

Individual Investors and Post-Earnings-Announcement Drift: Evidence from Korea

Yunsung Eom
Division of Management, Hansung University, Seoul, Korea,
yseom@hansung.ac.kr

Jaehoon Hahn
Corresponding author: School of Business, Yonsei University
50 Yonsei-ro, Seodaemun-gu, Seoul 120-749, Korea,
Tel: 82-2-2123-5457
hahnj@yonsei.ac.kr

Wook Sohn
Bank of Korea Economic Research Institute and
KDI School of Public Policy and Management, Seoul, Korea,
wooksohn@bok.or.kr

Abstract

This paper presents empirical evidence supporting the hypothesis that individual investors' news-contrarian trading behavior drives post-earnings-announcement drift (PEAD). Using data on daily trades by individual, institutional, and foreign investors available in the Korean stock market, we investigate trading behavior of these three groups of investors around earnings announcements. We find that after the announcement, individual investors tend to trade in the opposite direction to earnings surprise, selling good earnings surprise stocks and buying bad earnings surprise stocks, which impedes a full price response to earnings news, leading to under-reaction and PEAD. Moreover, we find that PEAD exists only for those stocks that individuals trade in the opposite direction to earnings news, and that the magnitudes of PEAD are greater for those stocks that are more intensely sold (for positive earnings surprise) and bought (for negative earnings surprise) by individuals.

Keywords: post-earnings-announcement drift; market efficiency;
underreaction; individual investors

JEL Classification: G12

1. Introduction

The tendency of sluggish stock price response to firms' earnings announcements, called post-earnings-announcement drift (PEAD), is arguably one of the strongest evidence against the notion of market efficiency. Since Ball and Brown (1968), Foster, Olsen and Shevlin (1984), and Bernard and Thomas (1989, 1990) reported PEAD, numerous subsequent studies examined stock price reaction around earnings announcements and found that PEAD is a robust phenomenon in the U.S. and many other countries. Given the robustness of PEAD and its implications for market efficiency, it is not surprising that many financial economists also started to pay attention to PEAD in recent years. A rational and risk-based explanation for PEAD, however, remains elusive, and there seems to be no consensus yet on the source of and the interpretation for the strong and persistent tendency of sluggish stock price response to earnings announcements.¹

In this paper, we provide empirical evidence supporting what Hirshleifer, Myers, Myers, and Teoh (2008, HMMT hereafter) call the "individual trading hypothesis," under which individual investors' post-announcement trading behavior impedes a full price response to earnings news, leading to under-reaction and PEAD.² Motivated by Bernard and Thomas' (1990) suggestion that investors' naïve understanding of the time-series properties of earnings may drive drift, HMMT (2008) hypothesize that individual investors trade as contrarians to earnings news, buying after negative earnings surprise and selling after positive earnings surprise. But inconsistent with the hypothesis, they find that individual clients of a major discount brokerage firm are net buyers following both good and bad earnings surprises, and they argue that post-announcement trading by individual investors does not drive PEAD.³

In contrast, Kaniel, Liu, Saar, and Titman (2012, KLST hereafter) find that individual investors at the NYSE trade in a news-contrarian manner, buying after bad earnings surprise and selling after good earnings surprise. They argue that news-contrarian trading behavior of individuals potentially slows the adjustment of stock prices to earnings news, which suggests that individuals are at least partly responsible for PEAD. However,

¹ Interpretations and explanations for PEAD offered in the literature include delayed price reaction (e.g., Bernard and Thomas (1990), and Ball and Bartov (1996)), mismeasurement of risk (e.g., Ball, Kothari, and Watts (1993)), and methodological problems (e.g., Jacob, Lys, and Sabino (2000)), among others.

² Barberis, Shleifer, and Vishny (1998) and Daniel, Hirshleifer, and Subrahmanyam (1998) provide behavioral models in which psychological biases such as overconfidence and conservatism lead to investors' under-reaction to earnings and consequently to PEAD.

³ HMMT (2008) find that the direction of post-announcement trading by individuals is unrelated to the direction of the news, and they also find that individuals' post-announcement net purchase is greater for those stocks with greater absolute value of the earnings surprise. They interpret this evidence as consistent with a news attention effect of Barber and Odean (2008).

they also find that pre-announcement trading by individuals predicts returns on and after earnings announcement dates, suggesting that trading by individuals as a group anticipates earnings surprise correctly. Such informed pre-announcement trading behavior of individual investors is inconsistent with the individual trading hypothesis, which implicitly assumes that individuals are neither informed nor sophisticated but naïve about earnings news.⁴

In this paper, we provide empirical evidence supporting the individual trading hypothesis: we find that PEAD is present only for those stocks that individual investors trade as contrarians to earnings news. More specifically, our evidence indicates that the stocks with positive earnings surprise show significantly positive drift only when individuals are net sellers following the announcement. Similarly, the stocks with negative earnings surprise show significantly negative drift only when individuals are net buyers after the announcement. Our findings suggest that individual investors' contrarian trading behavior after the earnings announcement slows down a full price adjustment in response to earnings news, leading to under-reaction and PEAD.

Previous research examining the relation between PEAD and individual investors' trading activity around earnings announcements in the U.S. mostly use indirect measures of individual investors' trading activity around earnings announcements, such as trade size as a proxy for trader identity or institutional shareholdings as a proxy for the prevalence of individual trading.⁵ HMMT (2008) and KLST (2012) are recent exceptions in this regard.⁶ They both use proprietary data that contain actual individual trades around earnings announcements. HMMT (2008) examine all trades by a random sample of individual investors trading through a major discount brokerage firm from 1991 to 1996, and KLST (2012) study daily buy and sell volumes of executed orders by individual investors trading on the NYSE from 2000 to 2003. As previously discussed, however, some of the findings by HMMT (2008) and KLST (2012) on post-announcement trading behavior of individual investors are not consistent with each other.

Complementary to the hypothesis of naïve individual investors' trading behavior impeding a full price response to earnings news is the idea that informed or sophisticated investors, e.g., institutional investors, are likely to trade in a way that anticipates earnings

⁴ KLST (2012) attribute roughly half of the abnormal return associated with the pre-announcement trading of individuals to private information and the rest to liquidity provision.

⁵ Lee (1992), Bhattacharya (2001), and Battalio and Mendenhall (2005) use trade size as a proxy for trader identity, and Bartov, Radhakrishnan, and Krinsky (2000) find that PEAD is strongest in firms with low institutional shareholdings.

⁶ Vieru, Perttunen, and Schadewitz (2006) study the trading of individual investors on the Helsinki Stock Exchange and they find that very active individual traders' pre-announcement trading is positively related to abnormal returns following the earnings announcement.

surprise and takes advantage of PEAD. Campbell, Ramadorai, and Schwartz (2009, CRS hereafter) examine institutional trading behavior around earnings announcements by estimating institutional trades at daily frequency using a regression methodology. They find that institutions are net buyers of stocks in advance of positive earnings surprises and net sellers of stocks in advance of negative earnings surprises for their 1995 – 2000 sample period.⁷ While CRS (2009) do not examine individual investors' trading behavior, their findings imply that individuals are net sellers (buyers) of stocks in advance of positive (negative) earnings surprises under the market clearing condition. However, this implication from CRS's (2009) findings is not borne out in the trading behavior of individual investors at the NYSE: KLST (2012) find that individual investor buying (selling) predicts positive (negative) abnormal returns on and after earnings announcement dates.

These inconsistencies in the findings of HMMT (2008), KLST (2012), and CSR (2009) regarding the trading behavior of individual and institutional investors before and after the earnings announcement cannot be easily reconciled since their data cover different universes of stocks, investors, and sample periods. In contrast, we examine the relation between PEAD and trading behavior of both individual and institutional investors around earnings announcements, using actual daily trading data available from the Korean stock market. The unique feature of the Korean stock market data used in this study is that trading volume data by all traders in the market, classified into three groups of individual, institutional, and foreign investors, are available at daily frequency for each stock. These three types of investors' trading constitutes total trading in the market, and consequently, their net share purchase for a given stock on a given day sum to zero. This feature of the data allows us to clearly examine the trading behavior around earnings announcements not only by individuals but also by institutional and foreign investors.⁸

We first document the presence of PEAD in the Korean stock market for our sample period from fiscal year 2000 to fiscal year 2012. We find that PEAD is both economically and statistically significant, and the drift is larger and more persistent for positive earnings surprise than negative earnings surprise. For the top (positive) earnings surprise quintile, PEAD is significant up to 60 trading days after the announcement at 3.51% (*t*-statistic of 4.49), and for the bottom (negative) earnings surprise quintile, PEAD is significant up to 20

⁷ Similarly, Ke and Ramalingegowda (2005) find that actively trading institutional investors change their stock holdings in the same direction as earnings surprise.

⁸ Park, Lee, and Song (2014) also use the data on daily trades by individual, institutional, and foreign investors in Korea, but their focus is not on whose trading drives PEAD, but on informational asymmetry and informed trading prior to earnings announcements. They find that informational asymmetry is larger before negative earnings surprises and that institutions tend to sell negative earnings surprise stocks prior to bad earnings news.

trading days after the announcement at -1.63% (t -statistic of -2.78).

Regarding the trading behavior of three types of investors, we find clear differences across the investor types. Individual investors are net sellers of good earnings surprise stocks before the earnings announcement, and their pre-announcement trading behavior predicts earnings surprise in the opposite direction. These findings are consistent with the U.S. evidence reported in HMMT (2008) who also find that U.S. individual investors tend to buy bad earnings surprise stocks and sell good earnings surprise stocks prior to earnings announcements. More importantly, we find that after the announcement, individual investors trade in the opposite direction to earnings surprise. This news-contrarian trading behavior of individuals is consistent with the individual trading hypothesis, since significant net selling of good earnings surprise stocks by individuals after the announcement would slow down a full price adjustment in response to positive earnings surprises, generating positive drift in stock prices.

In contrast to individual investors, foreign investors are net buyers of good earnings surprise stocks before the earnings announcement. Moreover, foreign investors' pre-announcement trading behavior predicts earnings surprise, analogous to CRS (2009) who find that U.S. institutional investors' trading behavior anticipates earnings surprise and PEAD. We also find that after the announcement, foreign investors trade in the same direction as earnings surprise. This post-announcement trading behavior of foreign investors suggests that they take advantage of PEAD, similar to institutional investors in the U.S. as found by CRS (2009). Domestic institutional investors' trading behavior, on the other hand, does not show a strong association with earnings surprise both before and after the earnings announcement.⁹

Our last but the strongest empirical evidence supporting the individual trading hypothesis is that the presence of PEAD depends on the post-announcement trading behavior of individual investors. We find that the stocks with positive earnings surprise experience positive abnormal returns only when individual investors are net sellers after the announcement. Similarly, we find that the stocks with negative earnings surprise experience negative abnormal returns only when individual investors are net buyers after the announcement. Furthermore, we find that more intense individual selling after the earnings

⁹ Our regression analysis at the individual stock level shows that domestic institutional investors pre-announcement trading behavior does not predict earnings surprise, and their post-announcement trading behavior is strongly associated with positive earnings surprise only when the surprise is measured by abnormal returns on the announcement day. But at the portfolio level, their post-announcement buying (selling) is associated with positive (negative) abnormal returns, similar to foreign investors.

announcement is associated with greater PEAD for positive earnings surprise stocks, and more intense individual buying after the earnings announcement is associated with greater PEAD for negative earnings surprise stocks. These findings show that PEAD is always accompanied by individual investors' news contrarian trading behavior after the earnings announcement, which indicates that individual investors' trading drives PEAD by impeding a full stock price response to earnings news.

2. PEAD in the Korean Stock Market

According to the World Bank, the Korean stock market is ranked 11th largest in the world in terms of total market capitalization of listed companies as of 2012. At \$1.18 trillion, the size of the Korean stock market is one of the largest in emerging markets along with India (\$1.26 trillion) and Brazil (\$1.23 trillion). Figure 1 plots the total market capitalization of the Korean stock market in millions of Korean won (KRW) from 2000 to 2012, with relative holdings by various investor types. Foreign ownership of listed Korean companies has steadily increased since 2000, peaking at 40% in 2004 and declining down to 27% in 2008. As of 2012, foreign ownership accounts for 32% of the Korean stock market.¹⁰ Individual and institutional investors own 24% and 16%, respectively, and other corporations own 24%.¹¹ Figure 2 presents relative shares of trading volume (sum of sales and purchases) by investor type. While individual investors' share of trading volume clearly shows a declining trend, individual investors still account for roughly half of trading volume (52% as of 2012). Institutional investors and foreign investors account for 25% and 23% of trading volume, respectively.

