnitude of positive stock price reaction to good news disclosures. They argue that this is the evidence that management, on average, delays the release of bad news to investors. Moreover, underperforming firms are more likely to abandon a project, sell some of their assets, change business strategy and even replace their management. These actions would generate more uncertainty and therefore increase the likelihood of information asymmetry in trading stocks of bad-news firms. Using unique Korea data, this study examines the trading volume and buying and selling activities by investor types prior to positive or negative earnings surprises in order to investigate the presence of information asymmetry among different types of investors.

If less information asymmetry exists before positive earnings surprises, institutional investors might not earn short-term abnormal returns around the events compared to individuals. In contrast, underperforming firms require investors to gather more information for their analysis than the good-news firms. Unlike individual investors, institutions frequently communicate with publicly traded firms as well as with brokerage firms through their investment banking, lending and asset management arms in order to acquire information. Prior literature suggests that institutional investors are informed traders. Badrinath, Kale and Noe (1995) show that returns on the portfolios of stocks with high institutional ownership lead the returns on the portfolios of stocks with low institutional ownership. Boehmer and Kelly (2009) provide evidence that stocks with greater institutional ownership are priced more efficiently. Hendershott, Livdan and Schürhoff (2012) provide evidence that institutional investors' order flow predicts the occurrence of news announcements, the sentiment of the news and the stock market reaction on news announcement days; it also forecasts earnings announcement surprises. Ke and Petroni (2004)

argue that institutional investors obtain private information, which is used to predict negative earnings, from private communication with management. We conjecture that if institutions also have better abilities than individuals to acquire and process information, they would have informational advantage prior to negative earnings surprises rather than positive events.

Kacperczyk and Seru (2007) and Fang, Peress and Zheng (2011) argue that funds with informational advantage trade less with media coverage. In this sense, we argue that the trading activities by investor types can be different prior to positive vs. negative earnings surprises.

Individual investors tend to postpone trading before earnings announcements because they face a risk of trading initiated by informed investors. Chae (2005) finds that the cumulative trading volume decreases before the scheduled announcements and is inversely related to information asymmetry. If individual investors have information about the upcoming positive earnings surprises and if they also face less information asymmetry (since more information is available prior to the positive event), they would not postpone the trading of the firms' stocks. However, we conjecture that individual investors have informational disadvantage compared to institutions before negative earnings surprises because firms tend to avoid leaking the negative news to the markets. With this prior, we test whether the trading volume decreases more before the negative news than before the positive earnings surprises.

After dividing the investors into individuals, institutions and foreigners, we then examine each of the three investor types' buying and selling activities around earnings announcements in order to investigate as to whether informed investors take advantage of their superior information. If institutions have better information on the upcoming news compared to other types of investors, they can make substantial short-term trading profits by moving ahead of

the uninformed investors. Since we argue that institutions have informational advantage only before the negative earnings surprises, their buying and selling activities would be more distinctive than other investors around the time of the negative news. We expect that the selling volume of institutions is higher than that of other investors prior to negative earnings surprises.

We also investigate whether foreigners have more informational advantage on anticipated earnings announcements compared to domestic investors. Previous literature provides inconclusive evidence that foreigners perform better than domestic investors in trading stocks. For instance, Grinblatt and Keloharju (2000) find that foreign investors act like momentum investors, with high levels of sophistication, and that they outperform local individual investors in the Finnish stock market. In contrast, Choe, Kho and Stulz (2005) find no evidence that foreign investors are better performed than domestic institutions in the Korean market. There are few studies that investigate as to whether foreigners have informational advantage on specific corporate events such as earnings announcements. This study looks into the buying and selling volume of foreigners around earnings announcements in order to examine their short-term informational advantage. Since foreigners who invest in the emerging markets are mostly institutional investors, we compare foreign institutions to both domestic institutions and domestic individuals.

The Korean data we employ in testing our hypotheses have a couple of advantages. First, we can directly investigate informed trading by any investor type around earnings announcements since the Korea Exchange provides daily trading volume by investor types for all stocks traded on the Korean Stock Exchange (KSE) and on the Korea Securities Dealers Automated Quotation (KOSDAQ). Also, the Korean stock market is one of the emerging markets

in which financial institutions from developed markets have actively invested. Foreign ownership has dramatically increased in Korea after the ownership limit on foreign investors was lifted in 1998. Foreign investors owned 18% of the capitalization of Korean stocks at the end of 1998; their ownership has increased to 31.15% as of the end of 2010. Therefore, Korean data is well suited for investigating foreigners' informational advantage relative to domestic investors.

Over the sample period of 2001-2010, we use analysts' earnings forecast errors, trading volume by investor types and stock return data for Korean firms in order to test our hypotheses. We first find that stock prices tend to increase starting one month before the announcements of positive earnings surprises and do not decline before negative earnings surprises, indicating that investors reflect on the upcoming positive news of stock prices during the pre-disclosure period. These results suggest that in general, investors anticipate positive earnings surprises, but do not have much information regarding the upcoming negative news. We then find that abnormal trading volume is significantly negative before the earnings announcements, which is consistent with Chae (2005). We also document that abnormal trading volume is not statistically different from zero before positive news, while it is significantly negative before negative news. This indicates that Chae's (2005) finding might be driven by abnormal trading volume prior to negative earnings surprises. The finding also supports our argument that information asymmetry among investors is larger before negative earnings surprises than before positive events.

We next test who has informational advantage among domestic individuals, domestic institutions and foreign institutions by investigating the buying and selling volume by each investor type around earnings announcements. For the test, we estimate the standardized trade imbalance (our proxy for buying pressure) by investor types before earnings announcements.

Over the trading days from -5 to -1 before negative earnings surprises, the trade imbalance by domestic institutions is -0.29 with a p-value of less than 0.1, which suggests that institutional investors sell their stocks with the upcoming negative news. The trade imbalance by individuals is 0.28 with a p-value of less than 0.1, while that of foreigners is not significantly different from zero. The result indicates that individual investors' trades are opposite to what the upcoming news implies; moreover, it reveals that foreigners' trades are not related to the upcoming earnings news. The trade imbalance by any investor type is significantly different from those by other investor types.

To show whether informed investors successfully exploit their superior information over the short-term period, we then examine the relation between trade imbalance by informed investors before earnings announcement and stock returns after the event in the multivariate regressions. We find that the trade imbalance of domestic institutions is positively related to stock returns after negative earnings surprises, but is not related to stock returns after positive events. We also find that the trade imbalances of individual and foreign investors are not related to stock returns after positive or negative earnings surprises. The result suggests that the selling pressure by institutional investors predict stock returns upon the announcements of negative earnings surprises.

Our paper adds to the extant literature by examining short-term informational advantage of institutions over other investors using high-frequency data. Campbell, Ramadorai and Schwartz (2009) infer institutional trading using the Trade and Quote (TAQ) data and find that institutions trade profitably prior to earnings announcements. In contrast, Kaniel, Liu, Saar and Titman (2012) argue that individuals trade profitably ahead of earnings announcements. Kelly

and Tetlock (2011) also find that retail investors have some information for a broader set of new announcements. We contribute substantially to this controversy by documenting that institutions take advantage of their forecasting ability only before negative earnings surprises, not before positive events. We also contribute to the growing literature on foreign investors' trading in the emerging markets. We find that foreign institutions' trading is not distinctive around earnings announcements and does not predict stock returns. This shows that foreign institutions have informational disadvantage compared to local institutions around the specific corporate event. The result is broadly consistent with Brennan and Cao's (1997) argument that foreign investors experience informational disadvantage in the local markets.

