Do individual investors drive post-earnings announcement drift?

Direct evidence from personal trades

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This study examines whether individual investors are the source of post-earnings announcement drift (PEAD). We provide evidence on how individual investors trade in response to extreme quarterly earnings surprises and on the relation between individual investors' trades and subsequent abnormal returns. We find no evidence that either individuals or any sub-category of individuals in our sample cause PEAD. Individuals are significant net buyers after *both* negative and positive earnings surprises. There is no indication that trading by any of our investor sub-categories explains the concentration of drift at subsequent earnings announcement dates. While post-announcement individual net buying is a significant negative predictor of stock returns over the next three quarters, individual investor trading fails to subsume *any* of the power of extreme earnings surprises to predict future abnormal returns.

Keywords: post earnings-announcement drift; trading activity; individual investors

I. INTRODUCTION

This paper examines whether post-earnings announcement drift, or PEAD (Foster, et al. 1984; Bernard and Thomas 1989, 1990), results from trades made by individual investors. PEAD is the tendency for stocks to earn high positive average abnormal returns in the three quarters subsequent to extreme positive earnings surprises, and, more strongly, to earn negative average abnormal returns in the three quarters subsequent to extreme negative earnings surprises, where an earnings surprise is calculated as the difference between the current quarter's earnings-per-share and split-adjusted earnings-per-share four quarters prior.

Bernard and Thomas (1990) suggest that PEAD is due to investors naively forecasting earnings.[1] Furthermore, recent studies suggest that PEAD may result from the trading activity of individual investors. These studies are motivated by a literature that argues that individual investors are less sophisticated than institutional investors, and that the trading of individual investors is the sources of market inefficiencies (e.g., Hand 1990; Lee et al. 1991; Grinblatt and Keloharju 2000).[2] One such study, Bartov et al. (2000), finds that PEAD is strongest in firms with low institutional shareholdings.[3] Furthermore, Bhattacharya (2001) provides evidence that the volume of small trades but not large trades is associated with the magnitude of random walk

[1] Papers that examine the serial correlation of earnings and returns in greater detail have concluded that this evidence is consistent with less naiveté than is suggested by Bernard and Thomas (1990) (Ball and Bartov 1996) or with no naiveté (Soffer and Lys 1999; Jacob et al. 2000) about the time series of earnings. Our purpose here is not to estimate investor perceptions about the time-series process for earnings. Rather, we examine whether the trading pattern of individual investors is consistent with predicted behavior under the hypothesis that trading by individual investors drives PEAD

[2] Although evidence suggests that individual investors make poor investment decisions on average (Barber and Odean 2000), there is also evidence that some individuals possess superior investment skills (Coval et al. 2003).

[3] However, results from tests of whether the level of institutional shareholdings is a good proxy for investor sophistication are mixed. Because of this, the authors indicate that their results do not provide strong evidence about whether individual investors cause PEAD.

earnings surprises, suggesting that investors who make small trades may underlie the PEAD phenomenon.

In this paper, we offer more direct tests of the hypothesis that individual investors cause PEAD by examining individual investor trading following earnings announcements. Using a database that includes all trades made by a sample of individual investors through a major discount brokerage firm from 1991 through 1996 inclusive, we examine whether individuals as a group, or relevant sub-categories, tend to make contrarian trades in opposition to the direction of earnings surprises. To the extent that individual trades can impede a full price response, their trading would intensify PEAD. In addition, we examine whether individual trading with respect to earnings announcements can subsume some of the explanatory power of earnings in predicting subsequent abnormal returns.

Past empirical work on trading in response to earnings announcements shows that earnings announcements stimulate trading volume.[4] In general, public news announcements can generate trading volume both by resolving uncertainty, thereby creating consensus and triggering 'unwinding' trades, and by providing information which generates disagreement and results in the taking of speculative positions. Investors who have differing information prior to a news announcement or who have different information-processing abilities may interpret earnings news differently, and may therefore trade differently in response (Karpoff 1986; Demski and Feltham 1994; Kim and Verrecchia 1994, 1997).

Most past empirical studies have focused on unsigned volume, and any identification of traders is inferred from the size of the trade. However, in order to examine whether trading by

[4] Several studies show that the effect of accounting disclosure on volume is related to the size of the earnings surprise (e.g., Bamber 1986, 1987; Ziebart 1990; Kross et al. 1994), to firm size (e.g., Bamber 1986; Ziebart 1990; Atiase and Bamber 1994; Bhattacharya 2001), and to the degree of information asymmetry prior to the information release (e.g., Ziebart 1990; Ajinkya et al. 1991; Atiase and Bamber 1994; Utama and Cready 1997).

individual investors causes PEAD, it is useful to determine whether they are trading in the same direction as the earnings surprise (net buying after good news and net selling after bad news) or in opposition to it. Our database allows us to make this determination.

In a related paper, Lee (1992) examines the inferred-signed trades of investors in relation to earnings news. Measuring the sign of the earnings surprise relative to the most recent Value Line earnings forecast, he finds that small trades tend to be inferred-buys for more than two days after both favorable and unfavorable earnings surprises. Lee assumes that it is individual investors who are making these small trades and he suggests that his findings are consistent with earnings announcements drawing the attention of individual investors to the stock. Our study differs from Lee's in that we examine only extreme earnings surprises (which are the source of the drift), directly identify individual traders rather than use the size of the trade as a proxy for whether the trader is an individual or an institution, and directly identify the direction of the trade (i.e., whether the trade is a buy or sell) rather than use the price relative to the bid-ask spread as a proxy for whether the trade was initiated by a buyer or seller.