2.1. Identifying Earnings Announcement Dates

Identifying earnings announcement dates in Korea is not as straightforward as it is in the U.S. Since 2001, listed firms in Korea are required to release earnings information (beginning with the earnings of the fiscal year 2000) via an electronic corporate data disclosure system called DART (Data Analysis, Retrieval and Transfer System) at least two weeks before the announcement of shareholders' meeting if net income (or revenue) of the current fiscal year is greater (or smaller) than the previous year's net income (or revenue) by

¹⁰ Korea opened its stock market to foreign investors in January 1992 but with restrictions on foreign ownership caps at 10% for each firm and 3% for each foreign investor. These restrictions were gradually eased in the 1990s, and in May 1998, stock ownership restrictions imposed on foreign investors were completely lifted, except for firms in some sectors such as telecommunications, airlines, media, and electricity. For more detail, see Kho (2011).

¹¹ Share ownership by "Other Corporations" largely reflects cross-holdings of firms within conglomerates (Chaebols) in Korea.

more than 30% (10%). With an introduction of the fair disclosure rule in November 2002, listed firms may also voluntarily announce preliminary earnings via DART. And in July 2004, the earnings change disclosure rule was changed to the 30% rule which applies to either earnings or revenue.¹²

These regulatory changes complicate the identification of earnings announcement dates since there are three disclosure events in which earnings information is conveyed to the public: 1) voluntary disclosure of preliminary earnings, 2) change in annual earnings if the 30% rule applies, and 3) the date of the shareholders' meeting. According to previous research such as Kim, Chang, and Yeo (2006) and Baik, Kim, and Lee (2012), reaction of stock prices to these three disclosure events suggests that the date of earnings announcement should be identified as follows. First, if a firm voluntarily discloses preliminary earnings, then the date of this voluntary disclosure should be regarded as the earnings announcement date. Second, if a firm does not disclose preliminary earnings but the 30% rule applies, then the date of earnings change disclosure should be regarded as the earnings announcement date. Third, if a firm does not disclose preliminary earnings and the 30% rule does not apply, then the announcement of the shareholders' meeting should be regarded as the earnings announcement date.¹³ We follow this rule in identifying earnings announcement dates in this study by collecting the relevant disclosure event dates for our sample firms from DART.

2.2. Measuring Earnings Surprise

There are several ways of measuring earnings surprise in the literature, but they all share a common basic form, which is actual reported earnings minus a forecast of earnings divided by a deflator. Most widely used measure of earnings surprise is the difference between current quarter's earnings and earnings four quarters ago divided by the standard deviation of this difference over the previous eight quarters. This measure of earnings surprise is commonly referred to as the standardized unexpected earnings (SUE). Another commonly used measure of earnings surprise is the difference between actual reported earnings and the mean analyst earnings forecast, scaled by the price prior to the reporting date, which is the measure used by CSR (2009) and KLST (2012), among others.¹⁴ Given the

¹² For large corporations whose value of total assets exceeds 2 trillion KRW, the 15% rule applies.

¹³ Kim, Chang and Yeo (2006) argue that reaction of stock prices suggests that the date of earnings change disclosure should be regarded as the earnings announcement date for those firms to which the 30 percent rule applies. For those firms to which this 30 percent rule does not apply, they argue that the date of shareholders' meeting announcement should be regarded as the earnings announcement date. Baik, Kim, and Lee (2012) further argue that if a firm voluntarily discloses preliminary earnings, the date of this preliminary disclosure should be regarded as the date of earnings announcement.

¹⁴ For a detailed study comparing PEAD for earnings surprises calculated from time series forecasts and analyst forecasts, see Livnat and Mendenhall (2006).

relatively short sample period and the limited availability of quarterly earnings forecast data in Korea, we adopt the second approach using annual (fiscal year end) earnings announcements.¹⁵ More specifically, earnings surprise is defined as the difference between actual reported annual earnings per share and the mean analyst forecast, scaled by the share price 10 trading days prior to the earnings announcement date.

2.3. Data

The sample stocks are those listed on the KOSPI market of the Korea Exchange (KRX) whose fiscal year ends in December, and the sample period is from fiscal year 2000 to fiscal year 2012. The KRX is the sole operator of the markets for stocks, bonds, derivatives, and commodities in Korea, and the KOSPI market is the major stock market whose listed stocks include most blue-chip stocks that consist the Korea Composite Stock Price Index (KOSPI). The data on annual (fiscal year-end) earnings per share and analyst forecasts are from FnGuide, and earnings announcement dates are identified for each firm by collecting the relevant earnings disclosure events from DART, following the rule explained in Section 2.1. Daily stock returns are from Korea Investors Service, and daily trading volume data for each stock by investor type (individual, institutional, or foreign investors) are from the Institute of Finance and Banking at Seoul National University. To be included in the sample, stocks must have data on daily returns and daily trading volume by investor type for 60 trading days prior to and after earnings announcements.

Table 1 reports summary statistics of the sample stocks used in this study. Each year, we rank stocks based on the measure of earnings surprise and remove the top (most positive) 1% and the bottom (most negative) 1% stocks from the sample. We then classify the sample stocks into five groups each year from Q1 to Q5 based on the earnings surprise measure: Q1 denotes the lowest (most negative) earnings surprise quintile, and Q5 denotes the highest (most positive) earnings surprise quintile. As reported on the right-most column, the total number of earnings announcements is 3,230 over the 13 years of our sample period, containing announcements from 248 firms a year on average. The mean of the earnings surprise measure ranges from -32.38% in Q1 to 5.18% in Q5, showing a negatively skewed cross-sectional distribution. While there is no clear pattern across the earnings surprise quintiles in terms of analyst following, market capitalization, or the book-to-market ratio, the stocks in the lowest earnings surprise quintile (Q1) tend to have a smaller number of analyst

¹⁵ The most widely used source of analyst earnings forecast data in Korea is called FnConsensus, provided by the data provider FnGuide. Their coverage of quarterly earnings forecasts, however, is very limited especially in the early 2000s (2000 – 2004), resulting in a small number of sample stocks satisfying the data requirements in the first 5 years of our sample period.

following, smaller market capitalization, and higher book-to-market ratio.

2.4. Earnings surprise and PEAD

We first investigate whether PEAD exists in Korea in our sample period. For each stock, we measure abnormal returns as market-adjusted returns over various windows around earnings announcement dates as in KLST (2012). More specifically, the abnormal return for stock i at time t is given by subtracting the benchmark portfolio return from stock i 's return, where the benchmark portfolio is the equal-weighted portfolio of all stocks in the sample.¹⁶ We then cumulate abnormal returns over various event windows and calculate the quintile portfolio returns as the equal-weighted average of these cumulative abnormal returns (CARs) for various event windows.

Table 2 reports CARs for the five earnings surprise quintiles over various windows around the earnings announcement date. The event windows range from 60 trading days prior to the announcement date (days [-60, -1]) to 60 trading days following the announcement date (days [2, 61]). On the earnings announcement date (days [0, 1]), the signs of CARs are in the same direction as earnings surprises, negative for the bottom three quintiles and positive for the top two quintiles. The CAR for Q1 is -0.45% with a t -statistic (clustering-corrected by year and month) of -2.40 and the CAR for Q5 is 0.78% with a t -statistic of 4.76.

The pattern of CARs subsequent to earnings announcements shows a clear pattern of PEAD where the drift in stock returns is much stronger for good earnings surprise stocks than for bad earnings surprise stocks. For the good earnings surprise stocks (Q5), the CARs are significantly positive for up to 60 trading days after the announcement, and the CAR for the [2, 61] window is both economically and statistically significant (3.51% with a t -statistic of 4.49). For bad earnings surprise stocks (Q1), the drift in stock returns is relatively smaller in magnitude and less persistent than good earnings surprise stocks, with the CAR for the [2, 21] window at -1.63% with a t -statistic of -2.78.

The pattern of CARs prior to earnings announcements suggests the presence of information leakage before the announcement, particularly for good earnings surprise stocks: the CARs for 10 and 20 trading day windows prior to the announcement date are 0.65% and 1.11%, and they are all statistically significant at the 5% level. This possible information leakage is illustrated in Figure 3, which displays the CARs for the five earnings surprise quintiles over 60 trading days prior to earnings announcements. A clear pattern of upward

¹⁶ As in KLST (2012), our results are also robust to using the value-weighted portfolio of all stocks in the sample as the benchmark portfolio.

drift starting at around 20 trading days prior to earnings announcements emerges for good earnings surprise stocks (Q5). Figure 4 illustrates the CARs for the five earnings surprise quintiles over 60 trading days subsequent to earnings announcements. As reported in Table 2, a strong and persistent upward PEAD in stock returns is present for good earnings surprise firms (Q5), and the downward PEAD for bad earnings surprise firms (Q1) is relatively weaker and short-lived.

The results in Table 2 and Figures 3 and 4 clearly indicate that PEAD exists in the Korean stock market for our post-2000 sample period. More specifically, there exists a drift in stock returns subsequent to earnings announcements in the same direction as the earnings surprise, and the drift persists through 20 trading days after earnings announcements for bad news firms and up to 60 trading days after earnings announcements for good news firms.

3. Trading Behavior around Earnings Announcements by Investor Type

In this section, we investigate whether there are any differences in the trading behavior across domestic individual, domestic institutional and foreign investors around earnings announcements. Our measure of trading behavior is cumulative trading flows (net buy) for each investor type for a given stock over various trading day windows around earnings announcements, constructed as in HMMT (2008) and CRS (2009). First, we measure net buy for stock i on day d as a percentage of the number of shares outstanding separately for each investor type as follows:

$$f_{i,d} = \frac{\text{Net Shares Purchsed by Investor Type}_{i,d}}{\text{Number of Shares Outstanding}_{i,d}} \times 100 \quad (1)$$

Then, for a given stock i on day d , we have the above net buy measures for individual, institutional, and foreign investors, and the three net buy measures for a given stock sum to zero since the three investor groups cover the entire market without any overlap across the groups.

We measure these trading flows by investor type for each stock daily and cumulate them over various trading windows around earnings announcements. Table 3 reports the mean cumulative trading flows and their t -statistics for each of the five earnings surprise quintiles for individual investors (Panel A), institutional investors (Panel B), and foreign investors (Panel C). Prior to earnings announcements, individual investors are clear net sellers of good earnings surprise stocks: as reported in Panel A, their cumulative trading flows of stocks in the good earnings surprise quintile (Q5) are significantly negative for all trading windows prior to the announcement, ranging from -0.11% (days [10, -1]) to -0.43%

(days [-60, -1]). Foreign investors, on the other hand, are clear net buyers of good earnings surprise stocks: as reported in Panel C, their cumulative trading flows are significantly positive for top three earnings surprise quintiles for all trading windows prior to earnings announcements. Institutional investors' pre-announcement trading shows strong association with bad earnings surprise stocks, as their cumulative trading flows over 10 and 20 trading days before the announcement are significantly negative for Q1 and Q2.

The clear contrast in pre-announcement trading behavior between individual and foreign investors is also present after the announcement. Individual investors continue to sell stocks in the good earnings surprise quintile (Q5), and their cumulative trading flows are significantly negative for all post-announcement trading windows. In contrast, foreign investors continue to buy good earnings surprise stocks (Q5), and their cumulative trading flows are significantly positive for all post-announcement trading windows. Institutional investors' post-announcement trading behavior does not show a strong pattern across the earnings surprise quintiles.

The results reported in Table 3 about the trading behavior of three types of investors can be summarized as follows. First, there exists a clear difference in the pattern of trading behavior across different types of investors. Second, given the difference in the trading behavior before the earnings announcement, foreign and institutional investors seem to be more informed and/or more sophisticated than individual investors, since foreign investors are net buyers of good earnings surprise stocks and institutional investors are net sellers of bad earnings surprise stocks before the earnings announcement.¹⁷ Third, given the difference in the trading behavior after the earnings announcement, foreign investors seem to be more sophisticated investors than domestic investors (both individual and institutional), since their trading behavior appears to exploit PEAD to their advantage.¹⁸

The results so far are mostly descriptive, but they broadly conform to the popular notion of individual investors being naïve, and institutional and foreign investors being more

¹⁷ It is difficult to say, however, whether foreign and institutional investors' trading behavior before earnings announcements is based on better informational access about the earnings to be announced, or more sophisticated analysis of firm's fundamentals and market conditions which enables them to predict earnings better.

¹⁸ Evidence on the relative performance of foreign investors is mixed. Choe, Kho, and Stulz (2005) and Park, Bae and Cho (2006), for example, argue that foreign investors' performance in Korea is inferior to that of domestic investors in terms of implicit transaction costs paid in their transactions. Ko and Kim (2004), Min (2006), and Bae, Min, and Jung (2011), on the other hand, argue that foreign investors outperform domestic investors in the Korean stock market. The evidence is mixed for other countries as well. Grinblatt and Keloharju (2000) find that foreign investors outperform local investors in Finland, while Kang and Stulz (1997) find that foreign investors do not outperform local investors in Japan. Unlike these papers, we focus on the trading behavior of individual, domestic institutional and foreign investors around a particular event, namely corporate earnings announcements.

informed or sophisticated. In the next section, we investigate how the trading behavior of three investor types before and after earnings announcements is related to earnings surprise by developing more formal hypotheses that can be tested in a regression framework.