The rest of the paper is organized as follows. Section II reviews the related literature and develops the hypotheses. Section III describes the data and Section IV explains the empirical findings. Section V concludes the paper.

II. Related literature and hypothesis development

Asymmetric information among investors has been a central and fundamental issue to financial economists. Relative to individual investors, institutions are generally viewed as better-informed, rational and sophisticated investors who have better access to market information and better ability to analyze corporate information. Since earnings announcements are regular and public information, investors try to project their expectations to forthcoming announcements in terms of the security price. Also, institutions have a better ability to acquire private information than individual investors and therefore, information asymmetry can be higher in the pre-disclosure period. That is, the anticipation of earnings news increases information asymmetry

across investors as they increase their search for private information that will allow them to profit once earnings are announced. Previous literature has extensively examined market behavior around the earnings announcements. For instance, Kim and Verrecchia (1991) show that investors acquire private information for the opportunity to trade before and at the earnings announcements. McNichols and Trueman (1994) also argue that information asymmetry should increase before earnings announcement as there is a risk that trades are initiated by informed investors. Chae (2005) documents that prior to earnings announcements, the cumulative trading volume decreases; which is correlated with the extent of information asymmetry.

In this study, we divide earnings announcements into positive and negative events. Lang and Lundholm (1993) demonstrate that successful firms provide more information than unsuccessful firms. Their analysis also indicates that successful firms have less information asymmetry and less uncertainty than bad-news firms. Kothari, Shu and Wysocki (2009) argue that firms tend to delay the release of bad news to investors. Therefore, information asymmetry among investors is larger before negative earnings surprises than before positive earnings surprises. Since we expect firms to actively leak information before positive news, the stock prices of firms begin to reflect on the upcoming positive news in the pre-disclosure period. In contrast, the stock prices do not reflect on the upcoming negative earnings surprises in the pre-disclosure period because bad news is not leaked to the markets. Therefore, we first test the following hypothesis:

H1: Stock prices increase prior to positive earnings surprises, but do not decrease prior to negative earnings surprises.

We also argue that the level of information asymmetry across investors is different before positive versus negative earnings surprises. Kim and Verrecchia (1991) show that if the precision of the public announcement is large enough, there is little incentive for investors to acquire private information in anticipation of a public announcement, and information asymmetry across investors remains small. This indicates that if firms leak sufficient information on upcoming positive earnings surprises, information asymmetry would be small prior to positive earnings surprises since it is hard for institutions to have informational advantage over individual investors. In contrast, if firms hide information of upcoming negative earnings surprises, institutional investors have incentives to acquire private information for the opportunity to trade. They can have superior information prior to the negative event based on their ability to acquire corporate information and greater resources in order to process the information. Thus, information asymmetry across investors becomes large prior to negative earnings surprises. Following Foster and Viswanathan's (1995) and Chae's (2005) results that trading volume is negatively related to information asymmetry prior to earnings announcements, we test the following hypothesis:

H2: The decrease in trading volume prior to negative earnings surprises is larger than that prior to positive earnings surprises.

To investigate whether institutions make use of private information on the upcoming corporate events, researchers tend to use the quarterly data or TAQ data until recently since they cannot obtain daily investor-specific trading data¹. For instance, Yan and Zhang (2009) find that

¹ For instance, institutional positions are reported only quarterly in the 13F filings in the United States.

the stocks for which the quarterly short-term institutional ownership has increased tend to have positive earnings surprises. To overcome the problem of the low-frequency data, some recent papers have used proprietary data with a small sample size or a short time period. Griffin, Harris and Topaloglu (2003) use the trade data on Nasdaq100 stocks from Nasdaq's transaction confirmation service and find that institutions purchase stocks that have recently risen; however, they do not predict future daily returns. Froot and Teo (2008) use custodial data from State Street Corporation and find that institutions' style investing is related to future stock returns. Baker, Litov, Wachter and Wurgler (2010) find that the average mutual fund displays the stock-picking skill in that subsequent earnings announcement returns on its weight-increasing stocks are significantly higher than those on its weight-decreasing stocks. Recently, Griffin, Shu and Topaloglu (2011) find that most institutional and individual investor groups are uninformed prior to takeovers and earnings announcements; yet, a group of large hedge fund traders sells prior to negative earnings announcements. These studies, which are based on proprietary data, have disadvantages since their samples are restricted in their coverage of institutional investors, and the time span they investigate is relatively short.

Other papers use the TAQ database in order to identify trading by institutional and individual investors based on trade size. Lee and Radhakrishna (2000) evaluate the performance of several alternative cutoff rules and find that a \$20,000 cutoff most effectively classifies institutional trades in small stocks. However, Campbell, Ramadorai and Schwartz (2009) find that Lee and Radhakrishna's approach performs poorly when benchmarked against the quarterly institutional holdings in 13F filings. We test whether domestic or foreign institutions can take advantage of their private information before the earnings announcements using the Korean data

that includes the daily net buys grouped by individuals, institutions and foreigners. Many previous studies have examined the behavior of institutions and individuals around earnings announcements. It has been argued that institutional trading is driven by their superior information gathering and processing skills. Hendershott, Livdan and Schürhoff (2012) present that the institutional order flow (buy volume minus sell volume) increases by more than five days prior to the announcement of good news and decreases by more than five days prior to bad news announcement. We argue that institutions have more incentive to acquire private information before negative earnings surprises than before positive earnings surprises since more private information can be acquired prior to the negative event. Accordingly, informed investors, the institutions, might trade stocks with anticipated negative earnings surprises more actively in order to exploit their private information. To test this argument, we measure a standardized trade imbalance by investor types as a proxy for buying pressure before earnings announcements. We then test the following hypothesis:

H3: The trade imbalance by informed investors, the institutions, is negative before negative earnings surprises while that by individuals is not negative.

H3-1: The trade imbalance by informed or uninformed investors should be close to zero before positive earnings surprises since information asymmetry is small before the event.

The extant literature provides evidence that foreign investors follow momentum trading strategies unlike local individual investors. For instance, Choe, Kho and Stulz (1999) find such evidence in the Korean market, and Kalev, Nguyen and Oh (2008) also find similar evidence for stocks traded on the Helsinki stock exchange. Brennan and Cao (1997) argue that foreign

investors' momentum strategies reflect their informational disadvantage in the local markets. In this paper, we investigate as to whether foreign investors have informational advantage on the upcoming earnings announcements relative to local institutional or individual investors. We expect that the trade imbalance by foreign institutions would not be directional if foreigners do not have informational advantage relative to local investors. We test the following hypothesis:

H3-2: The trade imbalance by foreign institutions should be close to zero before negative or positive earnings surprises.

If domestic institutions trade profitably using their superior information over the short term, their trade imbalance before earnings announcement should be positively related to stock returns after the announcement. This relation should hold for negative earnings surprises since we expect that domestic institutions have informational advantage only on the upcoming negative news. We also expect that trade imbalances by domestic individuals or foreigners are not related to the stock returns. This conjecture is not consistent with Kaniel et al.'s (2012) finding, in which the individuals trade profitably ahead of earnings announcements. Accordingly, we test the following hypotheses:

H4: The trade imbalance by domestic institutions before negative earnings surprises is positively related to stock returns after the events.

H4-1: The trade imbalance by domestic institutions does not forecast positive earnings surprises.

H4-2: The trade imbalance by individuals or foreign institutions is not related to stock returns after negative or positive earnings surprises.