We build on previous literature by examining more specifically the buying and selling behavior of individual investors around extreme earnings surprises. We thereby provide a focused examination of whether the trades made by individual investors explain PEAD. Furthermore, we apply two proxies for individual investor sophistication (capital invested and trading experience) to determine whether the least sophisticated investors (those with relatively little capital invested with the discount broker and/or those with relatively little trading experience) drive PEAD.

If drift reflects market misvaluation, then more sophisticated investors should buy before upward drift (to obtain high returns), and sell before downward drift (to avoid low returns). Thus, sophisticated investors should buy after positive earnings surprises and sell after negative earnings surprises. In order for markets to clear, naïve investors must be taking the opposite side of these transactions, buying after unfavorable earnings surprises and selling after favorable earnings surprises. In other words, the rational optimism (pessimism) and buying (selling) pressure of sophisticated investors after favorable (adverse) earnings news is met by irrational pessimism (optimism) and selling (buying) pressure on the part of naïve investors.

Trading patterns such as these can be a source of market underreaction to earnings news. In this scenario, the increased supply of shares offered by naïve individuals after favorable earnings news will, in equilibrium, tend to moderate the resulting price increase, resulting in prices that are inefficiently low.[5] Prices will on average tend to be corrected upward over the ensuing months, causing positive PEAD. Similarly, in this scenario, the increased demand for shares by naïve investors after unfavorable earnings news will, in equilibrium, tend to moderate the resulting price decline, causing negative PEAD. A more detailed discussion of this hypothesis is provided in section II.

This reasoning suggests a simple set of tests of whether individual investors cause post-earnings announcement drift. If individual investors are naïve with respect to earnings suprises, we expect to see significant net buying after negative earnings surprises, and significant net selling after positive earnings surprises. In contrast, if individual investors are attempting to

[5]Barberis, Shleifer and Vishny (1998) and Daniel, Hirshleifer and Subrahmanyam (1998) provide models in which PEAD can arise as an underreaction to earnings. There is debate in the empirical literature about whether PEAD reflects a rational risk premium; a simple tendency for investors to underreact to earnings news; or a more complex intertemporal pattern of short-term underreaction and long-term overreaction to earnings (e.g., Lakonishok, Shleifer, and Vishny, 1994; Dechow and Sloan, 1997; Lee and Swaminathan, 2000; Daniel and Titman, 2001).

arbitrage away PEAD in a sophisticated fashion, we expect to see the opposite pattern. Furthermore, given the evidence that downside PEAD is much stronger than upside PEAD, the tendency of individuals to buy after negative surprises should be stronger than the tendency of individuals to sell after positive surprises.

Stronger tests involve the relation between individual trading and subsequent stock returns. The hypothesis that individuals drive PEAD predicts that individual net sells, which generate underpricing, should predict high subsequent stock returns, and individual net buys, which generate overpricing, should predict low subsequent returns. If individual trading is a source of the relation between earnings surprise and subsequent returns, then the predictive power of individual trades should remain even after controlling for the earnings surprise. Finally, individual trading after earnings surprises should subsume part or all of the ability of the earnings surprise to predict subsequent returns.

The literature on PEAD also provides evidence that a disproportionate amount of drift is concentrated around the three subsequent quarterly earnings announcements (Bernard and Thomas, 1989; 1990). If PEAD represents mispricing, then sophisticated investors can exploit this pattern. Specifically, when there is a positive earnings surprise, investors should buy shares a few days prior to each of the next three quarterly earnings announcements and partly unwind these positions in the days after these announcements. When there is a negative earnings surprise, they should do the reverse. Such sophisticated trading, if unopposed by the trades of naïve investors, would accelerate the adjustment of prices and eliminate the concentration of PEAD at the subsequent earnings announcement dates. For the concentration of drift to exist despite arbitrage by sophisticated investors, naïve investors must be trading in the opposite direction, impeding the rapid adjustment of prices. Thus, if individual investors are naïve, after a

favorable (unfavorable) earnings announcement they will sell (buy) just prior to each of the subsequent earnings announcements. We discuss the reasoning behind this prediction in more detail in section II.

Our results indicate that individual investors do *not* cause post earnings announcement drift. We bring three kinds of evidence to bear on this issue. First, we test whether individuals trade in a contrarian fashion in response to extreme earnings surprises. As discussed in section II, if individual trading caused PEAD, investors would be net purchasers after good news and net sellers after bad news. This would reduce the amount by which prices react to earnings news, resulting in underreaction. In fact, in our sample individuals are significant net purchasers after both good and bad news, and this conclusion holds in different investor categories that differ in sophistication.

Second, we test whether net purchases made by individual investors can subsume the ability of the extreme earnings surprise to predict subsequent abnormal stock returns. We examine the relation between ranked net purchases (RANK NET PURCHASES) immediately following extreme earnings surprises and subsequent abnormal stock market returns and find that, on average, the stocks that individuals net sell following extreme earnings announcements outperform the stock that individuals net purchase following extreme earnings announcements. Although this effect is potentially consistent with individual trades pushing share prices away from fundamental values, it is statistically unrelated to PEAD. In fact, we find that controlling for RANK NET PURCHASES does not diminish at all the ability of extreme earnings surprise to predict subsequent returns.