4. Pre-announcement Trading Behavior and Earnings Surprise

The first hypothesis is about the predictive power of pre-announcement trading behavior for earnings surprise which can be stated as: more informed and/or more sophisticated investors' trading behavior before earnings announcements would predict earnings surprise. We test this hypothesis by estimating the following regression specification separately for each investor type:

$$ES_{i,d} = a + b\left(\sum_{j=1}^n f_{i,d-j}\right) + c'X_{i,d} + e_{i,d} \quad (2)$$

The dependent variable $ES_{i,d}$ denotes the earnings surprise measure for stock i on the announcement date d , and the independent variables are cumulative trading flows by a given investor type for stock i over the n trading day window preceding the announcement date d , and $X_{i,d}$ denotes the set of control variables that include CAR for stock i over the n trading day window preceding the announcement date d , the log of market capitalization, and the book-to-market ratio. A significantly positive coefficient estimate for b indicates that the given investor type's trading behavior predicts earnings surprise.

Table 4 reports estimated coefficients and their associated t -statistics in parenthesis from the regressions. Whether we measure the cumulative trading flows and CARs over the 30 trading day window (Panel A) or the 60 trading day window (Panel B), foreign investors' pre-announcement trading behavior predicts earnings surprise in the right direction: the coefficient for foreign investors' trading flows is positive and statistically significant. On the other hand, the coefficient for individual investors' trading flows is negative and statistically significant in Panel B, suggesting that their trading behavior over 60 days prior to earnings announcements predicts earnings surprise in the opposite direction. Over the 30 trading day window, the coefficient for individual investors' cumulative trading flows is still negative but lose its statistical significance. Institutional investors' pre-announcement trading behavior shows no clear association with earnings surprise: the coefficient on their cumulative trading flows is close to zero and statistically insignificant in both Panels A and B.

Figure 5 illustrates cumulative trading flows over 60 trading days preceding the earnings announcement for individual (Panel A), institutional (Panel B), and foreign (Panel C) investors. Consistent with the results reported in Table 4, individual investors are net buyers

of stocks whose earnings will be lower than analyst forecasts, and they are net sellers of stocks whose earnings will be higher than analyst forecasts. Foreign investors, on the other hand, are net buyers of stocks that would experience positive earnings surprise. Institutional investors' cumulative trading flows do not deviate much from zero, except for the bad earnings surprise firms (Q1) of which they are net sellers.

The results reported in Table 4 and Figure 5 suggest that foreign investors in the Korean stock market trade in the manner of anticipating earnings surprise, particularly good earnings news. While CRS (2009) find that institutional investors' pre-announcement trading behavior appears to predict earnings surprise in the U.S. stock market, we do not find that institutional investors in Korea trade in the manner of anticipating earnings surprise. Instead, we find that foreign investors' trading prior to earnings announcements is strongly associated with earnings surprise. And individual investors as a group appear to be on the other side of foreign investors' pre-announcement trades, as they tend to sell good earnings surprise firms.

5. Earnings Surprise and Post-announcement Trading Behavior

We now investigate the relation between earnings surprise and the pattern of trading behavior of individual, institutional, and foreign investors after the earnings announcement in the following regression specification, separately for each investor type:

$$\sum_{j=2}^n f_{i,d+j} = a + bES1 + cES5 + d'X_{i,d} + e_{i,d} \quad (3)$$

The dependent variable denotes cumulative trading flows for stock i over the n trading day window subsequent to the announcement date d by a given investor type, and the independent variables are the dummy variables for the most negative earnings surprise quintile ($ES1$) and the most positive earnings surprise quintile ($ES5$), the set of control variables ($X_{i,d}$) that include CAR for stock i over the n trading day window preceding the announcement date d , the log of market capitalization, and the book-to-market ratio.

As an alternative to the analyst earnings surprise measure, we also use the abnormal return at the time of the announcement ($CAR[0,1]$) as a proxy for earnings surprise and estimate the following regression separately for each investor type:

$$\sum_{j=2}^n f_{i,d+j} = a + bCAR1 + cCAR5 + d'X_{i,d} + e_{i,d} \quad (4)$$

In this specification, $CAR1$ and $CAR5$ denote dummy variables for the lowest $CAR[0,1]$ quintile (most negative abnormal returns) and the highest $CAR[0,1]$ quintile (most positive abnormal returns), respectively.

According to the individual trading hypothesis, individual investors trade in the

direction of impeding adjustment of stock prices to information in earnings announcements. More specifically, the hypothesis predicts that they tend to trade in the opposite direction to earnings surprise, buying bad earnings surprise stocks (positive coefficient for *ES1* or *CAR1*) and selling good earnings surprise stocks (negative coefficient for *ES5* or *CAR5*). On the other hand, we expect that sophisticated investors would trade in a way that takes advantage of PEAD, selling bad earnings surprise stocks (negative coefficient for *ES1* or *CAR1*) and buying good earnings surprise stocks (positive coefficient for *ES5* or *CAR5*).

Panel A of Table 5 reports the results from the regression specifications where the dependent variable is the cumulative trading flow over the 30 trading day window (days [2, 31]) after the earnings announcement. For individual investors, the coefficient estimates for the earnings surprise dummy variables are positive for bad news (*ES1* and *CAR1*) and negative for good news (*ES5* and *CAR5*), which indicates that they trade in the opposite direction of earnings surprise after the announcement. This relation between individual investors' post-announcement trading and earnings surprise is statistically significant only for good earnings news when the dummy variables are based on the analyst earnings surprise measure. But when the dummy variables are based on the abnormal returns on the announcement date, the relation is statistically significant both for good and bad earnings news. This news-contrarian trading behavior of individual investors is consistent with the individual trading hypothesis for PEAD: they tend to sell good earnings surprise stocks and buy bad earnings surprise stocks after the announcement, in the direction of slowing down adjustment of stock prices to earnings news.¹⁹

In a clear contrast to individual investors' trading, foreign investors trade in the same direction as the earnings surprise: they tend to sell bad earnings surprise stocks and buy good earnings surprise stocks, as indicated from the negative coefficients for bad news dummies (statistically significant for *CAR1*) and the positive coefficients for good news dummies (statistically significant for *ES5*). Institutional investors' post-announcement trading behavior shows a significantly positive association only with good earnings surprise when the surprise is measured by the abnormal return on the announcement date. These results suggest that foreign investors (and institutional investors to lesser extent) in Korea trade in a way that takes advantage of PEAD, similar to the findings of CRS (2009) and KLST (2012) for U.S. institutional investors' post-announcement trading behavior.

¹⁹ This finding is similar to the post-announcement trading behavior of the U.S. individual investors trading the NYSE stocks reported by KLST (2012), who also interpret the evidence as suggesting the potential of individual investors' trading slowing the adjustment of stock prices to earnings news.

Table 5 also shows that individual investors are not only news-contrarian but also return-contrarian, trading in the opposite direction to the CARs preceding the earnings announcement, as indicated from the negative and significant coefficients on $CAR[-30, -1]$. Individual investors' news-contrarian and return-contrarian trading behavior following earnings announcements found in Korea is consistent with the U.S. evidence for individual investors trading in the NYSE reported by KLST (2012). In contrast to the return-contrarian trading behavior of individual investors, foreign investors are momentum traders with respect to the CARs prior to the earnings announcement, as indicated from the strongly positive coefficients on $CAR[-30, -1]$. Panel B of Table 5 reports the results when we use the cumulative trading flow over the 60 trading day window (days [2, 61]) after the earnings announcement as the dependent variable in the regression, and the overall results are broadly similar to the results in Panel A.

Figure 6 presents cumulative trading flows for three investor types over the 60 trading day window after the earnings announcement. As Panel A of Figure 6 illustrates, the most pronounced pattern in the individual investors' post-announcement trading behavior is that they are net sellers of good earnings surprise stocks (Q5). Foreign investors on the other hand, are net buyers of good earnings surprise stocks (Q5) after the earnings announcement, as illustrated in Panel C of Figure 6. Domestic institutional investors' post-announcement trading behavior, illustrated in Panel B of Figure 6, does not show a clear pattern with regard to earnings surprise.

The results reported in Table 5 and Figure 6 are consistent with the individual trading hypothesis, but they are not necessarily indicative of PEAD being driven by individual investors' post-announcement trading. If individual investors drive PEAD, then PEAD would exist only in the presence of news-contrarian trading by individuals. More specifically, stocks would experience abnormal returns in the same direction as earnings surprise only when individual investors trade in the opposite direction of earnings news. We examine this hypothesis by investigating the pattern of abnormal returns for earnings surprise quintile portfolios conditional on post-announcement trading by individual, institutional, and foreign investors. Within each of the five earnings surprise quintile portfolios, we sort stocks by investors' cumulative trading flows over 30 trading days after the earnings announcement (days [2, 31]) from the most positive quintile (P5, most intensive net buy) to the most negative quintile (P1, most intensive net sell). If individual investors' news-contrarian post-announcement trading drives PEAD, then we would expect positive earnings surprise stocks to show a positive drift only when individual investors are selling them, and negative

earnings surprise stocks to show a negative drift only when individual investors are buying them.

Table 6 reports the mean CARs over 30 trading days after the earnings announcement (CAR[2, 31]) for each of the 25 subgroups when the five earnings surprise quintile portfolios are sorted by post-announcement trading by individual (Panel A), institutional (Panel B), and foreign (Panel C) investors. As predicted by the individual trading hypothesis, Panel A shows that positive earnings surprise stocks (Q5 and Q4) show significantly positive abnormal returns only when individual investors are selling them (P1 and P2). If individual investors are net buyers (P4 and P5), then positive earnings surprise stocks' abnormal returns are not positive but significantly negative. Similarly, negative earnings surprise stocks show significantly negative abnormal returns only when individual investors are buying them. If individual investors are net sellers, then negative earnings surprise stocks show significantly positive abnormal returns. These results in Panel A show a clear association between PEAD and post-announcement trading by individual investors: the presence of PEAD (the cells in the upper right corner and the lower left corner in Panel A) depends on individual investors' news-contrarian trading behavior that impedes the adjustment of stock prices to earnings news.

The results reported in Panel B and Panel C of Table 6 show that institutional and foreign investors' post-announcement trading is mostly in the direction of exploiting PEAD to their advantage. Positive earnings surprise stocks experience PEAD only when institutional or foreign investors are buying them (cells in the lower right corner of Panel B and Panel C), and negative earnings surprise stocks experience PEAD only when institutional or foreign investors are selling them (cells in the upper left corner of Panel B and Panel C).

Next, we take a closer look at the relation between PEAD and post-announcement trading behavior by considering individual, institutional, and foreign investors' post-announcement trading jointly. We sort all sample stocks each year not into quintiles as before, but into the positive or negative earnings surprise group based on the sign of the earnings surprise measure. Within each earnings surprise group, we then sort stocks based on cumulative trading flows after the earnings announcement (in time period [2, 31]) by individual, institutional, and foreign investors independently into either Sell (negative cumulative trading flow) group or Buy (positive cumulative trading flow) group.

Panel A of Table 7 reports the mean CARs over 30 trading days after the earnings announcement (CAR[2, 31]) for each of the 8 subgroups, classified by the sign of the earnings surprise measure and whether individual and institutional investors are net sellers or

net buyers. The results in Panel A clearly show that the sign of CARs depends on individual investors' trading behavior. Those stocks with positive earnings surprise experience positive abnormal returns only when individual investors are selling them, regardless of whether institutional investors are selling or buying them. Similarly, those stocks with negative earnings surprise experience negative abnormal returns only when individual investors are buying them, regardless of whether institutional investors are selling or buying them. This dependence of PEAD on the news-contrarian trading behavior of individual investors is also clearly present when stocks are double-sorted based on individual and foreign investors' cumulative trading flows after the announcement (Panel B): regardless of foreign investors' trading behavior, PEAD is present for positive (negative) earnings surprise stocks only when individual investors are selling (buying) them. When stocks are double-sorted based on institutional and foreign investors' trading behavior (Panel C), no clear relation emerges between their direction of trading and PEAD.