One might think that institutions can use options and short-selling to take advantage of their superior information. However, options on individual stocks are not available in Korean markets. Short-selling by individual investors began in 1969 in Korea. However, short-selling by institutional investors was introduced much later in 1996. The rules and regulations on short-selling in the Korean stock markets are stricter than those of the U.S. stock markets. The Korean financial authority currently allows only covered short-selling and imposes the uptick rule when investors sell their borrowed shares. In addition, short-sellers are required to provide evidence of settlement capability for their sales to the broker, who is a Korea Exchange member. Therefore, in the Korean markets, institutional investors are not able to take advantage of their superior information through option trading or short-selling.

III. Data

To test our hypotheses, we first obtain the data in the analysts' reports on South Korean companies from a database, *FnConsensus* of FnGuide². The South Korean financial data provider, FnGuide, collects data on analysts' reports since 2000. Due to this time limitation, our sample includes analysts' forecast data for South Korean companies over the fiscal years of 2001-2010. We exclude earnings forecast data for the upcoming quarters and only include forecast data for the fiscal year-end EPS. We collect each analyst's last earnings forecast prior to earnings announcements as well as the actual earnings of each company from the *FnConsensus*.

We then combine accounting data, trading volume by investor types, and the stock return data with analysts' forecast data. We obtain the annual accounting data over the sample period of

² We also collect analysts' forecast data from IBES. The dates of earnings announcements from IBES tend to be later than the actual announcement dates. Therefore, we use the data from the local data provider, FnGuide.

2001-2010 from *Total Solution 2000* (TS 2000), a database compiled by the *Korean Listed Companies' Association*. We obtain the daily trading volume of each stock by domestic individuals, domestic institutions and foreigners around the earnings announcement dates from *Korea Exchange*. We also obtain stock return data and the Korean market index around the dates of earnings announcements from a database (*KIS-value*) of *Korean Information Service* (KIS). The KIS is affiliated with Moody's and is a leading provider of credit-related information and services in South Korea.

We exclude financial companies since such companies are heavily regulated and are less subject to information asymmetry compared to industrial companies. Since we are interested in asymmetric information among individuals, institutions and foreigners, we exclude firms from our sample if the ownership of institutions and foreigners accounts for less than 5 percent. Our final sample consists of 2,019 firm-years (or earnings announcements) representing 596 distinctive firms, which have been traded for some period over the years 2001-2010 in KSE or KOSDAQ.

Table 1 reports the number of firms over our sample period and the descriptive statistics of firm characteristics. Since we assume that information asymmetry is not the same before positive vs. negative earnings surprises, we divide our sample into firms announcing positive earnings surprises and firms announcing negative earnings surprises based on the following analyst' earnings forecast error (AEFE).

$$AEFE_{i,t} = \frac{Actual_{i,t} - Forecast_{i,t}}{|Actual_{i,t}|}$$

where $AEFE_{i,t}$ denotes analyst earnings forecast error for firm i in fiscal year t , $Actual_{i,t}$ is the reported EPS (earnings per share) of firm i for fiscal year t and $Forecast_{i,t}$ is the consensus EPS forecasts of firm i for the same year. The consensus EPS forecast for a firm is the average of the last forecasts of analysts covering the firm for the fiscal year-end EPS. If $AEFE_{i,t}$ is positive (negative), the firm announces a positive (negative) earnings surprise.

Panel A of Table I shows the number of firms announcing positive and negative earnings surprises by year. For the year 2001, our sample includes only 42 firms since a small number of firms have been covered by analysts in the early 2000s. The number of firms has increased to 200 in 2004 and remains at a figure greater than 200 following 2004. Out of 1,806 firms listed in KSE and KOSDAQ as of the end of 2010, 263 firms (14.56%) are included in our sample. Out of 2,019 firm-years in the total sample, 604 firm-years (30%) announce positive earnings surprises while 1,415 firm-years (70%) announce negative earnings surprises.

[Insert Table I about here]

Panel B of Table I summarizes the variables by representing the characteristics of the sample firms. The mean total assets and market capitalization are approximately 1,981 and 1,504 billion won at the end of the fiscal year. The mean actual earnings per share (EPS) is about 3,671 won with a standard deviation of 8,866 won. The number of analysts covering each sample firm is about 7 on average. The mean profitability (EBIT/total assets) is 8.7% and the mean leverage (total debt/total assets) is 40.65%. Also, the mean dividend yield is 3.24% and the mean market to book ratio of equity is 2.61.

Panel C of Table I compares the characteristics of sample firms announcing positive vs. negative earnings surprises. We measure information asymmetry of a firm with its firm size, the number of analysts following and the market to book ratio of equity. The firm size, measured by total assets and market capitalization, is not different between firms announcing positive vs. negative news. However, the firms announcing positive earnings surprises have a higher number of analysts following and a lower market to book ratio of equity than those announcing negative news. This suggests that investors face more information asymmetry when investing in firms with negative earnings surprises. Further, firms announcing positive earnings surprises tend to have higher actual EPS, profitability (EBIT/total assets) and dividend yield.

IV. Empirical findings

We assume that stock prices increase prior to positive earnings surprises due to information leakage, while stock prices do not decrease prior to negative earnings surprises in hypothesis 1. To test this hypothesis, we measure the abnormal return (AR) and the cumulative abnormal return (CAR) around earnings announcements. $AR_{i,t}$ is a market-adjusted return for firm i on day t , calculated as follows:

$$AR_{i,t} = R_{i,t} - R_{m,t},$$

where $R_{i,t}$ is a return for firm i on day t , and $R_{m,t}$ is a value-weighted return of all stocks traded on the Korean exchanges on day t . Then, we calculate CAR over the period from day t_1 to t_2 as below:

$$CAR_{(t_1,t_2)} = \sum_{t=t_1}^{t_2} AR_t.$$

Table II reports mean CARs over several event periods around positive and negative earnings surprises. The results show that stock prices begin increasing before the announcements of positive earnings surprises. The mean CAR of the pre-disclosure period, trading days from -25 to -1, is 1.72% and is significantly different from zero at the 1% confidence level. The results also show that the stock prices continue to increase after the announcement of the positive event. However, stock prices do not decline before the announcements of negative earnings surprises. The mean CAR over the period of days from 0 to 5 is -0.92% and is statistically significant at the 1% confidence level, which means that stock prices reflect the negative information only after the announcement. The results of the mean difference tests show that CARs are significantly different over all event periods around positive vs. negative earnings surprises.

[Insert Table II about here]

We report the patterns of stock returns around positive and negative earnings surprises in Figure I. In this figure, stock prices start to increase before the positive event, but declines only after the announcements of the negative event. We also find that stock prices continue to rise after positive news over some period, which is consistent with post-earnings-announcement drift (PEAD)³. The results in Table 2 and Figure 1 are consistent with our conjecture in hypothesis 1, that information on upcoming positive news leaks to the market before the event; however, negative information does not leak to the market before the news announcement.

[Insert Figure I about here]

³ Since Ball and Brown (1968) report the phenomenon of PEAD, previous literature has extensively investigated the phenomenon.

To further investigate the movement of stock prices around earnings announcements, we divide stocks with negative earnings surprises into three portfolios (P1, P2, P3) with equal number of stocks, and also divide stocks with positive earnings surprises into three portfolios (P4, P5, P6) with equal number of stocks based on analysts' EPS forecast errors (AEFE). On average, P1 has the smallest AEFE and P6 has the largest AEFE. We focus on the abnormal returns of the stocks in P1, P2, P5 and P6 over 11 days around the earnings news since firms in P3 & P4 announce actual earnings close to market expectation. The stock prices in P1 decline by 0.56% over the days from -5 to -1 and then further decrease by 1.74% over the days from 0 to 5. The stock prices in P2 decline only after the announcements of negative earnings surprises. However, stock prices in P5 & P6 increase by almost 1% over the days from -5 to -1, implying that the market begins reflecting on upcoming positive news at least 5 days before the announcements.