Third, we measure the extent to which, conditional on an earnings surprise at a given date, individual investors make abnormal trades in the days just prior to or after subsequent

quarterly earnings announcements. Our findings are not consistent with the trading pattern predicted by the hypothesis that individual investor trading causes the concentration of PEAD at the three subsequent earnings announcement dates.

Thus, our evidence opposes the proposition that individual investors cause PEAD. However, it is consistent with trading by individuals being influenced by an earnings attention effect.[6] That is, the greater the absolute value of the earnings surprise, the greater the volume bought and sold, but the direction of the news is unrelated to the direction of the trading.

The remainder of this paper is structured as follows. Section II explains how trading by individual investors could induce PEAD. Section III contains a description of the data and sample selection criteria, variable definitions, and descriptive statistics. Section IV provides evidence on individual investor trading in relation to earnings surprises. In Section V we examine the relation between individual trading, earnings surprises, and subsequent stock returns. Section VI examines individual trading, conditional on an earnings surprise, near the dates of subsequent quarterly earnings announcements. and Section VII concludes.

II. NAÏVE TRADING AND POST-EARNINGS ANNOUNCEMENT DRIFT

Several papers suggest that the trading behavior of individual investors may be the source of PEAD. Prior research consistently suggests that drift is associated with high individual shareholding and trading (e.g., Bartov et al. 2000, Bhattacharya 2001). However, if trading by individuals causes PEAD, then their trading must be naïve in a way that systematically causes prices to underreact to earnings news. Before discussing what trading behavior would cause PEAD, we review the PEAD phenomenon.

[6] For an analysis of the effects of media-reported general news announcements on investor trading, see Barber and Odean (2001).

PEAD is typically characterized as an underreaction to earnings news. Bernard and Thomas (1990) show that seasonal random walk quarterly earnings changes are positively serially correlated. That is, after a positive earnings surprise, subsequent earnings surprises tend to be predictably positive, while after a negative earnings surprise, subsequent earnings surprises tend to be predictably negative. Furthermore, stock returns around subsequent earnings announcements tend to be predictable. Specifically, while stock prices generally increase (decrease) after good (bad) news, they do not seem to increase (decrease) enough. In fact, they continue to rise (fall) following the subsequent three quarterly earnings announcements. Bernard and Thomas (1989) suggest that this happens because investors react naively to earnings announcements by failing to recognize the serial correlation in earnings surprises.

A group of investors that drives PEAD would trade in a way that opposes a full and rational stock price adjustment in response to earnings surprises. Thus, after favorable earnings news, when price rises, such individuals would, on average, sell the stock, while after bad news, such individuals would, on average, buy. In other words, such individuals would be contrarian with respect to current earnings news. This suggests a simple set of tests of whether individual investors cause post-earnings announcement drift – if individuals cause PEAD then they will tend to net buy after negative earnings surprises and net sell after positive earnings surprises.

Furthermore, if trading by individuals causes share prices to underreact to earnings news (which manifests as PEAD), then their net purchases must be related to subsequent abnormal stock returns. Therefore, the hypothesis that individuals drive PEAD predicts that individual net selling, which generates underpricing, should predict high subsequent stock returns, and individual net buying, which generates overpricing, should predict low subsequent stock returns. Moreover, if trading by individual investors is a source of the relation between extreme earnings

surprises and subsequent returns, then the predictive power of individual trades should remain even after controlling for the magnitude of the earnings surprise. Finally, individual trading after earnings surprises should subsume part or all of the ability of the earnings surprise to predict subsequent returns.

There is also evidence from past literature that stock return drift is disproportionately concentrated around the three subsequent quarterly earnings announcements (Bernard and Thomas, 1989; 1990). If PEAD represents a market inefficiency, this presents sophisticated investors with an opportunity to exploit this pattern using a dynamic trading strategy. For example, after a positive earnings surprise an investor can earn high returns by buying shares a few days prior to each of the next three quarterly earnings announcements, and partly unwinding these positions in the days after these announcements.

Such a strategy offers a favorable balance between risk and expected return. While risk that is related to earnings announcements is greater at the time of the earnings announcements, the expected return is also greater around subsequent earnings announcements. Concentrating trades near the time of earnings announcements reduces extraneous risk that is unrelated to these announcements. Note also that even investors who do not trade actively to exploit drift can, in the quarters after a favorable earnings surprise, benefit by advancing any planned purchase from a few days after to a few days before a subsequent earnings announcement, and by deferring any planned sale from a few days before to a few days after a subsequent earnings announcement.

When there is a negative earnings surprise, investors should do the reverse, selling just before subsequent earnings announcements. In either case, sophisticated trading tends to accelerate the adjustment of prices. If unopposed by the trades of naïve investors, such arbitrage would eliminate the concentration of PEAD at the subsequent earnings announcement dates. In

equilibrium, the concentration of drift can persist despite the trading of sophisticated investors, if naïve investors trade in the opposite direction, further delaying price adjustment. Thus, if individual investors are naïve, conditional on a favorable (unfavorable) earnings announcement they will sell (buy) just prior to each of the subsequent earnings announcements.

In this account, naïve traders delay price adjustment, but this is of course not the *purpose* of their trades. Rather, after a favorable earnings announcement naïve traders differ from sophisticated investors in their beliefs about fundamental value. Sophisticated investors believe that price is too low, and their purchases drive the price higher. Naïve traders, in contrast, believe that the price has moved up too much, and therefore tend to sell. (If they did not have such a belief, they would have no reason to sell, and there would be no underreaction at the original earnings announcement date.) Just as a sophisticated trader thinks he is getting a good deal buying a security right before a subsequent earnings announcement, a naïve trader thinks he is getting a good deal selling the security at that time.