The results in Table 7 provide strong empirical support for the individual trading hypothesis. They show that PEAD exists only when earnings surprises are followed by individual investors' news-contrarian trading behavior, i.e., only when they trade in the direction of slowing down price adjustments in response to earnings news. This strong relationship between PEAD and individual investors' trading behavior suggests an additional question that can be asked. If PEAD is driven by individual investors' news-contrarian trading behavior, then is there a relationship between the magnitude of PEAD and the intensity of individual investors' buying or selling behavior? We examine this question by sorting all sample stocks as in Table 7, but take one more step by further sorting stocks into Sell_H (Buy_H) and Sell_L (Buy_L) depending on whether individual investors' cumulative net sale (buy) is higher or lower than the cross-sectional average within the Sell (Buy) group.

Table 8 reports the mean CARs for 8 subgroups sorted by the intensity of individual investors' trading and either institutional investors' (Panel A) or foreign investors' (Panel B) direction of trading. The CARs for the positive earnings column show that the CARs are positive only when individual investors are net sellers (the first four rows), regardless of institutional investors' direction of trading (Sell or Buy). Furthermore, the magnitudes of the CARs are greater when individuals are selling more intensely (9.09% vs. 2.52% and 8.81% vs. 1.06%). The same pattern holds for the negative earnings surprise column: the CARs are negative only when individuals are net buyers, and the absolute magnitude is greater when they are buying more intensely (-8.35% vs. -5.04% and -5.61% vs. -2.23%). This strong relationship between the intensity of individual investors net selling (buying) and the

magnitude of the positive (negative) CARs is also clearly present in Panel B, where stocks are double sorted based on individual and foreign investors' trading behavior. Overall, the results in Table 8 provide further support for the individual trading hypothesis.

6. Conclusion

In this paper, we investigate whether individual investors' news-contrarian trading behavior drives post-earnings-announcement drift (PEAD), which Hirshleifer, Myers, Myers, and Teoh (2008) call the individual trading hypothesis. We make use of the unique feature of the Korean stock market data that provide daily trading volume by individual, institutional, and foreign investors separately at daily frequency for each stock.

As predicted by the hypothesis, individual investors tend to trade in the opposite direction to earnings surprise, selling good earnings surprise stocks and buying bad earnings surprise stocks, which impedes a full price response to earnings news. In addition, PEAD exists only for those stocks that individuals trade in the opposite direction to earnings surprise: positive earnings surprise stocks show positive abnormal returns only when individuals are selling them, and negative earnings surprise stocks experience negative abnormal returns only when individuals are buying them. Furthermore, the magnitude of PEAD is greater for those stocks that are more intensely sold (for positive earnings surprise) and bought (for negative earnings surprise) by individuals. Taken together, our findings provide empirical support for the individual trading hypothesis, indicating that individual investors' news-contrarian trading behavior is a strong driver of PEAD.

References

- Bae, S. C., Min, J. H., Jung, S. (2011). Trading behavior, performance, and stock preference of foreigners, local institutions, and individual investors: Evidence from the Korean stock market. *Asia- Pacific Journal of Financial Studies*, 40(2), 199-239.
- Baik, B., Kim, Y. J., J. Lee (2012). A study on the exact timing of annual earnings announcements in the Korean market. *Korean Accounting Association Journal* 37(4), 253-293 (in Korean).
- Ball, R., Bartov, E. (1996). How naive is the stock market's use of earnings information? *Journal of Accounting and Economics*, 21(3), 319-337.
- Ball, R., Brown, P. (1968). An empirical evaluation of accounting income numbers. *Journal of Accounting Research*, 159-178.
- Ball, R., Kothari, S. P., Watts, R. L. (1993). Economic determinants of the relation between earnings changes and stock returns. *Accounting Review*, 622-638.
- Barber, B. M., Odean, T. (2008). All that glitters: The effect of attention and news on the buying behavior of individual and institutional investors. *Review of Financial Studies*, 21(2), 785-818.
- Barberis, N., Shleifer, A., Vishny, R. (1998). A model of investor sentiment. *Journal of Financial Economics*, 49(3), 307-343.
- Bartov, E., Radhakrishnan, S., Krinsky, I. (2000). Investor sophistication and patterns in stock returns after earnings announcements. *Accounting Review*, 75(1), 43-63.
- Battalio, R. H., Mendenhall, R. R. (2005). Earnings expectations, investor trade size, and anomalous returns around earnings announcements. *Journal of Financial Economics*, 77(2), 289-319.
- Bernard, V. L., Thomas, J. K. (1989). Post-earnings-announcement drift: delayed price response or risk premium?. *Journal of Accounting Research*, 1-36.
- Bernard, V. L., Thomas, J. K. (1990). Evidence that stock prices do not fully reflect the implications of current earnings for future earnings. *Journal of Accounting and Economics*, 13(4), 305-340.
- Bhattacharya, N. (2001). Investors' trade size and trading responses around earnings announcements: An empirical investigation. *Accounting Review*, 76(2), 221-244.
- Campbell, J. Y., Ramadorai, T., Schwartz, A. (2009). Caught on tape: Institutional trading, stock returns, and earnings announcements. *Journal of Financial Economics*, 92(1), 66-91.

Choe, H., Kho, B. C., Stulz, R. M. (2005). Do domestic investors have an edge? The trading experience of foreign investors in Korea. *Review of Financial Studies*, 18(3), 795-829.

Daniel, K., Hirshleifer, D., Subrahmanyam, A. (1998). Investor psychology and security market under- and overreactions. *Journal of Finance*, 53(6), 1839-1885.

Foster, G., Olsen, C., Shevlin, T. (1984). Earnings releases, anomalies, and the behavior of security returns. *Accounting Review*, 574-603.

Grinblatt, M., Keloharju, M. (2000). The investment behavior and performance of various investor types: a study of Finland's unique data set. *Journal of Financial Economics*, 55(1), 43-67.

Hirshleifer, D. A., Myers, J. N., Myers, L. A., Teoh, S. H. (2008). Do individual investors cause post-earnings announcement drift? Direct evidence from personal trades. *Accounting Review*, 83(6), 1521-1550.

Jacob, J., Lys, T., Sabino, J. (2000). Autocorrelation structure of forecast errors from time-series models: Implications for post-earnings announcement drift studies. *Journal of Accounting and Economics*, 28, 329-58.

Kang, J., Stulz, R. M. (1997). Why is there a home bias? An analysis of foreign portfolio equity ownership in Japan. *Journal of Financial Economics*, 46(1), 3-28.

Kaniel, R., Liu, S., Saar, G., Titman, S. (2012). Individual investor trading and return patterns around earnings announcements. *Journal of Finance*, 67(2), 639-680.

Ke, B., Ramalingegowda, S. (2005). Do institutional investors exploit the post-earnings announcement drift?. *Journal of Accounting and Economics*, 39(1), 25-53.

Kho, B (2011). The impact and role of foreign investors in Korea. *Asian Review of Financial Research* 24(1), 231-273.

Kim, J. H., Chang J. H., Yeo, E. J. (2006). A study of accurate timing of disclosure to annual earnings. *Korean Accounting Association Journal* 31(2), 35-55 (in Korean).

Ko, K., Kim, K. (2004). Portfolio performance and characteristics of each investor type: Individuals, institutions, and foreigners. *Korean Securities Association Journal* 33(4), 3562 (in Korean).

Lee, C. M. (1992). Earnings news and small traders: An intraday analysis. *Journal of Accounting and Economics*, 15(2-3), 265-302.

Livnat, J., Mendenhall, R. R. (2006). Comparing the post-earnings announcement drift for

surprises calculated from analyst and time series forecasts. *Journal of Accounting Research*, 44(1), 177-205.

Min, J. H. (2006) Do foreigners trade differently from domestic investors in the Korean stock market? *Korean Academic Association of Business Administration Journal* 19(1), 5373.

Park, K-I., Bae, K-H., Cho, J-W. (2006). Analyses on performance by different types of investors in Korean stock market. *Korean Securities Association Journal* 35(3), 41-76 (in Korean).

Park, T. J., Lee, Y., Song, K. R. (2014). Informed trading before positive vs. negative earnings surprises. *Journal of Banking and Finance*, 49, 228-241.

Vieru, M., Perttunen, J., Schadewitz, H. (2006). How investors trade around interim earnings announcements. *Journal of Business Finance and Accounting*, 33(1- 2), 145-178.

Table 1
Summary Statistics

This table reports summary statistics of sample firms used in this study. We require that sample firms be listed on the KOSPI market of the Korea Exchange (KRX); have fiscal year ending in December; have the mean analyst earnings forecast data available from FnGuide; have data on daily stock returns and daily trading flows (net buy) by individual, institutional, and foreign investors' over 60 days prior to and after the earnings announcements. For each stock, we measure earnings surprise as actual reported annual earnings per share minus the mean analyst earnings forecast, scaled by the share price 10 trading days prior to the earnings announcement date. We sort all sample stocks each year into quintiles according to earnings surprise, with Q1 (Q5) denoting the most negative (positive) earnings surprise quintile. The table reports the number of earnings announcements and the mean values of announced earnings, earnings forecast, price per share, earnings surprise, analyst following, market capitalization, and the ratio of book value of equity to market value of equity (BE/ME), for each of the 5 quintiles and for all sample firms. The sample period is from 2000 to 2012.

	Earnings Surprise Quintile					All Sample Firms
	Q1 (Negative)	Q2	Q3	Q4	Q5 (Positive)	
Number of Earnings Announcements	639	649	648	649	645	3,230
Announced Earnings (in KRW)	-329	3,112	4,563	7,114	8,054	4,513
Earnings Forecast (in KRW)	2,228	3,985	4,902	6,668	5,931	4,749
Price per Share (in KRW)	21,036	40,657	63,152	82,169	54,081	52,310
Earnings Surprise (%)	-32.38	-3.46	-0.84	0.67	5.18	-6.10
Analyst Following	5.27	7.45	9.49	9.19	6.94	7.68
Market Capitalization (in million KRW)	897,106	1,620,721	2,405,400	4,025,988	3,024,994	2,398,695
BE/ME	1.83	1.56	1.18	1.13	1.60	1.46

Table 2
Cumulative Abnormal Returns around Earnings Announcements

This table reports cumulative abnormal returns (in %) conditional on earnings surprise. For each stock, we measure earnings surprise as actual reported annual earnings per share minus the mean analyst earnings forecast, scaled by the share price 10 trading days prior to the earnings announcement date. We sort all sample stocks each year into quintiles according to earnings surprise, with Q1 (Q5) denoting the most negative (positive) earnings surprise quintile. We then compute cumulative abnormal returns for each stock over various time periods before and after earnings announcements. We define abnormal returns as market-adjusted returns using the equal-weighted portfolio of all sample stocks as a proxy for the market portfolio. For each earnings surprise quintile, we report the mean cumulative abnormal returns with clustering-corrected *t*-statistics in parentheses, testing the hypothesis of zero cumulative abnormal returns. Statistical significance at the 5% level is indicated in bold.

Earnings Surprise Quintile	Time Periods								
	[-60, -1]	[-30, -1]	[-20, -1]	[-10, -1]	[0, 1]	[2, 11]	[2, 21]	[2, 31]	[2, 61]
Q1(Negative)	-2.24 (-2.67)	-0.86 (-1.41)	-0.99 (-1.90)	-0.35 (-0.97)	-0.45 (-2.40)	-0.98 (-2.58)	-1.63 (-2.78)	-1.32 (-1.83)	-1.18 (-1.26)
Q2	-1.17 (-1.70)	-0.95 (-1.94)	-0.55 (-1.33)	-0.91 (-3.02)	-0.15 (-0.84)	-0.35 (-1.21)	-0.30 (-0.68)	-0.59 (-1.10)	-0.99 (-1.40)
Q3	0.45 (0.62)	-0.52 (-1.02)	-0.32 (-0.79)	-0.39 (-1.40)	-0.15 (-0.97)	-0.47 (-1.73)	-0.22 (-0.57)	-0.04 (-0.09)	-0.17 (-0.26)
Q4	1.10 (1.54)	1.10 (2.08)	1.03 (2.44)	0.60 (2.15)	0.39 (2.16)	-0.20 (-0.69)	0.06 (0.16)	0.57 (1.25)	-0.16 (-0.23)
Q5 (Positive)	1.68 (2.29)	0.85 (1.55)	1.11 (2.37)	0.65 (2.15)	0.78 (4.76)	0.70 (2.32)	1.25 (2.93)	1.62 (3.04)	3.51 (4.49)
Q5 - Q1	3.92 (3.52)	1.70 (2.09)	2.10 (2.99)	1.00 (2.13)	1.23 (4.94)	1.68 (3.46)	2.88 (3.98)	2.94 (3.28)	4.68 (3.84)

Table 3
Cumulative Trading Flows by Investor Type around Earnings Announcements

This table reports cumulative trading flows (net buy) as a percentage of the number of shares outstanding conditional on earnings surprise. For each stock, we measure earnings surprise as actual reported annual earnings per share minus the mean analyst earnings forecast, scaled by the share price 10 trading days prior to the earnings announcement date. We sort all sample stocks each year into quintiles according to earnings surprise, with Q1 (Q5) denoting the most negative (positive) earnings surprise quintile. We then compute cumulative trading flows by individual (Panel A), institutional (Panel B), and foreign (Panel C) investors separately for each stock, defined as daily net buy as a percentage of the number of shares outstanding cumulated over various time periods before and after earnings announcements. For each earnings surprise quintile, we report the mean cumulative trading flows with clustering-corrected *t*-statistics in parentheses, testing the hypothesis of zero cumulative trading flows. Statistical significance at the 5% level is indicated in bold.