[Insert Table III about here]

We then investigate the trading volume around earnings announcements following Foster and Viswanathan (1995) and Chae (2005). They find that the trading volume decreases before the scheduled announcements since uninformed investors try to avoid a risk of trades initiated by informed investors. We calculate a turnover (TO) of firm i on a specific day t as follows:

$$TO_{i,t} = \log\left(\frac{\text{Trading Volume}_{i,t}}{\text{Outstanding}_{i,t}} + 0.00000255\right),$$

where *Trading Volume* means a trading volume of firm *i* on day *t* and *Outstanding* means the number of the firm's outstanding stock on the same day⁴. We then calculate the abnormal trading volume (ATO) of firm *i* on a specific day *t* as follows:

$$ATO_{i,t} = TO_{i,t} - \overline{TO}_i,$$

where the average turnover in the pre-event period (days -55 to -26) is calculated as

$$\overline{TO}_i = \frac{\sum_{t=-55}^{-26} TO_{i,t}}{30}.$$

Table IV reports the cumulative abnormal turnovers (ATO) by different investor types over different event periods around the announcements of earnings surprises. Panel A reports ATO by aggregate investors. We find in the total sample that ATO is significantly negative before earnings announcements, but is significantly positive over the event period of days 0 to 5. The result indicates that investors tend to decrease trading activities due to information asymmetry before the event, but increase trading activities after the event, which is consistent with Chae's (2005) result. We argue that the level of information asymmetry among investors can be different before positive vs. negative earnings surprises. Moreover, we discover that ATO is not statistically different from zero before the announcements of the positive earnings surprises, whereas ATO is about -0.32 and is statistically significant at the 1% confidence level before the announcements of the negative events. This is consistent with our conjecture that the level of information asymmetry is more severe before negative events. The result also indicates that

⁴ To avoid a zero trading volume problem, we add a small number in the formula.

Chae's result might be driven by information asymmetry prior to the negative event even though our sample is different from Chae's.

[Insert Table IV about here]

Panel B of Table IV reports abnormal turnovers by institutions around earnings announcements. We find that ATO is not statistically different from zero before and after the event, and is also not different from zero around positive or negative earnings surprises. These results indicate that institutional investors do not decrease their trading activities since they are not subject to information asymmetry.

Panel C of Table IV shows that abnormal turnovers by individual investors decrease around earnings announcements in general. We specifically find that the ATO over the event period of days -5 to -1 is not statistically significant before positive earnings surprises, while the ATO over the same period is significantly negative at the 5% level prior to negative earnings surprises. The result indicates that individual investors do not decrease their trading activities before the positive event as much as before the negative event, which is consistent with H2. Panel D reports ATO by foreigners and shows that the pattern of their trading activities is similar to that of individual investors' trading activities.

We find in Table IV that institutional investors do not decrease their trading volume before earnings announcements, whereas individual and foreign investors do. We also discover that individual and foreign investors decrease their trading volume more before negative earnings surprises than before positive events. These results suggest that domestic institutions, rather than

individuals and foreigners, are more informed on upcoming earnings news, and the level of information asymmetry is more severe before negative earnings surprises.

The trading volume does not show who buys (or sells) the stock with upcoming positive or negative earnings surprises. Following Malmendier and Shanthikumar (2006) and Lai and Teo (2008), we utilize a standardized trading imbalance in order to measure the direction of trading by each type of investors before the earnings news. We first calculate the trade imbalance (TI) on firm i by x type investor on day t as follows:

$$TI_{i,x,t} = \frac{Buy\ Volume_{i,x,t} - Sell\ Volume_{i,x,t}}{Buy\ Volume_{i,x,t} + Sell\ Volume_{i,x,t}}$$

Using the standard deviation of the TI over the year, we then normalize TI in order to attain the standardized trade imbalance (STI) as follows:

$$STI_{i,x,t} = \frac{TI_{i,x,t} - \overline{TI}_{i,x,year(t)}}{std(TI_{i,x,year(t)})}$$

Panel A of Table V shows the cumulative STI by individuals, institutions and foreigners around the announcements of positive earnings surprises. We find that the STIs by any type of investors are not different from zero over the event period of days from -5 to -1, from 0 to 1 or from 0 to 5. The ANOVA test also shows that each STI is not different from those by other investor types. Overall, the result indicates that any type of investors does not directionally trade over short-term periods around the announcements of positive earnings surprises.

Panel B shows STI by investor types around the announcements of negative earnings surprises. We find that STI by individuals is positive and statistically significant before and after

the negative news, suggesting that individual investors trade stocks in the opposite direction to the news. The STI by institutions over the period of days from -5 to -1 is approximately -0.29 with a p-value of less than 0.01, meaning that domestic institutions sell stocks anticipating negative earnings surprises. We also find that trading by foreign investors is not directional around the negative news. The ANOVA test shows that each STI is statistically different from those by other investor types.

[Insert Table V about here]

We divide the sample firms into 6 portfolios in Table III. We report STI by investor types around the earnings news for each portfolio in Table VI. The mean CAR of P1 over the period of days from 0 to 5 is -1.74%, while that of P6 is 1.98%. Since analysts' forecast errors for the stocks in P3 and P4 are close to zero, we focus on the STIs by investor types for the stocks in P1, P2, P5 and P6. In P1, STI by individual investors over the period of days from -5 to -1 is 0.36, while that by institutional investors is about -0.36. The result indicates that domestic institutions sell stocks anticipating large negative surprises, whereas individual investors buy those stocks. The STI by any investor type is not different from zero after the earnings news for the stocks in P1. Institutional investors also sell the stocks in P2 before the negative news, while individual investors buy the stock before and after the news.

[Insert Table VI about here]

The result in Table VI also shows that STI by any investor type is not statistically different from zero for the stocks in P5 before and after positive news. Surprisingly, STI by institutions is negative for the stocks with the largest positive earnings surprises in P6. Due to the

increase in stock prices resulting from information leakage, institutional investors seem to realize positive returns by selling their stocks before the news

The results in Tables V and VI suggest that investors do not show any directional trading behaviors around positive earnings surprises since there is a low level of information asymmetry around positive news. Consistent to our conjecture, domestic institutions make informed trading before negative earnings surprises, while individual investors trade in the opposite direction to the negative news. In contrast, foreign investors do not directionally trade around positive and negative earnings surprises. These results are generally consistent with hypotheses, H3, H3-1 and H3-2.

To further investigate the informedness of institutional trading, we investigate as to whether their trading predicts the abnormal return in multivariate regressions. We primarily estimate the following equation.

$$CAR_{[0,5]} = \beta_0 + \beta_1 STI_{[-5,-1]} + \beta_2 ES + \beta_3 CAR_{[-5,-1]} + \beta_4 Size + \beta_5 MB + \beta_6 NumAnal + \varepsilon_{i,t}$$

Further, we attempt to find in the regression the relation between cumulative abnormal return (CAR) over the period of days from 0 to 5 and STI by each investor type over the period of days from -5 to -1. We include the earnings surprise dummy (ES), which is a variable taking 1 if analysts' EPS forecast errors is larger than the median and otherwise, 0. We also include CAR over the period of days from -5 to -1 as well as the firm size (Size), market to book ratio of equity (MB) and the number of analysts covering each firm-year (NumAnal) as control variables. The firm size is calculated as a natural log of market capitalization at the end of the fiscal year.