It could be argued on prior conceptual grounds that drift could not represent a market inefficiency because if naïve trading were to induce such a pattern of mispricing, smart arbitrageurs would find it profitable to trade to exploit it. Such exploitation would tend to attenuate the pattern. However, a literature in behavioral finance and accounting has argued that despite arbitrage by sophisticated investors, the behavior of imperfectly rational investors can induce mispricing (including PEAD), and under some circumstances, mispricing can persist.[7] If naive investors are subject to common misperceptions, then in the aggregate, these misperceptions may be substantial enough to influence price. (Given such commonality, we would also expect to see evidence of such misperceptions within our sample of individual

[7]See, for example, the models and surveys of DeLong et al. (1991), Shleifer and Vishny (1997), Daniel et al. (1998), Fischer and Verrecchia (1999), Hirshleifer (2001), and Lee (2001).

investors if individual investors are driving PEAD.) Furthermore, if sophisticated investors are risk averse, the degree to which they arbitrage mispricing may be limited. As discussed earlier, there is also empirical evidence suggesting that the trading of unsophisticated individual investors influences prices.

Empirically, several authors have concluded that PEAD represents a market inefficiency (see, for example, Bernard and Thomas 1989, 1990). We do not take a stand on this issue. We merely argue that, given existing theory and evidence, the hypothesis that PEAD is a market inefficiency resulting from individual investor trading deserves to be tested.

III. TRANSACTION DATA, SAMPLE SELECTION, VARIABLE DEFINITIONS, AND DESCRIPTIVE STATISTICS

Transaction Data

The data used in this study comes from a large discount broker. It includes trades made by 78,000 households, using that broker. The broker made 3,075,797 trades on behalf of these households between January 1991 and December 1996 inclusive. 1,969,747 of these trades involve common stock, while the remainder involves mutual fund shares, bonds, and other securities. We classify the households as *actively-trading investors* (6,000 households), *high-capital investors* (12,000 households), and *general investors* (60,000 households).[8] Any investor that conducts more than 48 trades in a year is classified as actively-trading; investors that are not classified as actively-trading and that have more than $100,000 of invested wealth at any time are classified as high-capital investors; and all remaining investors are classified as general investors.

[8] We follow the broker's classification scheme when grouping investors. However, the broker refers to the high-capital investors as affluent. We change this label so that it more accurately reflects the criterion.

The high-capital and actively-trading investor classifications measure two aspects of investing experience – the amount of wealth invested and the frequency of trades. We use these two aspects of investing experience to proxy for investor sophistication. With respect to the amount of wealth invested, an investor who has a greater amount of wealth invested and who intends to trade frequently in the stock market has a greater incentive to invest resources learning about stock trading.[9] Furthermore, greater invested wealth may be associated with past stock market success. With respect to the frequency of trades, investors may learn through experience about the time series property of earnings and about market price patterns. This suggests that more sophisticated individual investors may be better at avoiding errors in trading in response to earnings announcements, or may even be good at exploiting PEAD.

Sample Selection And Variable Definitions

Our sample consists of all firm-quarters with sufficient Compustat data with at least one trade made during the following 13 months by our sample of investors.[10] From Compustat, we require primary earnings per share before extraordinary items (quarterly data item 19) at both quarter t and quarter t-4, price per share at the end of quarter t (quarterly data item 14), and the corresponding split adjustment factors (quarterly data item 17). Additionally, we require an earnings announcement date and the number of shares outstanding at the end of the quarter (quarterly data item 61). Using the Compustat data, we construct the standardized unexpected

[9] Consistent with this, Cready (1988) finds evidence consistent with wealthy institutional investors trade more quickly in response to earnings announcements, suggesting that the value of information increases with wealth.

[10] This sample selection criteria is much less strict than that used by Lee (1992) or Bhattacharya (2001). In these studies, firms must have an average of at least 10 trades per day over the prior year to be included in the sample. Because our data represents only a small subset of the total number of trades, imposing this criterion would reduce the sample size by more than 95 percent. However, imposing this criterion (an average of at least 10 shares traded per day) does not materially affect the main results of our study.

earnings (SUE) as the seasonal difference in split-adjusted earnings per share scaled by the split-adjusted end of quarter price (i.e., the price at the end of the quarter prior to the earnings announcement). We define SUE 1 firms as the 10 percent of firms with the most negative random walk earnings surprise, SUE 10 firms as the 10 percent of firms with the most positive random walk earnings surprise, and SUE 5 and 6 firms as the 20 percent of firms with the smallest (in absolute value) random walk earnings surprise.