Panel A: Individual Investors

Earnings Surprise Quintile	Time Periods								
	[-60, -1]	[-30, -1]	[-20, -1]	[-10, -1]	[0, 1]	[2, 11]	[2, 21]	[2, 31]	[2, 61]
Q1(Negative)	0.22 (1.54)	0.03 (0.28)	0.07 (0.92)	0.06 (1.34)	0.00 (0.29)	-0.06 (-1.35)	-0.03 (-0.34)	0.07 (0.62)	0.22 (1.49)
Q2	-0.01 (-0.07)	0.07 (0.72)	0.07 (0.97)	0.08 (2.06)	0.03 (1.46)	-0.01 (-0.22)	0.00 (0.01)	0.01 (0.16)	0.00 (0.03)
Q3	-0.33 (-2.50)	-0.13 (-1.45)	-0.10 (-1.38)	-0.03 (-0.74)	0.00 (-0.15)	-0.07 (-1.70)	-0.13 (-1.88)	-0.15 (-1.69)	-0.07 (-0.46)
Q4	-0.38 (-3.01)	-0.21 (-2.63)	-0.13 (-1.95)	-0.03 (-0.70)	-0.01 (-0.39)	-0.05 (-1.12)	-0.15 (-2.38)	-0.18 (-2.06)	-0.25 (-1.69)
Q5 (Positive)	-0.43 (-3.37)	-0.31 (-3.77)	-0.23 (-3.30)	-0.11 (-2.44)	0.00 (-0.06)	-0.22 (-4.63)	-0.35 (-5.46)	-0.39 (-4.60)	-0.41 (-3.08)
Q5 - Q1	-0.65 (-3.39)	-0.33 (-2.62)	-0.30 (-2.93)	-0.18 (-2.67)	-0.01 (-0.25)	-0.15 (-2.35)	-0.33 (-3.26)	-0.45 (-3.33)	-0.64 (-3.15)

Panel B: Institutional Investors

Earnings Surprise Quintile	Time Periods								
	[-60, -1]	[-30, -1]	[-20, -1]	[-10, -1]	[0, 1]	[2, 11]	[2, 21]	[2, 31]	[2, 61]
Q1(Negative)	-0.22 (-1.83)	-0.14 (-1.63)	-0.11 (-1.93)	-0.08 (-2.11)	0.00 (-0.19)	0.05 (1.38)	0.05 (0.81)	0.01 (0.16)	-0.08 (-0.67)
Q2	-0.05 (-0.46)	-0.15 (-1.90)	-0.13 (-2.28)	-0.11 (-3.28)	-0.01 (-0.93)	0.01 (0.27)	0.00 (-0.03)	-0.02 (-0.26)	-0.05 (-0.45)
Q3	-0.03 (-0.30)	-0.15 (-1.98)	-0.06 (-0.99)	-0.02 (-0.67)	-0.01 (-0.37)	0.01 (0.15)	0.10 (1.56)	0.14 (1.77)	0.03 (0.22)
Q4	0.04 (0.35)	-0.03 (-0.47)	-0.05 (-0.84)	-0.04 (-1.03)	0.00 (-0.07)	0.04 (1.10)	0.05 (0.85)	0.05 (0.73)	0.00 (-0.00)
Q5 (Positive)	0.11 (0.96)	0.06 (0.88)	0.05 (0.80)	-0.01 (-0.23)	-0.01 (-0.65)	0.02 (0.52)	-0.01 (-0.11)	-0.05 (-0.68)	-0.09 (-0.80)
Q5 - Q1	0.33 (1.99)	0.20 (1.81)	0.16 (1.93)	0.07 (1.34)	-0.01 (-0.35)	-0.03 (-0.60)	-0.06 (-0.67)	-0.06 (-0.56)	-0.01 (-0.05)

Table 3
Continued

Panel C: Foreign Investors

Earnings Surprise Quintile	Time Periods								
	[-60, -1]	[-30, -1]	[-20, -1]	[-10, -1]	[0, 1]	[2, 11]	[2, 21]	[2, 31]	[2, 61]
Q1(Negative)	0.02 (0.24)	0.02 (0.29)	-0.02 (-0.39)	-0.01 (-0.24)	0.00 (0.05)	0.00 (0.10)	-0.01 (-0.19)	-0.06 (-0.95)	-0.08 (-0.90)
Q2	0.13 (1.34)	0.10 (1.59)	0.08 (1.75)	0.03 (1.03)	-0.01 (-0.47)	0.01 (0.18)	-0.02 (-0.28)	-0.05 (-0.68)	-0.02 (-0.18)
Q3	0.32 (3.11)	0.29 (4.37)	0.18 (3.11)	0.07 (2.01)	0.00 (0.32)	0.05 (1.52)	0.02 (0.30)	-0.01 (-0.08)	0.11 (0.91)
Q4	0.31 (3.06)	0.27 (3.94)	0.17 (3.30)	0.07 (2.03)	0.01 (1.17)	0.02 (0.49)	0.10 (1.84)	0.15 (2.30)	0.31 (3.06)
Q5 (Positive)	0.36 (3.84)	0.28 (4.72)	0.22 (4.28)	0.12 (3.00)	0.02 (1.75)	0.17 (3.90)	0.32 (4.85)	0.39 (4.73)	0.48 (3.61)
Q5 - Q1	0.33 (2.59)	0.27 (3.23)	0.24 (3.44)	0.13 (2.51)	0.02 (1.19)	0.17 (3.24)	0.33 (4.03)	0.45 (4.31)	0.56 (3.50)

Table 4
Pre-announcement Trading Behavior by Investor Type and Earnings Surprise

This table reports a regression analysis relating earnings surprise to pre-announcement trading behavior by individual, institutional, and foreign investors. The dependent variable in the regressions is the earnings surprise measure for each stock, and the independent variables include cumulative trading flows by investor type before the announcement, cumulative abnormal returns (CAR) for the stock before the announcement, the log of market capitalization (ln(Size)), and the ratio of book value of equity to market value of equity (BE/ME). For each stock, we measure earnings surprise as actual reported annual earnings per share minus the mean analyst earnings forecast, scaled by the share price 10 trading days prior to the earnings announcement date. We define abnormal returns as market-adjusted returns using the equal-weighted portfolio of all sample stocks as a proxy for the market portfolio. Panel A (B) reports the results where cumulative trading flows by investor type and CARs are computed over 30 (60) trading days before the announcement. Clustering-corrected *t*-statistics are in parenthesis and statistical significance at the 5% level is indicated in bold.

Panel A: Cumulative Trading Flows[-30,-1] and Earnings Surprise

	Intercept	Cumulative Trading Flows[-30, -1]	CAR[-30, -1]	ln(Size)	BE/ME
Individual Investors	-0.24 (-2.05)	-0.41 (-1.52)	0.08 (1.04)	0.02 (2.38)	-0.02 (-1.23)
Institutional Investors	-0.24 (-2.06)	-0.05 (-0.22)	0.11 (1.42)	0.02 (2.40)	-0.02 (-1.23)
Foreign Investors	-0.24 (-2.05)	0.51 (2.16)	0.10 (1.31)	0.02 (2.38)	-0.02 (-1.23)

Panel B: Cumulative Trading Flows[-60,-1] and Earnings Surprise

	Intercept	Cumulative Trading Flows[-60, -1]	CAR[-60, -1]	ln(Size)	BE/ME
Individual Investors	-0.24 (-2.05)	-0.55 (-3.34)	0.02 (0.59)	0.02 (2.38)	-0.02 (-1.20)
Institutional Investors	-0.24 (-2.00)	0.08 (0.64)	0.06 (1.20)	0.02 (2.34)	-0.02 (-1.21)
Foreign Investors	-0.24 (-2.02)	0.38 (2.20)	0.05 (1.16)	0.02 (2.35)	-0.02 (-1.20)

Table 5
Earnings Surprise and Post-announcement Trading Behavior by Investor type

This table reports a regression analysis relating post-announcement trading behavior by individual, institutional, and foreign investors to earnings surprise. For each stock, we measure earnings surprise as actual reported annual earnings per share minus the mean analyst earnings forecast, scaled by the share price 10 trading days prior to the earnings announcement date. We sort all sample stocks each year into quintiles according to earnings surprise, with quintile 1 (quintile 5) denoting the most negative (positive) earnings surprise quintile. The dependent variable in the regressions is cumulative trading flows by investor type after the announcement, and the independent variables include dummy variables for earnings surprise quintile 1 (ES1) and earnings surprise quintile 5 (ES5), cumulative abnormal returns (CAR) for the stock before the announcement, the log of market capitalization (ln(Size)), and the ratio of book value of equity to market value of equity (BE/ME). ES1 and ES5 can be interpreted as dummy variables for bad earnings news (ES1) and good earnings news (ES5). As an alternative to the analyst earnings surprise measure, we also use the abnormal return at the time of the announcement (CAR[0,1]) as a proxy for earnings surprise. CAR1 and CAR5 denote dummy variables for the lowest CAR[0,1] quintile (most negative abnormal return) and the highest CAR[0,1] quintile (most positive abnormal return), respectively. Panel A (B) reports the results where cumulative trading flows by investor type are computed over 30 (60) trading days after the announcement and pre-announcement CARs are computed over 30 (60) trading days before the announcement. Clustering-corrected *t*-statistics are in parenthesis and statistical significance at the 5% level is indicated in bold.

Panel A: Earnings Surprise and Cumulative Trading Flows[2, 31]

	Intercept	ES1	ES5	CAR1	CAR5	CAR[-30, -1]	ln(Size)	BE/ME
Individual Investors	-0.0086	0.0018	-0.0026			-0.0150	0.0005	0.0004
	(-2.01)	(1.26)	(-2.08)			(-3.38)	(1.84)	(1.17)
	-0.0082			0.0039	-0.0021	-0.0164	0.0005	0.0004
	(-1.97)			(3.38)	(-2.38)	(-3.72)	(1.66)	(1.24)
Institutional Investors	0.0044	-0.0004	-0.0007			0.0062	-0.0003	-0.0003
	(1.08)	(-0.33)	(-0.94)			(1.94)	(-0.96)	(-0.69)
	0.0039			-0.0011	0.0015	0.0066	-0.0002	-0.0003
	(1.01)		(-1.46)	(2.04)	(2.04)	(2.04)	(-0.93)	(-0.76)
Foreign Investors	0.0078	-0.0011	0.0030			0.0078	-0.0005	-0.0004
	(2.48)	(-1.38)	(3.23)			(2.81)	(-2.30)	(-1.91)
	0.0079			-0.0025	0.0008	0.0088	-0.0005	-0.0004
	(2.46)		(-2.92)	(0.90)	(3.24)	(-2.15)	(-1.84)	

Panel B: Earnings Surprise and Cumulative Trading Flows[2, 61]

	Intercept	ES1	ES5	CAR1	CAR5	CAR[-60, -1]	ln(Size)	BE/ME
Individual Investors	-0.0150	0.0041	-0.0025			-0.0073	0.0011	-0.0001
	(-1.79)	(1.92)	(-1.36)			(-2.11)	(1.93)	(-0.10)
	-0.0133			0.0046	-0.0034	-0.0088	0.0009	0.0000
	(-1.60)			(2.45)	(-2.14)	(-2.54)	(1.73)	(0.04)
Institutional Investors	0.0110	-0.0015	-0.0006			0.0002	-0.0008	0.0000
	(1.39)	(-0.85)	(-0.45)			(0.05)	(-1.59)	(0.05)
	0.0098			-0.0021	0.0029	0.0007	-0.0008	0.0000
	(1.27)		(-1.51)	(2.69)	(0.24)	(0.24)	(-1.52)	(-0.03)
Foreign Investors	0.0112	-0.0023	0.0027			0.0080	-0.0007	-0.0005
	(2.36)	(-2.21)	(2.11)			(2.56)	(-2.02)	(-1.60)
	0.0108			-0.0027	0.0005	0.0089	-0.0006	-0.0005
	(2.33)		(-2.26)	(0.36)	(2.80)	(-1.84)	(-1.65)	

Table 6
PEAD conditional on Post-announcement Trading Behavior by Investor Type

This table reports cumulative abnormal returns (in %) conditional on earnings surprise and post-announcement trading behavior by investor type. For each stock, we measure earnings surprise as actual reported annual earnings per share minus the mean analyst earnings forecast, scaled by the share price 10 trading days prior to the earnings announcement date. We sort all sample stocks each year into quintiles according to earnings surprise, with Q1 (Q5) denoting the most negative (positive) earnings surprise quintile. Within each earnings surprise quintile, we sort on cumulative trading flows after the earnings announcement (in time period [2, 31]) by individual (Panel A), institutional (Panel B), and foreign (Panel C) investors. We define abnormal returns as market-adjusted returns using the equal-weighted portfolio of all sample stocks as a proxy for the market portfolio. For each of the 25 subgroups, we report the mean cumulative abnormal returns with clustering-corrected *t*-statistics in parentheses, testing the hypothesis of zero cumulative abnormal returns. Statistical significance at the 5% level is indicated in bold.