Since our sample is a cross-sectional time-series (panel) data, we estimate the equation using OLS with clustered standard errors; the results are reported in Table VII⁵. Panel A of Table VII shows the regression results for stocks with positive earnings surprises. The dependent variable is CAR[0,5] in all models 1 to 10. As primary testing, we include STIs by institutions over the periods of days from -25 to -1 or days from -5 to -1 as independent variables in models 1 to 4, and STIs by individuals and foreigners in models 5 to 10. In all models, the coefficients on STIs are not statistically significant, which is consistent with the results in Tables V&VI. This result suggests that investors either do not trade stocks anticipating positive earnings surprises, or they cannot exploit others since there is little information asymmetry among the three types of investors due to information leakage prior to the announcements. The coefficients on the earnings surprise dummy are positive and marginally significant in Models 1, 2, 5 and 6, meaning that the abnormal returns are larger if analysts' forecast errors are higher than the median of the sample. The coefficients on CAR[-25,-1] are significantly negative in those models, implying that the returns show a mean-reverting pattern around earnings announcements. We also include the size, MB and the number of analysts in order to control for the level of information asymmetry. The coefficients on size or MB are negative and marginally significant in models 2, 4, 6 and 10, which mean that abnormal returns tend to be smaller when the level of the firms' information asymmetry gets larger.

[Insert Table VII about here]

⁵ Refer to Petersen (2009) for an explanation on OLS with clustered standard errors.

We then report the regression results for stocks with negative earnings surprises in Panel B of Table VII. The coefficients on institutions STI[-25,-1] are significantly positive at the 10% confidence level in models 1&2; those on institutions STI[-5,-1] are significantly negative at the 5% level in models 3&4. The coefficients on STIs by individuals and foreigners are not statistically significant in models 5 to 10. This evidence is also consistent with the results in Tables V&VI, that institutions sell their stocks anticipating negative news. We also find that the coefficients on the earnings surprise dummy are significantly negative in all models, which means that stock returns are more negative if analysts' forecast errors are smaller than the median in the subsample. Other results are similar to those in Panel A.

The results in Table VI support H4 & H4-1, which state that trade imbalance by institutions are positively related to stock returns only after the announcements of negative earnings surprises. They also support H4-2, such that trade imbalance by individual or foreign investors do not predict stock returns after the announcements of earnings news.

In summary, we find that stock prices begin to rise before the announcements of positive earnings surprises due to information leakage. We then find that the trading volume decreases only before negative earnings surprises; however, the decrease is driven by individuals and foreign investors. We also find that institutional investors directionally trade only before the negative news since they have informational advantage on the upcoming announcements of negative earnings surprises. Finally, we document that foreign investors do not have superior information on the most important corporate event, earnings announcements.

V. Conclusion

In this research, we have examined whether institutions exploit their informational advantage over the short-term around earnings announcements. We conjecture that the level of information asymmetry is higher before negative earnings surprises compared to positive earnings surprises due to the information leakage of positive news. Hence, institutions would take advantage of their superior information only around the negative news.

Using unique Korean data over the period of 2001-2010, we find that information leakage leads stock prices to increase before the announcements of positive earnings surprises. We document that the trading volume decreases only prior to the announcements of negative earnings surprises. We then find that domestic institutions sell their stock anticipating negative news; however, individual investors trade their stock in the opposite direction to the news. Trade imbalance by institutions predicts stock returns upon the negative news. However, we do not find any evidence that foreign investors directionally trade stocks around the earnings news based on their informational advantage.

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Table I
Descriptive Statistics of Earnings Announcements

Panel A: Number of Positive Earnings Announcements and Negative Earnings Announcements

| Year | Positive Earnings Surprises | Negative Earnings Surprises | Total |
|-------|-----------------------------|-----------------------------|-------|
| 2001 | 10 | 32 | 42 |
| 2002 | 29 | 60 | 89 |
| 2003 | 57 | 125 | 182 |
| 2004 | 61 | 139 | 200 |
| 2005 | 85 | 200 | 285 |
| 2006 | 77 | 180 | 257 |
| 2007 | 54 | 177 | 231 |
| 2008 | 65 | 157 | 222 |
| 2009 | 89 | 159 | 248 |
| 2010 | 77 | 186 | 263 |
| Total | 604 | 1,415 | 2,019 |

Panel B: Descriptive Statistics for Earning Announcement Firms

| Variables | Mean | Median | Max. | Min. | Std. Dev. |
|-------------------------------------|----------|----------|------------|------------|-----------|
| Total Assets (billion won) | 1,981.20 | 378.31 | 66,868.18 | 16.03 | 5,213.65 |
| Market Capitalization (billion won) | 1,504.28 | 226.84 | 81,898.43 | 1.57 | 4,487.15 |
| Actual EPS (won) | 3,670.99 | 1,423.37 | 125,285.34 | -51,465.54 | 8,866.35 |
| Number of Analysts following | 6.98 | 4.00 | 30.00 | 1.00 | 6.55 |
| EBIT/Total Assets (%) | 8.70 | 7.67 | 49.00 | -70.86 | 7.63 |
| Debt/Total Assets (%) | 40.65 | 40.77 | 164.44 | 1.69 | 19.27 |
| Dividend Yield (%) | 3.24 | 1.83 | 96.55 | 0.00 | 6.57 |
| Market to Book ratio of Equity | 2.61 | 1.17 | 1,200.50 | -1.40 | 28.21 |

Panel C: Comparison of the Characteristics of Firms announcing Positive vs Negative Earnings Surprises

| Variables | Positive Earnings Surprises | | Negative Earnings Surprises | | Difference Test | |
|-------------------------------------|-----------------------------|----------|-----------------------------|----------|-----------------|------------------|
| | Mean | Median | Mean | Median | Mean (t-value) | Median (z-value) |
| | Total Assets (billion won) | 2,225.67 | 420.32 | 1,876.85 | 358.33 | 1.38 |
| Market Capitalization (billion won) | 1,743.38 | 261.02 | 1,402.08 | 214.20 | 1.45 | 1.47 |
| Actual EPS (won) | 5,324.84 | 2,117.80 | 2,965.03 | 1,083.42 | 4.70*** | 8.60*** |
| Number of Analysts following | 7.44 | 5.00 | 6.77 | 4.00 | 2.04** | 1.56 |
| EBIT/Total Assets (%) | 9.93 | 8.64 | 8.17 | 7.14 | 5.12*** | 4.68*** |
| Debt/Total Assets (%) | 39.80 | 39.08 | 41.01 | 41.34 | -1.29 | -1.64* |
| Dividend Yield (%) | 3.96 | 1.90 | 2.91 | 1.77 | 2.61*** | 1.48 |
| Market to Book ratio of Equity | 1.69 | 1.09 | 3.00 | 1.21 | -1.44 | -2.32** |

Panel A reports the number of firms announcing positive and negative earnings surprises each year. If the actual EPS (earnings per share) for a fiscal year is larger (smaller) than the average of the last EPS forecasts made by analysts, earnings announcements are classified as positive (negative) earnings surprises. Panel B reports the mean, median, maximum, minimum and standard deviation of variables representing firm characteristics. Total assets and market capitalization are measured at the end of the fiscal year in billion won. Actual EPS is the reported EPS by the firm. Number of analysts following is the number of analysts covering each firm for the fiscal year. EBIT/total assets is the earnings before interest and taxes divided by total assets; debt/total assets is a percentage of total debt divided by total assets. Dividend yield is the ratio of cash dividend paid per share over the fiscal year to the stock price. Market to book ratio of equity is the ratio of market value of equity to book value of equity at the end of the fiscal year. Panel C reports the mean and median of all variables; it also provides the results of the mean difference tests and nonparametric median difference tests between the two subsamples, positive vs. negative earnings surprises.

*, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table II
Cumulative Abnormal Returns around Earnings Announcements

| Event Period | Positive Earnings Surprises (N=604) | | Negative Earnings Surprises (N=1,412) | | Mean Difference Test |
|-----------------|--|---------|--|----------|-------------------------|
| | CAR | t-value | CAR | t-value | t-value |
| [-25,-1] | 0.0172 | 3.30*** | -0.0054 | -1.56 | 3.58*** |
| [-10,-1] | 0.0115 | 3.37*** | -0.0006 | -0.24 | 2.91*** |
| [-5,-1] | 0.0074 | 3.18*** | 0.0002 | 0.15 | 2.51*** |
| [0,1] | 0.0110 | 5.97*** | -0.0059 | -4.77*** | 7.53*** |
| [0,5] | 0.0131 | 4.69*** | -0.0092 | -4.98*** | 6.61*** |
| [0,10] | 0.0198 | 5.47*** | -0.0101 | -4.36*** | 7.00*** |

The Table reports the mean cumulative abnormal returns (CARs) over different event periods as well as the results of mean difference tests of CARs between positive vs. negative earnings surprises. Day 0 is the earnings announcement date. Abnormal returns are market adjusted returns.

*, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table III**Cumulative Abnormal Returns around Earnings Announcements: Portfolio Sorting by AEFE**

| Event Period | Portfolios | | | | | | P6-P1 t-value |
|-----------------|------------|------------|-----------|-----------|-----------|-----------|------------------|
| | P1 | P2 | P3 | P4 | P5 | P6 | |
| [-5,-1] | -0.0056 | 0.0002 | 0.0063 | 0.0048 | 0.0084 | 0.0090 | 2.79*** |
| | (-1.95)** | (0.07) | (2.58)*** | (1.30) | (2.09)** | (2.07)** | |
| [0,1] | -0.0156 | -0.0042 | 0.0022 | 0.0087 | 0.0070 | 0.0173 | 8.11*** |
| | (-7.03)*** | (-1.98)** | (1.10) | (2.55)*** | (2.60)*** | (5.10)*** | |
| [0,5] | -0.0174 | -0.0074 | -0.0029 | 0.0089 | 0.0105 | 0.0198 | 6.03*** |
| | (-5.19)*** | (-2.35)*** | (-0.91) | (1.89)* | (2.35)*** | (3.78)*** | |

The Table reports the cumulative abnormal returns (CARs) of each portfolio, P1-P6, over different event periods. Day 0 is the earnings announcement date. We divide the stocks with negative earnings surprises into three portfolios (P1, P2, P3) with equal number of stocks; we also divide the stocks with positive earnings surprises into three portfolios (P4, P5, P6) with equal number of stocks based on analysts' EPS forecast errors (AEFE). On average, P1 has the smallest AEF E and P6 has the largest AEF E. The numbers in parentheses are t-values. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table IV
Cumulative Abnormal Turnover around Earnings Announcements by Investor Type

Panel A: Aggregate Investors

| Event Period | Total sample | | Positive Earnings Surprises | | Negative Earnings Surprises | |
|-----------------|--------------|----------|-----------------------------|---------|-----------------------------|----------|
| | ATO | t-value | ATO | t-value | ATO | t-value |
| [-25,-1] | -1.1821 | -3.61*** | -0.7490 | -1.36 | -1.3673 | -3.39*** |
| [-10,-1] | -0.5031 | -3.15*** | -0.1976 | -0.68 | -0.6338 | -3.32*** |
| [-5,-1] | -0.2411 | -2.69*** | -0.0509 | -0.33 | -0.3224 | -2.95*** |
| [0,1] | 0.3885 | 10.10*** | 0.5480 | 8.11*** | 0.3203 | 6.87*** |
| [0,5] | 0.3777 | 3.51*** | 0.8211 | 4.40*** | 0.1880 | 1.44 |
| [0,10] | -0.0961 | -0.52 | 0.5305 | 1.60* | -0.3642 | -1.62* |

Panel B: Institutions

| Event Period | Total sample | | Positive Earnings Surprises | | Negative Earnings Surprises | |
|-----------------|--------------|---------|-----------------------------|---------|-----------------------------|---------|
| | ATO | t-value | ATO | t-value | ATO | t-value |
| [-25,-1] | 0.2702 | 0.70 | -0.1306 | -0.20 | 0.4538 | 0.95 |
| [-10,-1] | 0.1408 | 0.65 | 0.0590 | 0.15 | 0.1773 | 0.69 |
| [-5,-1] | 0.0775 | 0.57 | -0.1404 | -0.58 | 0.1747 | 1.06 |
| [0,1] | -0.0036 | -0.05 | -0.1333 | -1.14 | 0.0516 | 0.61 |
| [0,5] | -0.0034 | -0.02 | -0.0706 | -0.27 | 0.0264 | 0.14 |
| [0,10] | -0.2506 | -1.01 | -0.4124 | -1.00 | -0.1772 | -0.57 |

Panel C: Individuals

| Event Period | Total sample | | Positive Earnings Surprises | | Negative Earnings Surprises | |
|-----------------|--------------|----------|-----------------------------|---------|-----------------------------|----------|
| | ATO | t-value | ATO | t-value | ATO | t-value |
| [-25,-1] | -2.1219 | -4.29*** | -1.4419 | -1.47 | -2.4110 | -4.25*** |
| [-10,-1] | -0.8694 | -3.42*** | -0.7855 | -1.62* | -0.9053 | -3.04*** |
| [-5,-1] | -0.4094 | -2.94*** | -0.3634 | -1.39 | -0.4291 | -2.61*** |
| [0,1] | -0.1172 | -1.88* | -0.1034 | -0.92 | -0.1232 | -1.64* |
| [0,5] | -0.4217 | -2.41*** | -0.4745 | -1.53 | -0.3991 | -1.88* |
| [0,10] | -0.7727 | -2.48*** | -0.8126 | -1.49 | -0.7557 | -1.99** |

Panel D: Foreigners

| Event Period | Total sample | | Positive Earnings Surprises | | Negative Earnings Surprises | |
|-----------------|--------------|----------|-----------------------------|----------|-----------------------------|----------|
| | ATO | t-value | ATO | t-value | ATO | t-value |
| [-25,-1] | -2.7846 | -5.89*** | -2.2990 | -2.50*** | -2.9988 | -5.48*** |
| [-10,-1] | -1.2365 | -4.67*** | -0.9412 | -1.82* | -1.3710 | -4.49*** |
| [-5,-1] | -0.6989 | -4.43*** | -0.4564 | -1.53 | -0.8084 | -4.37*** |
| [0,1] | -0.2836 | -3.60*** | -0.1814 | -1.26 | -0.3303 | -3.51*** |
| [0,5] | -0.6951 | -3.63*** | -0.4838 | -1.37 | -0.7935 | -3.50*** |
| [0,10] | -1.1573 | -3.70*** | -1.0023 | -1.74* | -1.2284 | -3.30*** |

Panels A, B, C and D report cumulative abnormal turnovers (ATO) by aggregate investors, institutions, individuals and foreigners over different event periods, respectively. Day 0 is the earnings announcement date.

*, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table V**Cumulative Standardized Trade Imbalance around Earnings Announcements by Investor Type***Panel A: Positive Earnings Surprises*

| Event Period | Individuals | | Institutions | | Foreigners | | ANOVA (F-value) |
|-----------------|-------------|---------|--------------|---------|------------|---------|--------------------|
| | STI | t-value | STI | t-value | STI | t-value | |
| [-5,-1] | 0.0919 | 0.72 | -0.1906 | -1.47 | 0.0841 | 0.65 | 1.55 |
| [0,1] | 0.0161 | 0.26 | -0.0848 | -1.33 | -0.0535 | -0.83 | 0.68 |
| [0,5] | -0.1767 | -1.27 | -0.1133 | -0.84 | 0.0280 | 0.21 | 0.59 |

Panel B: Negative Earnings Surprises

| Event Period | Individuals | | Institutions | | Foreigners | | ANOVA (F-value) |
|-----------------|-------------|---------|--------------|----------|------------|---------|--------------------|
| | STI | t-value | STI | t-value | STI | t-value | |
| [-5,-1] | 0.2783 | 3.12*** | -0.2932 | -3.68*** | 0.0107 | 0.13 | 11.83*** |
| [0,1] | 0.1386 | 3.31*** | -0.0658 | -1.48 | -0.0666 | -1.52 | 7.64*** |
| [0,5] | 0.2115 | 2.23** | -0.1077 | -1.14 | -0.1529 | -1.76* | 4.70*** |

Panel A reports cumulative standardized trade imbalance (STI) by three investor types, individuals, institutions and foreigners, over different event periods for firms announcing positive earnings surprises. Day 0 is the earnings announcement date. Panel B reports cumulative standardized trade imbalance (STI) by three investor types, individuals, institutions and foreigners, over different event periods for firms announcing negative earnings surprises. If STI is positive (negative), the buying volume is larger (smaller) than the selling volume.

*, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table VI
Cumulative Trade Imbalance around Earnings Announcements by Investor Type: Portfolio
Sorting by AEFE

| Portfolio | Investor Type | Event Period | | | | | |
|-----------|---------------|--------------|----------|---------|---------|---------|---------|
| | | [-5,-1] | | [0,1] | | [0,5] | |
| | | STI | t-value | STI | t-value | STI | t-value |
| P1 | Individuals | 0.3627 | 2.32** | 0.1066 | 1.46 | 0.1351 | 0.82 |
| CAR[0,5] | Institutions | -0.3584 | -2.64*** | -0.0677 | -0.88 | -0.1559 | -0.99 |
| -0.0174 | Foreigners | 0.0334 | 0.25 | -0.0760 | -1.00 | -0.1645 | -1.12 |
| P2 | Individuals | 0.3415 | 2.10** | 0.1449 | 2.03** | 0.3273 | 1.98** |
| CAR[0,5] | Institutions | -0.2887 | -2.11** | -0.0825 | -1.07 | -0.2207 | -1.33 |
| -0.0074 | Foreigners | 0.0029 | 0.02 | -0.0043 | -0.06 | -0.0489 | -0.32 |
| P3 | Individuals | 0.1356 | 0.94 | 0.1606 | 2.19** | 0.1709 | 1.04 |
| CAR[0,5] | Institutions | -0.2378 | -1.69* | -0.0481 | -0.62 | 0.0480 | 0.29 |
| -0.0029 | Foreigners | -0.0087 | -0.06 | -0.1143 | -1.52 | -0.2417 | -1.58 |
| P4 | Individuals | 0.2564 | 1.13 | -0.0660 | -0.63 | -0.3411 | -1.47 |
| CAR[0,5] | Institutions | -0.2865 | -1.30 | 0.0547 | 0.49 | 0.2912 | 1.15 |
| 0.0089 | Foreigners | 0.0946 | 0.42 | -0.0892 | -0.78 | -0.3053 | -1.28 |
| P5 | Individuals | 0.1062 | 0.49 | 0.1385 | 1.27 | 0.2351 | 0.94 |
| CAR[0,5] | Institutions | 0.0983 | 0.44 | -0.0831 | -0.75 | -0.3488 | -1.54 |
| 0.0105 | Foreigners | 0.0324 | 0.14 | -0.1235 | -1.12 | -0.0125 | -0.05 |
| P6 | Individuals | -0.0868 | -0.40 | -0.0247 | -0.23 | -0.4260 | -1.78* |
| CAR[0,5] | Institutions | -0.3955 | -1.72* | -0.2276 | -2.08** | -0.2786 | -1.28 |
| 0.0198 | Foreigners | 0.1257 | 0.55 | 0.0541 | 0.49 | 0.4094 | 1.87* |

The Table reports cumulative standardized trade imbalance (STI) by three investor types, individuals, institutions and foreigners, over different event periods for each portfolio, P1-P6. Day 0 is the earnings announcement date. We divide the stocks with negative earnings surprises into three portfolios (P1, P2, P3) with equal number of stocks; we also divide the stocks with positive earnings surprises into three portfolios (P4, P5, P6) with equal number of stocks based on analysts' EPS forecast errors (AEFE). P1 has the smallest AEFEE and P6 has the largest AEFEE on average.

*, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table VII

OLS with clustered standard errors on Cumulative Abnormal Returns (CARs)

Panel A: Positive Earnings Surprises

| | Dependent Variable CAR[0,5] | | | | | | | |
|--------------------------|-----------------------------|----------------------|------------------|------------------|---------------------|----------------------|------------------|------------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Institutions STI[-25,-1] | 0.0034 (0.10) | -0.0074 (-0.21) | | | | | | |
| Institutions STI[5,-1] | | | 0.0752 (0.85) | 0.0756 (0.85) | | | | |
| Individuals STI[-25,-1] | | | | | 0.0141 (0.33) | 0.0182 (0.43) | | |
| Foreigners STI[-25,-1] | | | | | -0.0126 (-0.37) | -0.0087 (-0.25) | | |
| Individuals STI[-5,-1] | | | | | | | 0.1397 (0.95) | 0.1444 (0.99) |
| Foreigners STI[-5,-1] | | | | | | | 0.0373 (0.39) | 0.0255 (0.27) |
| Earning Surprise dummy | 0.0115 (1.73)* | 0.0117 (1.76)* | 0.0095 (1.46) | 0.0094 (1.44) | 0.0105 (1.62)* | 0.0109 (1.68)* | 0.0070 (1.06) | 0.0072 (1.08) |
| CAR[-25,-1] | -0.0608 (-1.99)** | -0.0647 (-2.13)** | | | -0.0532 (-1.75)* | -0.0578 (-1.92)** | | |
| CAR[-5,-1] | | | -0.0975 | -0.0999 | | | -0.0608 | -0.0608 |

| | | | | | | | | |
|--------------------------------|------------------|---------------------|------------------|---------------------|------------------|---------------------|------------------|---------------------|
| | | | (-1.52) | (-1.57) | | | (-0.88) | (-0.88) |
| Firm Size | | -0.0049 (-1.77)* | | -0.0026 (-1.10) | | -0.0027 (-1.14) | | -0.0028 (-1.14) |
| Market to Book ratio of Equity | | -0.0020 (-1.58) | | -0.0020 (-1.63)* | | -0.0021 (-1.70)* | | -0.0020 (-1.72)* |
| Number of Analysts following | | 0.0004 (0.64) | | 0.0000 (0.01) | | 0.0002 (0.38) | | 0.0001 (0.24) |
| Intercept | 0.0063 (1.48) | 0.1379 (1.96)** | 0.0063 (1.49) | 0.0800 (1.33) | 0.0050 (1.23) | 0.0796 (1.32) | 0.0063 (1.51) | 0.0825 (1.35) |
| Adj. R ² (%) | 1.74 | 4.17 | 1.22 | 2.79 | 1.71 | 3.25 | 1.14 | 2.65 |