For each firm-quarter, we identify all trades of the firm's common stock made by our sample of investors during the following quarter. We measure the trading activity over various event windows, ranging in length from one day to a whole quarter. For example, we measure the trading activity on the earnings announcement day for quarter q, for firm j, by summing the number of common shares of firm j traded by any investor in the dataset on the earnings announcement day. We scale this sum by the number of common shares outstanding for firm j at the end of quarter q. We repeat this procedure for subsamples of trades (i.e., for buys and sells) and for subsamples of investors (i.e., for high-capital investors, actively-trading investors, and general investors). We measure net purchases as the difference between the number of shares purchased and the number of shares sold in the event window, scaled by millions of shares outstanding at quarter-end.[11]

A challenge for calculating abnormal trading activity is that the *normal* trading benchmark for individual firms is difficult to identify because, as we discuss later, earnings surprises seem to affect the frequency of trading over long periods. Therefore, we compare how individual investors trade the shares of firms with extreme earnings surprises with how they trade

[11] When the number of shares purchased exceeds the number of shares sold in the event window, net purchases is positive. When the number of shares sold exceeds the number of shares purchased in the event window, net purchases is negative.

the shares of firms with little or no earnings surprise. That is, we consider individual trades in the shares of firms in SUE 5 and 6 as the benchmark, and test how the trades of shares of firms in SUE 1 and of firms in SUE 10 differ from this benchmark.

Since prior literature has found PEAD to be stronger in small firms (Foster et al. 1984; Bernard and Thomas 1989, 1990), we also partition the firms based on their market value of equity at quarter end. Using alternative size measures, we verify that these findings hold when only small firms are considered.

Descriptive Statistics

Our final sample consists of 941,210 trades made in the 13 months following 65,703 earnings announcements. 54 percent of these trades are buys, with a mean number of shares purchased of 512, and 46 percent of these trades are sells, with a mean number of shares sold of 594.[12] Although 76.9 percent of the investors are classified as general investors, these investors make only 40 percent of the trades, and the 15.4 percent of the sample that is classified as high-capital investors make only 11.4 percent of the trades. The remaining 48.6 percent of the trades are made by the 7.7 percent of the sample that is classified as actively-trading investors.

Further descriptive statistics are provided in Table 1. Panel A of Table 1 describes the distribution of trade size of both buys and sells by year. It is interesting to note the large number of large trades in the database. For example, the trade size is greater than $5,000 for approximately half of the trades and at least 500 shares are traded in more than 25 percent of the trades. Since prior studies use either the number of shares traded or the dollar value of the transaction to classify trades as being initiated by individuals or institutions, prior studies would

[12] Table 1 descriptive statistics differ slightly from these because the Table 1 sample includes all trades of common stock and the Table 1 sample is not restricted to trades of firms with available Compustat data.

classify these large trades as either institutional trades or as indeterminate. The wide variation in the frequency of trading among individuals is also of interest. Panel B shows that while the median individual trades 4 times per year for a total of approximately $21,000, the median actively-trading investor trades 22 times a year for approximately $158,000. It is also interesting to note how highly skewed the trading volume (measured in dollar value and number of trades) is. For example, the mean trading volume, measured in dollars per year, is greater than the third quintile indicating that there are a few very large trades. Finally, actively-trading investors trade, on average, 6 times as often and 10 times as much (in dollar value) as general investors, and more than 4 times as often and more than 5 times as much (in dollar value) as high-capital investors. Because the actively-trading investors are indeed highly active, it is plausible that these investors may be disproportionately important in generating the empirically observed price patterns. On the other hand, these traders may be more sophisticated than other individual investors, suggesting that they are not the source of PEAD.

Put Table 1 about here.

IV. INDIVIDUAL INVESTOR TRADING FOLLOWING EXTREME EARNINGS SURPRISES

In this section, we discuss the trades made by individual investors following extreme earnings surprises. Furthermore, we describe the trading behavior of the three investor groups: General Investors, High-Capital Investors, and Actively-Trading Investors.

Trading by Individual Investors Following Extreme Earnings Surprises

The hypothesis that individuals cause post-earnings announcement drift suggests that individuals will buy after extremely bad earnings news (pushing the stock price up) and sell after

extremely good earnings news (pushing the stock price down). As described previously, in the first set of tests, we examine the trades made by individual investors following extreme earnings surprises (SUE 1 firms and SUE 10 firms) and compare these to the trades made by individual investors following earnings announcements with little or no surprise (SUE 5 and 6).

Figure 1 reveals that in the 25 trading days following an extreme earnings announcement, cumulative abnormal net purchases made by individual investors are greater on average for SUE 1 (bad news) firms than for SUE 10 (good news) firms.[13] However, two aspects of this evidence sharply contradict the proposition that individual investors cause PEAD. First, individuals are net purchasers after both good news and bad news. This confirms the finding in Lee (1992) for extreme earnings news, and confirms directly that this effect is due to individual investors. This net buying by individuals in SUE 10 firms during the 16 days following an extreme earnings surprise is inconsistent with the hypothesis that individual investor trade against favorable earnings news, causing underreaction and subsequent drift. Second, the difference in cumulative net purchases between good news and bad news firms does not develop until 17 days (i.e., more than three weeks) after the earnings announcement so differences in individual trading cannot explain any under- or overreaction in the days following the earnings announcement.

Put Figure 1 about here.

Table 2 provides numerical statistics that confirm the pattern in Figure 1. Panel A (B), reports differences in mean number of shares traded (buys, sells, and net purchases) per million shares outstanding between extreme good news (bad news) firms and no news firms. In the first 15 days following an extreme earnings surprise, there is statistically significant buying and

[13] Cumulative net purchases is the sum of shares purchased minus the sum of shares sold beginning on the day following the earnings announcement and ending on day t, scaled by the number of shares outstanding at the end of the quarter for which earnings is announced. Cumulative abnormal net purchases is the difference between cumulative net purchases for SUE 1 (SUE 10) firms and cumulative net purchases for SUE 5 and SUE 6 firms.

selling for both good and bad news firms (relative to no news firms). Note that the significant net purchases following good news contradict the hypothesis that individuals are causing PEAD.