Panel A: CAR[2, 31] conditional on Individual Investors' Cumulative Trading Flows in [2, 31]					
Individual Investors'	(Negative)		Earnings Surprise		(Positive)
Cumulated Tradng Flows[2, 31]	Q1	Q2	Q3	Q4	Q5
P1 (Sell)	11.34	8.93	9.87	9.26	11.50
	(6.75)	(8.04)	(9.16)	(9.92)	(8.37)
P2	3.64	1.72	3.00	4.59	5.38
	(3.52)	(1.78)	(4.27)	(6.03)	(5.55)
P3	-3.78	-2.97	-1.76	-0.88	-0.29
	(-2.85)	(-3.35)	(-2.76)	(-0.97)	(-0.37)
P4	-7.38	-2.36	-3.54	-3.33	-3.94
	(-4.41)	(-2.09)	(-3.70)	(-3.72)	(-3.62)
P5 (Buy)	-9.30	-8.32	-6.27	-6.57	-4.24
	(-5.32)	(-7.04)	(-5.99)	(-6.98)	(-3.69)
P5 - P1	-20.64	-17.25	-16.14	-15.83	-15.73
	(-8.52)	(-10.63)	(-10.75)	(-11.94)	(-8.79)
Panel B: CAR[2, 31] conditional on Institutional Investors' Cumulative Trading Flows in [2, 31]					
Institutional Investors'	(Negative)		Earnings Surprise		(Positive)
Cumulated Tradng Flows[2, 31]	Q1	Q2	Q3	Q4	Q5
P1 (Sell)	-5.90	-4.49	-4.70	-1.13	0.80
	(-3.14)	(-3.23)	(-4.72)	(-1.05)	(0.55)
P2	-4.12	-2.05	-1.38	-3.46	-0.82
	(-3.18)	(-2.01)	(-1.38)	(-3.64)	(-0.84)
P3	-5.95	-2.49	-2.14	-1.02	-0.70
	(-3.46)	(-2.26)	(-2.56)	(-1.25)	(-0.67)
P4	0.51	0.11	0.54	1.77	0.95
	(0.38)	(0.11)	(0.62)	(2.00)	(0.90)
P5 (Buy)	9.77	5.43	8.20	6.67	7.92
	(6.43)	(4.86)	(7.92)	(6.06)	(6.06)
P5 - P1	15.67	9.92	12.90	7.80	7.12
	(6.48)	(5.56)	(8.98)	(5.05)	(3.65)

Table 6
Continued

Panel C: CAR[2, 31] conditional on Foreign Investors' Cumulative Trading Flows in [2, 31]

Foreign Investors' Cumulated Tradng Flows[2, 31]	(Negative) Q1	Q2	Earnings Surprise Q3	Q4	(Positive) Q5
P1 (Sell)	-5.27 (-3.24)	-3.33 (-2.68)	-0.77 (-0.70)	-0.02 (-0.01)	-1.28 (-1.00)
P2	-3.17 (-1.82)	-1.79 (-1.85)	-1.55 (-1.74)	-2.77 (-3.01)	-2.07 (-1.85)
P3	-2.45 (-1.93)	-1.62 (-1.46)	-1.21 (-1.35)	-1.60 (-1.74)	-0.53 (-0.56)
P4	-1.59 (-0.96)	-1.27 (-1.15)	0.03 (0.03)	1.10 (1.17)	2.30 (2.47)
P5 (Buy)	6.63 (3.91)	4.62 (3.56)	4.24 (3.48)	6.17 (6.52)	9.58 (6.87)
P5 - P1	11.90 (5.07)	7.95 (4.42)	5.00 (3.05)	6.18 (4.11)	10.86 (5.73)

Table 7
Individual Investors' Post-announcement Trading Behavior and PEAD

This table reports cumulative abnormal returns (in %) conditional on earnings surprise and post-announcement trading behavior by investor type. For each stock, we measure earnings surprise as actual reported annual earnings per share minus the mean analyst earnings forecast, scaled by the share price 10 trading days prior to the earnings announcement date. We sort all sample stocks each year into the positive or negative earnings surprise group based on the sign of the earnings surprise measure. Within each earnings surprise group, we then sort stocks based on cumulative trading flows after the earnings announcement (in time period [2, 31]) by individual, institutional, and foreign investors independently into either Sell (negative cumulative trading flow) group or Buy (positive cumulative trading flow) group. We define abnormal returns as market-adjusted returns using the equal-weighted portfolio of all sample stocks as a proxy for the market portfolio. For each of the 24 subgroups, we report the mean cumulative abnormal returns with clustering-corrected *t*-statistics in parentheses, testing the hypothesis of zero cumulative abnormal returns. Statistical significance at the 5% level is indicated in bold.

Panel A: Individual Investors vs. Institutional Investors

Cumulative Trading Flows[2, 31]		Positive Earnings Surprise		Negative Earnings Surprise	
Individual	Institutional	CAR[2, 31]	Number of Obs	CAR[2, 31]	Number of Obs
Sell	Sell	5.03 (6.45)	217	3.43 (4.00)	268
Sell	Buy	5.30 (10.06)	483	5.44 (11.23)	681
Buy	Sell	-4.41 (-7.43)	373	-7.04 (-12.23)	664
Buy	Buy	-4.16 (-4.08)	149	-3.50 (-4.20)	231

Panel B: Individual Investors vs. Foreign Investors

Cumulative Trading Flows[2, 31]		Positive Earnings Surprise		Negative Earnings Surprise	
Individual	Foreign	CAR[2, 31]	Number of Obs	CAR[2, 31]	Number of Obs
Sell	Sell	3.42 (4.82)	247	4.71 (7.55)	341
Sell	Buy	6.19 (11.32)	453	4.97 (8.82)	608
Buy	Sell	-5.31 (-7.78)	320	-6.55 (-11.01)	599
Buy	Buy	-2.79 (-3.68)	202	-5.27 (-6.48)	296

Panel C: Institutional Investors vs. Foreign Investors

Cumulative Trading Flows[2, 31]		Positive Earnings Surprise		Negative Earnings Surprise	
Institutional	Foreign	CAR[2, 31]	Number of Obs	CAR[2, 31]	Number of Obs
Sell	Sell	-5.65 (-6.74)	193	-7.42 (-9.58)	403
Sell	Buy	1.35 (2.24)	397	-1.45 (-2.27)	529
Buy	Sell	0.63 (0.98)	374	1.24 (2.28)	537
Buy	Buy	6.61 (9.17)	258	5.94 (8.45)	375

Table 8

Individual Investors' Post-announcement Trading Behavior and PEAD

This table reports cumulative abnormal returns (in %) conditional on earnings surprise and post-announcement trading behavior by investor type. For each stock, we measure earnings surprise as actual reported annual earnings per share minus the mean analyst earnings forecast, scaled by the share price 10 trading days prior to the earnings announcement date. We sort all sample stocks each year into the positive or negative earnings surprise group based on the sign of the earnings surprise measure. Within each earnings surprise group, we then sort stocks based on cumulative trading flows after the earnings announcement (in time period [2, 31]) by individual, institutional, and foreign investors independently into either Sell (negative cumulative trading flow) group or Buy (positive cumulative trading flow) group. For individual investors, we further sort stocks into Sell_H (Buy_H) and Sell_L (Buy_L) depending on whether individual investors' cumulative net sale (buy) is higher or lower than the cross-sectional average within the Sell (Buy) group. We define abnormal returns as market-adjusted returns using the equal-weighted portfolio of all sample stocks as a proxy for the market portfolio. For each of the 32 subgroups, we report the mean cumulative abnormal returns with clustering-corrected t -statistics in parentheses, testing the hypothesis of zero cumulative abnormal returns. Statistical significance at the 5% level is indicated in bold.

Panel A: Individual Investors vs. Institutional Investors

Cumulative Trading Flows[2, 31]		Positive Earnings Surprise		Negative Earnings Surprise	
Individual	Institutional	CAR[2, 31]	Number of Obs	CAR[2, 31]	Number of Obs
Sell_H	Sell	9.09 (6.53)	83	7.81 (5.46)	109
Sell_L	Sell	2.52 (2.93)	134	0.42 (0.42)	159
Sell_H	Buy	8.81 (11.21)	264	9.32 (13.79)	373
Sell_L	Buy	1.06 (1.92)	219	0.74 (1.25)	308
Buy_H	Sell	-5.54 (-6.15)	185	-8.35 (-11.08)	402
Buy_L	Sell	-3.30 (-4.29)	188	-5.04 (-5.74)	262
Buy_H	Buy	-5.14 (-3.64)	47	-5.61 (-3.03)	87
Buy_L	Buy	-3.71 (-2.76)	102	-2.23 (-3.08)	144

Panel B: Individual Investors vs. Foreign Investors

Cumulative Trading Flows[2, 31]		Positive Earnings Surprise		Negative Earnings Surprise	
Individual	Foreign	CAR[2, 31]	Number of Obs	CAR[2, 31]	Number of Obs
Sell_H	Sell	7.86 (6.10)	100	8.73 (8.84)	149
Sell_L	Sell	0.41 (0.57)	147	1.59 (2.19)	192
Sell_H	Buy	9.30 (11.52)	247	9.10 (11.75)	333
Sell_L	Buy	2.48 (3.96)	206	-0.04 (-0.05)	275
Buy_H	Sell	-6.93 (-7.68)	153	-8.11 (-9.77)	343
Buy_L	Sell	-3.83 (-3.82)	167	-4.47 (-5.43)	256
Buy_H	Buy	-2.61 (-1.86)	79	-7.29 (-5.52)	146
Buy_L	Buy	-2.91 (-3.35)	123	-3.30 (-3.52)	150

Figure 1
Total Stock Market Capitalization and Ownership Share by Investor Type

This figure plots total stock market capitalization (in millions of KRW) of listed companies in the Korea Exchange (KRX) from 2000 to 2012, and ownership share by investor type. The data are from the Bank of Korea.

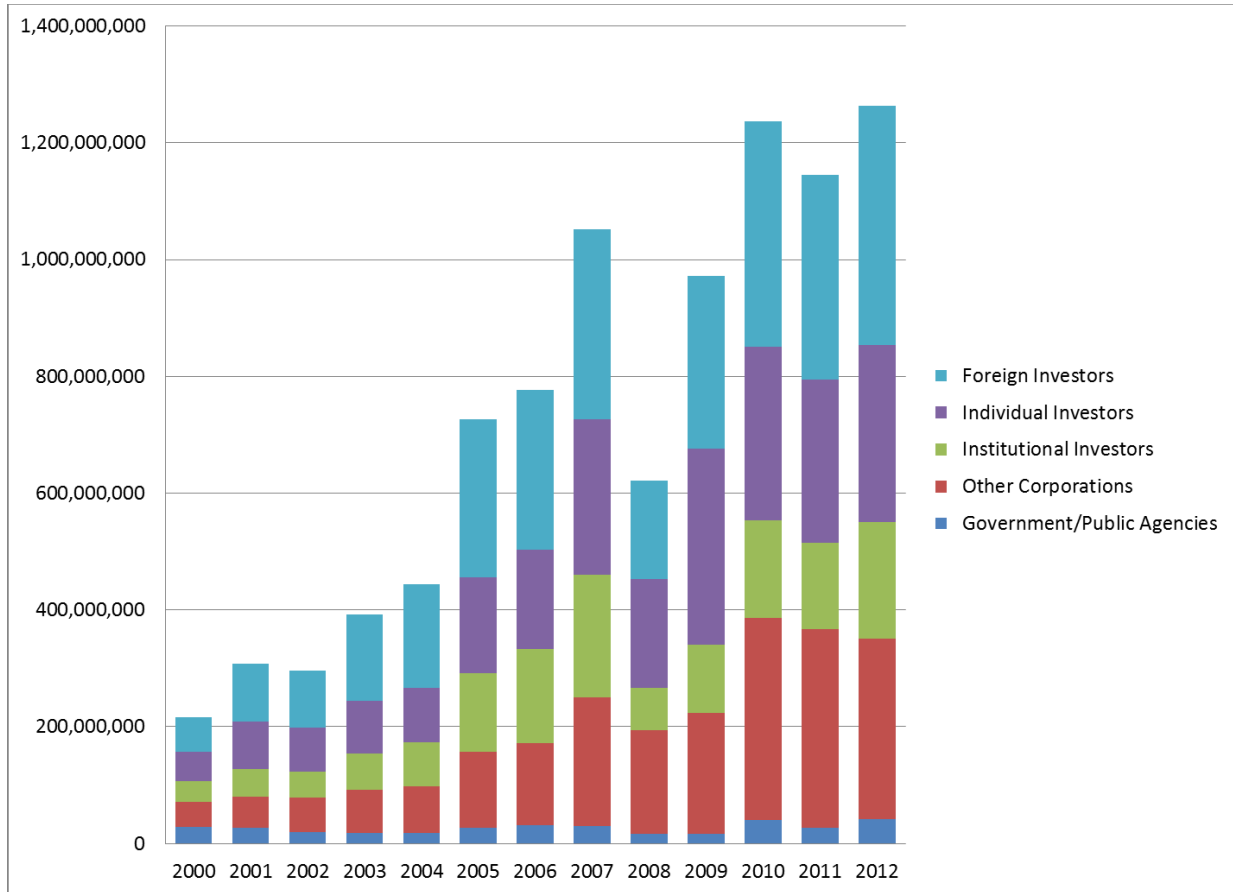


Figure 2
Share of Trading Volume by Investor Type

This figure plots the relative shares of trading volume (sum of sales and purchases in KRW) by investor type in Korea from 2000 to 2012. The data are from the Bank of Korea.