Panel B: Negative Earnings Surprises

| | Dependent Variable CAR[0,5] | | | | | | | |
|--------------------------|-----------------------------|-------------------|--------------------|--------------------|--------------------|--------------------|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Institutions STI[-25,-1] | 0.0404 (1.63)* | 0.0407 (1.62)* | | | | | | |
| Institutions STI[5,-1] | | | 0.1583 (2.21)** | 0.1595 (2.23)** | | | | |
| Individuals STI[-25,-1] | | | | | -0.0062 (-0.20) | -0.0049 (-0.16) | | |
| Foreigners STI[-25,-1] | | | | | -0.0208 (-0.84) | -0.0209 (-0.85) | | |

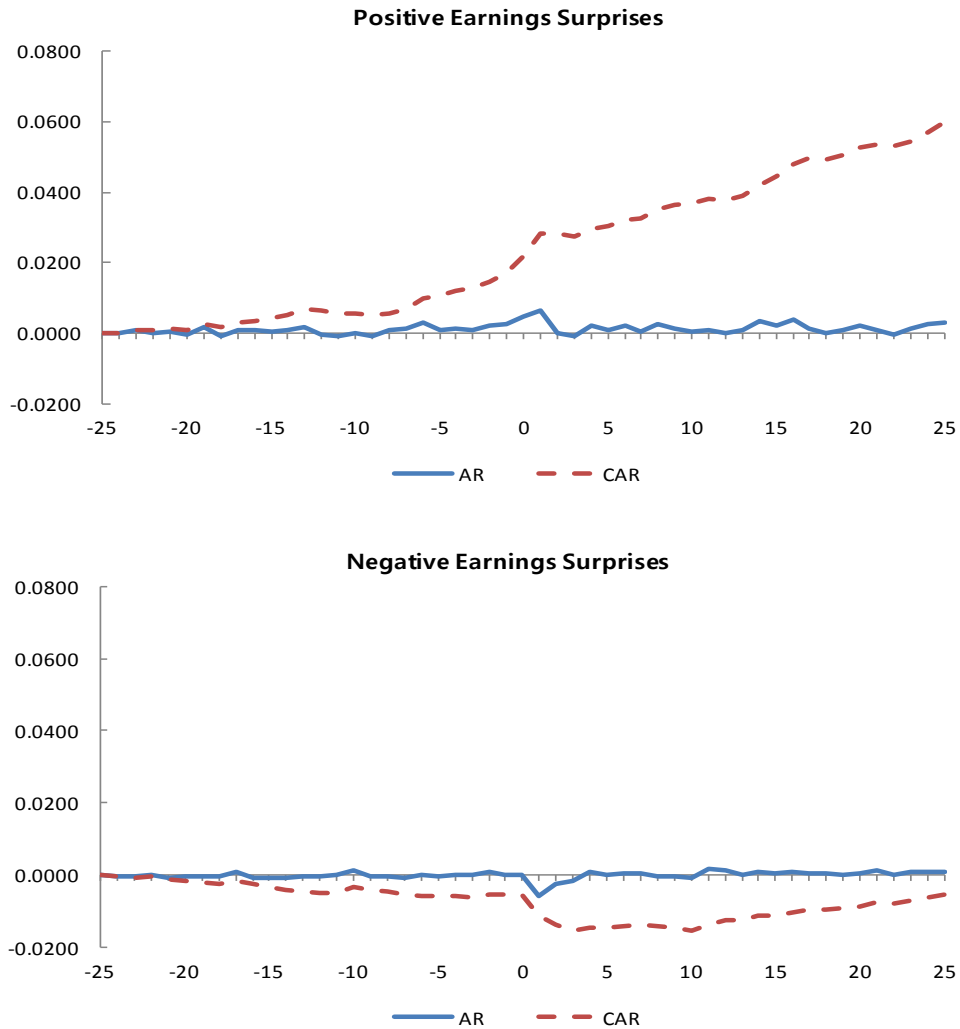
| | | | | | | | | |
|--------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Individuals STI[-5,-1] | | | | | | | -0.0803 (-1.04) | -0.0814 (-1.05) |
| Foreigners STI[-5,-1] | | | | | | | -0.0270 (-0.35) | -0.0292 (-0.38) |
| Earning Surprise dummy | -0.0118 (-2.58)*** | -0.0129 (-2.69)*** | -0.0129 (-2.81)*** | -0.0141 (-2.92)*** | -0.0119 (-2.61)*** | -0.0134 (-2.82)*** | -0.0144 (-3.16)*** | -0.0158 (-3.34)*** |
| CAR[-25,-1] | -0.0732 (-2.71)*** | -0.0725 (-2.67)*** | | | -0.0643 (-2.12)** | -0.0642 (-2.11)** | | |
| CAR[-5,-1] | | | -0.1616 (-3.03)*** | -0.1605 (-2.99)*** | | | -0.1702 (-2.81)*** | -0.1713 (-2.82)*** |
| Firm Size | | 0.0011 (0.62) | | 0.0010 (0.54) | | 0.0007 (0.40) | | 0.0018 (1.04) |
| Market to Book ratio of Equity | | -0.0001 (-1.97)** | | -0.0002 (-2.77)*** | | 0.0001 (3.02)*** | | 0.0001 (2.78)*** |
| Number of Analysts following | | -0.0007 (-1.52) | | -0.0007 (-1.50) | | -0.0006 (-1.32) | | -0.0007 (-1.61)* |
| Intercept | -0.0028 (-0.87) | -0.0259 (-0.57) | -0.0014 (-0.43) | -0.0209 (-0.46) | -0.0032 (-0.99) | -0.0168 (-0.38) | -0.0023 (-0.75) | -0.0447 (-1.00) |
| Adj. R ² (%) | 2.25 | 2.51 | 2.64 | 2.95 | 1.93 | 2.32 | 2.65 | 3.15 |

The Table reports the results of clustered OLS on cumulative abnormal returns (CAR) over the period of days from 0 to 5. Panel A is the result for firms announcing positive earnings surprises, and Panel B is the result for firms announcing negative earnings surprises. STI of institutions, individuals or foreigners represents cumulative standardized trade imbalance by each investor type over different event periods, respectively. Earnings surprise dummy (ES) is a dummy variable taking a value of 1 if

analysts' EPS forecast errors is larger than the median, and otherwise, 0, in panel A. ES is a dummy variable taking a value of 1 if analysts' EPS forecast errors is smaller than the median, and otherwise, 0, in Panel B. Firm size is the natural log of market capitalization measured at the end of the fiscal year. Market to book ratio of equity is the ratio of market value of equity to book value of equity at the end of the fiscal year. Number of analysts following is the number of analysts covering each firm for the fiscal year. T-values are in parenthesis.

*, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Figure 1
Abnormal and Cumulative Abnormal Returns around Earnings Announcements



The Figure shows the patterns of abnormal return (AR) and cumulative abnormal return (CAR) of firms announcing positive and negative earnings surprises over the event period of days from -25 to 25. Day 0 is the earnings announcement date.