In fact, the only aspect of the evidence suggesting that individuals may contribute to drift is that net purchases are larger, more significant, and more persistent following bad news. Indeed, following good news, there is insignificant net selling beginning 16 trading days (i.e., more than three weeks) after the earnings announcement. However, the difference between the net purchases following good vs. bad news is not significant in the first three weeks of trading following an earnings announcement.[14] Overall, this evidence suggests that individuals are influenced by an earnings attention effect, but there is no indication that individuals systematically engage in the earnings-contrarian form of trading that would induce underreaction and so cause PEAD.

Trading by Individual Investors Following Extreme Earnings Surprises in Small Firms

Prior literature finds that PEAD is more prevalent in small firms (Foster et al. 1984; Bernard and Thomas 1989, 1990). Since individual investors tend to be disproportionate holders of the shares of small firms, several authors have suggested that smaller firms are more likely to have a less sophisticated shareholder base (Lee et al. 1991; Potter 1992; Walther 1997). To test whether individuals investing in small firms are causing PEAD, we examine how investors trade following extreme earnings surprises at small firms. Table 3 replicates the analysis from table 2 for firms with market value of equity less than the median in the sample. That is, we classify

[14] In an efficient market, prices react immediately so if individual investors were driving underreaction, they would need to trade in opposition to the earnings surprise from the first days after the announcement.

firms as small or large based on their market value of equity (MVE) at the end of the fiscal quarter and define firms with MVE less than the median as small firms.[15]

Put Table 3 about here.

Since investors in the dataset tend to invest in large firms, the sample size is reduced by approximately two-thirds. The statistical power is therefore reduced but the results of this analysis are largely consistent with those using the entire sample. Although individuals sell more shares following good news than in the benchmark case of no-news, they also sell more shares following good news. Resulting net purchases (buys – sells) is not significantly different for good news vs. no news firms. Furthermore, the signs on net purchases are consistent that using the full sample (i.e., they support an attention effect) but net purchases is not significantly different from zero in three of four windows. Thus, even in small firms, where PEAD is strongest, there is no evidence that individuals cause PEAD.

Trading by Individual Investor Class

Even if individual investors as an aggregate do not drive drift, there could be important trading effects concentrated in particular classes of investors. The activities of naïve individual investors could be masked in the aggregate by arbitrage on the part of more sophisticated individual investors trading to profit from PEAD. We therefore examine specifically those investor classes that are most likely to be either less or more sophisticated. As discussed previously, there is reason to believe that investors with more capital invested and more experienced traders may be more sophisticated in their processing of information. Therefore, we

[15] We also replicate this analysis using the bottom decile of MVE as our measure of small firms and find essentially identical results. However, the sample size is reduced to approximately 900 firms and the statistical power is significantly reduced.

expect high-capital investors and actively-trading investors to be more sophisticated, on average, than general investors. We test whether the least sophisticated individuals – general investors – drive PEAD and whether high-capital investors and actively-trading investors trade in a way that masks the effect in aggregate. Panel A (Panel B) of table 4 tests whether net purchases are significantly different for extreme good news (bad news) and non-news earnings announcements for the three classes of investors (high-capital investors, actively-trading investors, and general investors).

Put Table 4 about here.

Contrary to our expectations, we find no evidence that the general investors drive PEAD. Trading by general investors does, however, support the earnings attention effect in that these investors are net purchasers after *both* good and bad earning news. Furthermore, we find no evidence that more experienced or high capital individual investors exploit PEAD. While high-capital investors are net sellers following good news (an earnings-contrarian behavior), these results are insignificant. Finally, trading by actively-trading investors strongly supports an earning attention effect, but these investors do not appear either to cause or to take advantage of PEAD.

As a further test, in results not reported here we partition investors into three classes based on the gender and marital status of the head of the household.[16] The first class, female, consists of all households in which a female is reported as the head of the household, regardless of marital status.[17] The second and third classes, married male and single male respectively, are

[16] The partitioning variables used in this section are self-reported by the individual investors. A large number of accounts in the database have no information about gender and / or marital status. These accounts are omitted for this portion of the analysis.

[17] The small number of female head of households precludes a further partition into married and unmarried.

composed of accounts that report married and single male head of households respectively. In brief, there is no clear indication that any of the classes are systematically driving PEAD at subsequent earnings announcements.

In summary, the evidence on individual investor trading does not support the hypothesis that individuals or any class thereof are trading in a manner that would cause PEAD.

V. INDIVIDUAL INVESTOR TRADING AS A PREDICTOR OF POST-EARNINGS ANNOUNCEMENT DRIFT

As discussed in section II, if trading by individual investors causes PEAD, then their net trading should negatively predict subsequent stock market returns. Furthermore, net trading by individuals should subsume part or all of the explanatory power of the earnings surprise for predicting subsequent abnormal stock returns. In this section, we examine the relation between individual investor trading and subsequent market-adjusted returns for the sample of investors as a whole and for the individual investor classes described previously.