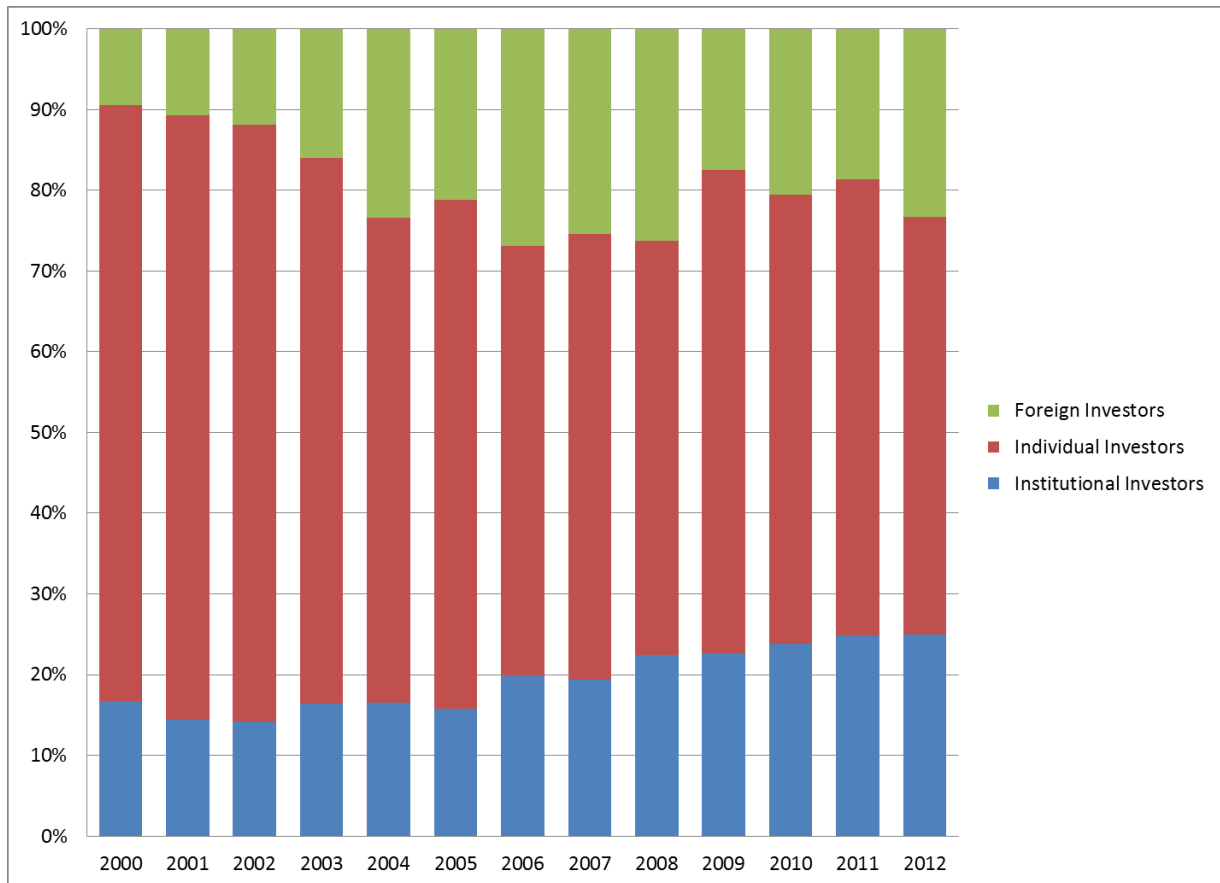


Figure 3
Cumulative Abnormal Returns Prior to Earnings Announcement

This figure plots cumulative abnormal returns (in %) over 60 trading days prior to the earnings announcement date conditional on earnings surprise. For each stock, we measure earnings surprise as actual reported annual earnings per share minus the mean analyst earnings forecast, scaled by the share price 10 trading days prior to the earnings announcement date. We sort all sample stocks each year into quintiles according to earnings surprise, with Q1 (Q5) denoting the most negative (positive) earnings surprise quintile. We then compute cumulative abnormal returns for each stock over various time periods before and after earnings announcements. We define abnormal returns as market-adjusted returns using the equal-weighted portfolio of all sample stocks as a proxy for the market portfolio. The figure plots the mean cumulative abnormal returns for each earnings surprise quintile.

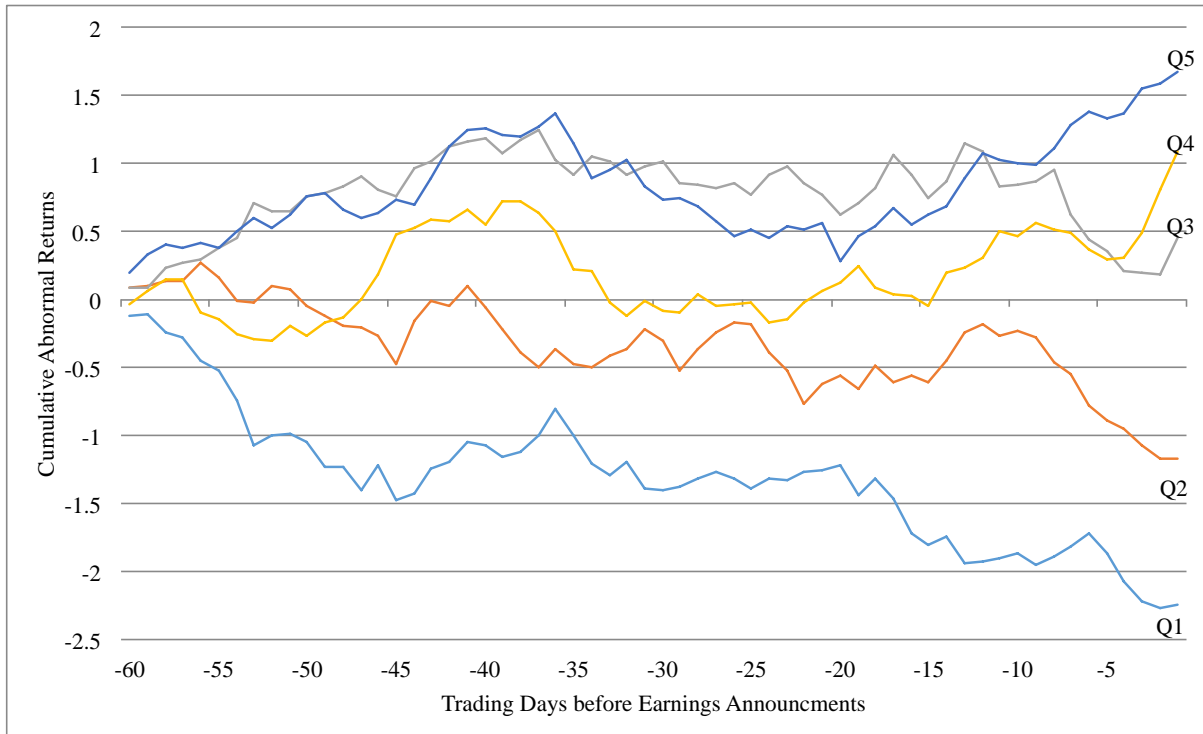


Figure 4
Cumulative Abnormal Returns Subsequent to Earnings Announcement

This figure plots cumulative abnormal returns (in %) over 60 trading days subsequent to the earnings announcement date conditional on earnings surprise. For each stock, we measure earnings surprise as actual reported annual earnings per share minus the mean analyst earnings forecast, scaled by the share price 10 trading days prior to the earnings announcement date. We sort all sample stocks each year into quintiles according to earnings surprise, with Q1 (Q5) denoting the most negative (positive) earnings surprise quintile. We then compute cumulative abnormal returns for each stock over various time periods before and after earnings announcements. We define abnormal returns as market-adjusted returns using the equal-weighted portfolio of all sample stocks as a proxy for the market portfolio. The figure plots the mean cumulative abnormal returns for each earnings surprise quintile.

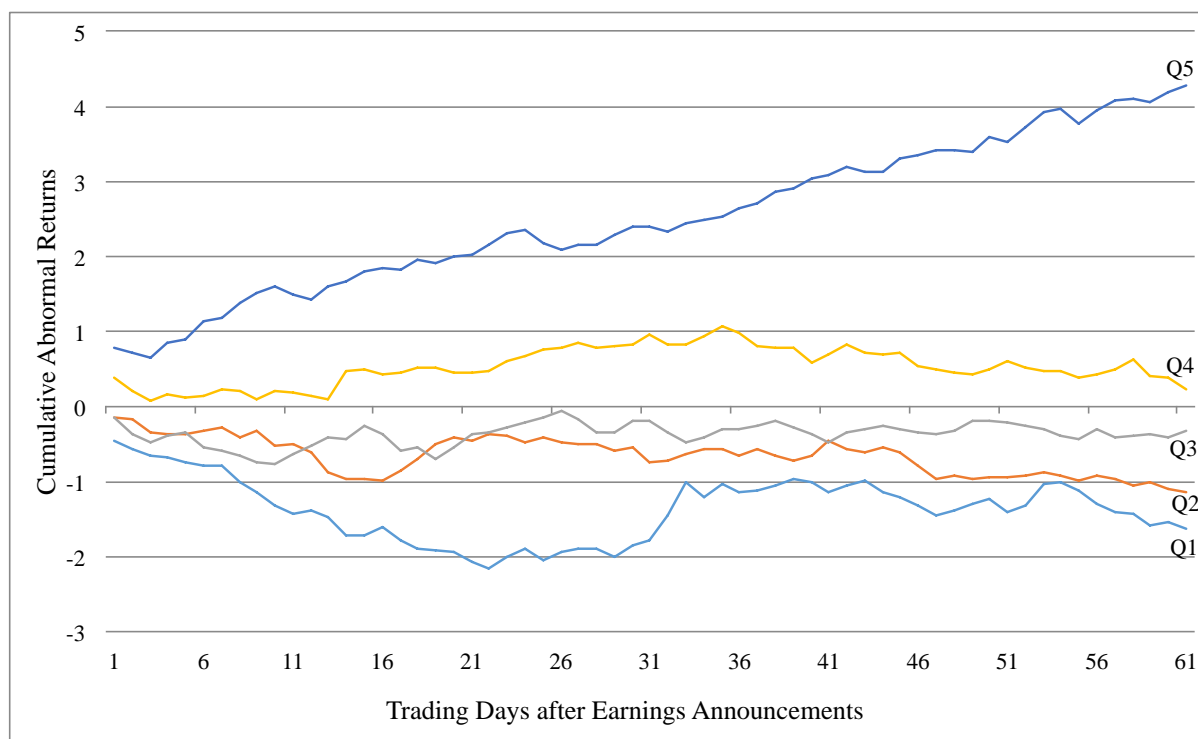


Figure 5
Cumulative Trading Flows Prior to Earnings Announcement

These figure plot cumulative trading flows (net buy) as a percentage of the number of shares outstanding conditional on earnings surprise. For each stock, we measure earnings surprise as actual reported annual earnings per share minus the mean analyst earnings forecast, scaled by the share price 10 trading days prior to the earnings announcement date. We sort all sample stocks each year into quintiles according to earnings surprise, with Q1 (Q5) denoting the most negative (positive) earnings surprise quintile. We then compute cumulative trading flows by individual (Panel A), institutional (Panel B), and foreign (Panel C) investors separately for each stock, defined as daily net buy as a percentage of the number of shares outstanding cumulated over various time periods before and after earnings announcements. The figure plots the mean cumulative trading flows over 60 trading days prior to the earnings announcement date for each earnings surprise quintile.

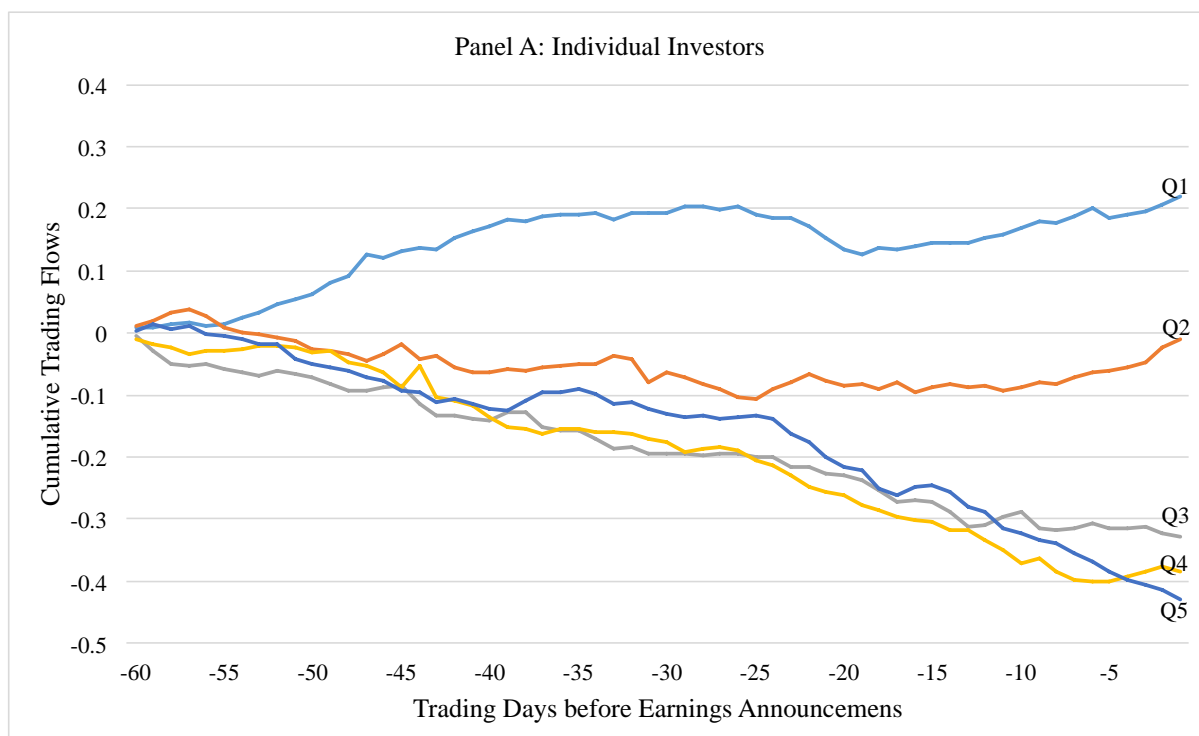


Figure 5
Continued

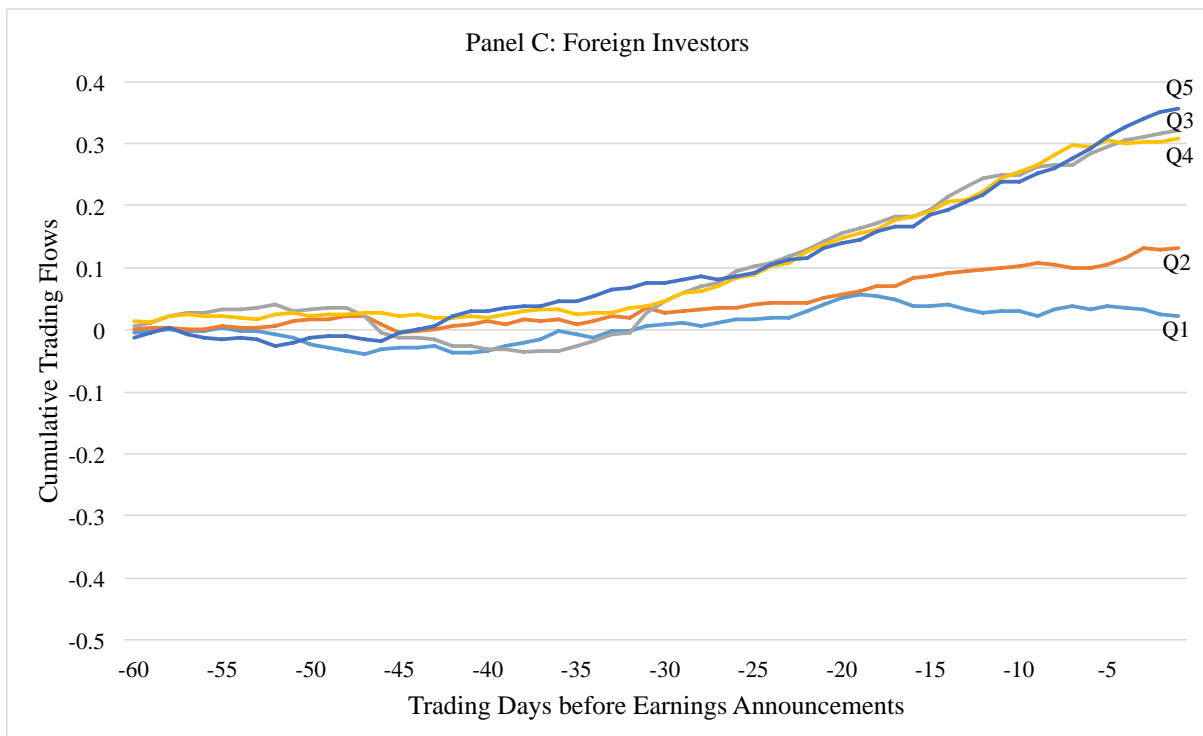
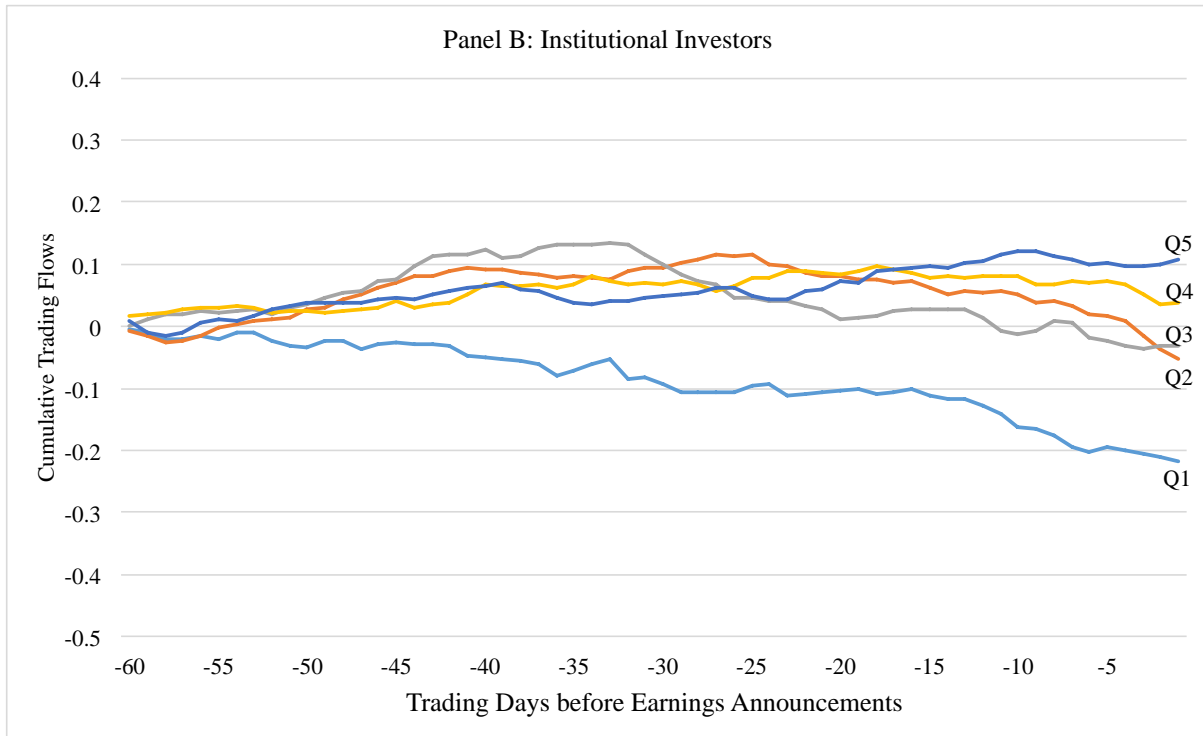


Figure 6
Cumulative Trading Flows Subsequent to Earnings Announcement

These figure plot cumulative trading flows (net buy) as a percentage of the number of shares outstanding conditional on earnings surprise. For each stock, we measure earnings surprise as actual reported annual earnings per share minus the mean analyst earnings forecast, scaled by the share price 10 trading days prior to the earnings announcement date. We sort all sample stocks each year into quintiles according to earnings surprise, with Q1 (Q5) denoting the most negative (positive) earnings surprise quintile. We then compute cumulative trading flows by individual (Panel A), institutional (Panel B), and foreign (Panel C) investors separately for each stock, defined as daily net buy as a percentage of the number of shares outstanding cumulated over various time periods before and after earnings announcements. The figure plots the mean cumulative trading flows over 60 trading days subsequent to the earnings announcement date for each earnings surprise quintile.

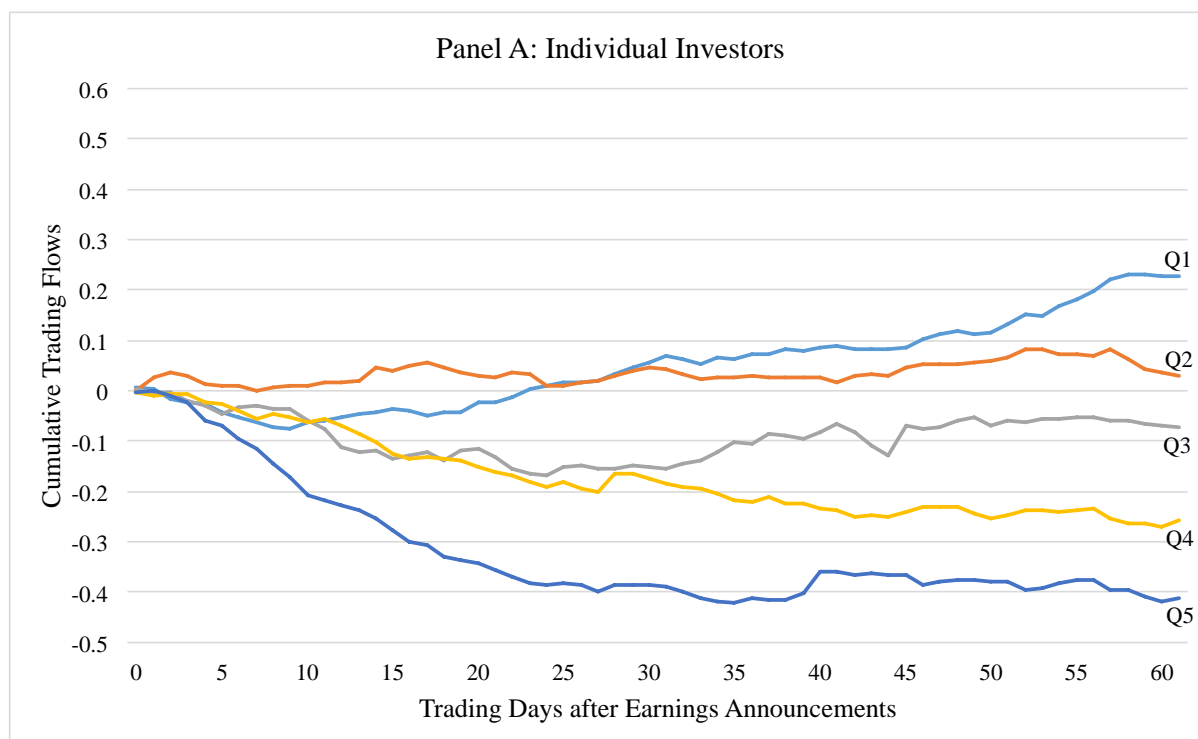


Figure 6
Continued