Trading by Individual Investors and Subsequent Returns

Previous studies (e.g., Bernard and Thomas 1989; 1990) find that PEAD is strongest among firms with relatively extreme earnings surprises. This suggests that we may be able to increase the power of our tests by focusing on firms with relatively extreme earnings surprises. This filters out the noise from firms with modest SUEs and little PEAD. On the other hand, when we restrict the sample to those firms with the most extreme SUEs (e.g., to those firms in deciles 1 and 10), most of the data is excluded. As a compromise, we restrict the sample for the

subsequent analyses to those 11,480 firms in SUE deciles 1 to 3 or 8 to 10 [18] and to those firms with non-zero net buys in the 5 days following the earnings announcement.[19]

Table 5 reports the results of regressions of returns (measured over the 9 and 6 months subsequent to the earnings announcement) on SUE (the decile rank of the earnings surprise) both with and without controlling for past momentum. To control for market-to-book and size, we add the decile rank of the firm's market-to-book ratio (MTB) and the decile rank of the firm's market value of equity (MVE) as regressors. We measure momentum as the market-adjusted buy and hold returns over the 6 months prior to the earnings announcement date.

The coefficients on SUE are strongly significant. This confirms that after controlling for size, market-to-book, and past momentum, the PEAD effect was strong during the time period. Thus, this time period is appropriate for testing whether individual investor trading drives PEAD.

We next examine the effect of including the decile rank for net buying of the firm (RANK NET PURCHASES) in the regression. Specifically, RANK NET PURCHASES is the decile rank based on the number of shares purchased minus the number of shares sold from day +1 to day +5 relative to the earnings announcement date, scaled by the number of shares outstanding at the end of the fiscal quarter for which earnings is announced. Table 5 reveals that individual investor trading in the five days following extreme earnings announcements (RANK NET PURCHASES) is a significant negative predictor of future 6-month and 9-month stock returns, and that this effect is independent of the size and market-to-book effects.

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[18] When we run our analyses on firms in deciles 1 and 10 of SUE, the coefficients have the same sign but are insignificant because the small sample size reduces the power of our tests. Using SUE deciles 1 to 2 and 9 to 10 or including firms in all SUE deciles provides results similar to those reported.

[19] Including those firms with zero net-buys provides almost identical results.

The talent that individual investors show for picking losers in their post-earnings announcement trades certainly raises a suspicion that they may be the source of PEAD. However, Table 5 shows that the PEAD effect is *not* subsumed by individual investor trading. The coefficient on SUE remains highly significant ($p<.0001$) after RANK NET PURCHASES is included in the regression.

One could argue that only a subset of individual investors drive PEAD; if so, including investors outside of this subset adds noise to our analyses. In this case, we may not expect RANK NET PURCHASES to subsume SUE completely. However, including RANK NET PURCHASES in the regression does not detract *at all* from the magnitude and significance of the SUE effect. This evidence strongly contradicts the hypothesis that trading by individual investors as a group is a source of the PEAD effect.

Even after controlling for SUE, RANK NET PURCHASES remains statistically significant. Indeed, the coefficients on RANK NET PURCHASES from regressions that include SUE are larger and more significant than those from regressions (not reported) that do not include SUE. Thus, individual investors have a special "skill" at picking losers, conditional on an extreme earnings surprise.[20]

In summary, these analyses reveal that individual investors trade foolishly in response to extreme earnings surprises in the sense that their trades in the 5 days following these surprises are negative predictors of returns over the next 6 to 9 months. This anti-arbitrage by individual investors suggests that they may be the driving force behind some kind of market inefficiency, perhaps losing money when the market misvaluation is corrected. However, this individual trading effect appears to be unrelated to PEAD. There is no indication from the returns evidence

[20] This is consistent with evidence, not conditioned on earnings surprises, that individual investor trades on average underperform (Odean 1999; Barber and Odean 2000).

that individual investors drive PEAD. Nor is there any indication that PEAD underlies this individual investor trading effect.

Trading by Classes of Individual Investors and Future Returns

The results in the previous section rule out the hypothesis that the trades of the individuals in our sample *as a group* are the source of drift. However, it remains possible that some unsophisticated class of individual investors drives PEAD, and that this is being masked by sophisticated trades in the opposite direction made by another subset of individual investors. Thus, to explore further whether a class of individuals drives PEAD, we report similar returns regressions for each of the investor classes in table 6. Analyses by class reduces the sample size, so statistical significance is generally lower. However, all regressors other than RANK NET PURCHASES remain significant in the 9-month return window, and while the coefficients on RANK NET PURCHASES are insignificant for the affluent class, they remain negative.

The significance and magnitude of the coefficients on RANK NET PURCHASES increase from high-capital investors to general investors to actively-trading investors. This suggests that high-capital investors are less 'skilled' at picking losers following extreme earnings surprises, that ranked net purchases made by general investors following extreme earnings surprises are stronger predictors of negative future returns, and that this effect is strongest for actively-trading investors. The key finding, however, is that for all classes of individual investors, adding RANK NET PURCHASES to the regression has virtually no effect on the coefficient or significance of SUE. That is, SUE remains strongly significantly positive in all specifications, and SUE is not subsumed by the trading of high-capital investors, actively-trading

investors, or general investors. This evidence strongly opposes the hypothesis that trading by any of these investor classes drives PEAD.

VI. TRADING IN SHORT WINDOWS AROUND SUBSEQUENT EARNINGS ANNOUNCEMENTS

The hypothesis that individual investors are the source of PEAD predicts that individual investors are net sellers after initial favorable earnings surprises, and more strongly are net purchasers after initial unfavorable earnings surprises. As discussed in Section II, if the drift represents genuine mispricing, then sophisticated investors, who understand that drift is particularly intense near the dates of subsequent earnings announcements, should also time their trades with respect to the *subsequent* announcements. Specifically, after a favorable earnings surprise, they should avoid selling immediately before quarterly earnings announcements in quarters +1, +2, and +3 after the initial earnings announcement and instead delay selling to after each announcement. Furthermore, sophisticated investors should also accelerate any planned purchases so that they are made immediately before quarterly earnings announcements in quarters +1, +2, and +3, rather than waiting until after. If sophisticated arbitrageurs follow this strategy, then for markets to clear, the unsophisticated investors who are driving the mispricing must display an opposite trading pattern. Thus, to explore further whether individual investors are driving PEAD, we also examine investor trades in the days surrounding subsequent earnings announcements conditional on an initial earnings surprise. Examining these trades can also provide insights into psychological biases, such as attention and disposition effects.

All Investors

Table 7 addresses this issue. The column labeled Qtr 0 reports trading behavior following the initial earnings announcement. Panel A (B) reports slope coefficients and t-statistics from separate regressions of buys, sells, and net purchases on an indicator variable set equal to 1 for SUE 10 (SUE 1) firms and to 0 for firms in SUE 5 and SUE 6 (i.e, for those with little or no earnings surprise). In the 25-day window subsequent to the earnings surprise, there is significant buying and selling after both good and bad news (relative to the medium news category). Furthermore, net purchases are generally significantly different from zero after both good and bad news, and net buying is larger, more significant, and more persistent after bad news.[21]

Put Table 7 about here.

The later columns of Table 7 describe the trading around earnings announcements made in the four quarters subsequent to the initial earnings announcement (i.e., in quarters Qtr +1, Qtr +2, Qtr +3, and Qtr +4). Panel A shows that after a favorable earnings surprise, the number of shares both purchased and sold are unusually high and strongly significant in the 10 days preceding and the 25 days following later quarterly earnings announcements, and Panel B shows that a similar pattern obtains after unfavorable surprises. Thus, extreme earnings surprises trigger trading activity not only near the time of the announcement, but in the days surrounding later quarterly earnings announcements. This is consistent with rational trading based upon information, or with an attention effect over a long horizon.

[21] There is significant net buying following bad news in each of the windows [+1, +5], [+6, +15], and [+16, +25]. On the other hand, following good news, there is strongly significant net buying only in window [+6, +15], weakly significant net buying in window [+1, +5], and weakly significant net selling in window [+16, +25]. The early net buying is inconsistent with the hypothesis that individuals drive PEAD.

Turning to net purchases, conditional on good earnings news, net buying is significantly positive in the window [-1, -10] prior to the next three quarterly earnings announcements (i.e., Qtrs +1 to +3). This is not consistent with the hypothesis that individuals are naively driving the concentration of upside drift at later earnings announcement dates. Rather, this evidence is consistent with individual investors being sophisticated enough to accelerate buying to right before rather than right after the earnings announcement. However, we also find evidence (not reported in the table) of high net buying (t = 2.05) by individuals in the two days immediately following the next quarterly earnings announcement (Qtr +1), which is not supportive of this kind of sophistication.[22] In summary, this evidence does not give any clear indication that individuals are systematically trading in a way that would cause a concentration of drift on later quarterly earnings announcement dates. Nor does the evidence support the opposite hypothesis, that individual investors profit by systematically trading in a sophisticated fashion (i.e., by exploiting the drift at later earnings announcement dates).

Panel B of table 7 is especially relevant for our main hypothesis since drift is stronger after bad news. This panel reveals significant net buying in the 5 days subsequent to the earnings announcement in Qtr +1 following bad news, and some indication of further buying in days [+6, +15] and [+16, +25]. This suggests sophisticated behavior because by delaying net purchases to a few days after the announcement, individuals are able to avoid the concentration of downward drift on the Qtr +1 earnings announcement date.

There is no sign of such sophisticated behavior with respect to Qtr +2, but some possible indication with respect to Qtr +3 (with insignificant net selling prior to the announcement, and

[22] While the hypothesis that individuals drive PEAD makes no prediction for Qtr +4 (since there is little drift in the fourth quarter), our analysis reveals that, conditional on an unfavorable earnings surprise, there is significant net selling (t = -2.64) in the window [-1, -10] prior to the earnings announcement a year later (Qtr +4).

significant buying in the window [+16, +25]). These results provide no support for the hypothesis that individual trading drives the concentration of downside drift after bad news at the subsequent three earnings announcement dates. In fact, these results provide limited support for the alternative hypothesis that individuals are sophisticated exploiters of downside PEAD. However, there is also significant net selling in the 10 days prior to the Qtr +4 earnings announcement, and significant net buying in days [+6, +15], a pattern somewhat similar to that in Qtr +3. Since drift has virtually dissipated by Qtr +4, this disagrees with the interpretation that such trading patterns are intended to exploit drift.[23]

Taking the evidence as a whole (conditioned on either good or bad news), there is no indication that individuals are systematically engaging in a form of trading that would be expected if individual investor errors were the source of the concentration of drift at later quarterly earnings announcement dates. If anything, there is a rather modest indication that individuals are acting as sophisticated arbitrageurs to exploit PEAD.

The evidence after bad news is, however, broadly suggestive of some psychological stories. After initial bad news about earnings, individuals are net buyers, which could reflect an attention effect coupled with a disposition effect; or a bias in self-attribution (an insistence on interpreting new information as supportive of the self and past judgments (see, e.g., Langer and Roth 1975)). Further purchases after earnings announcements in subsequent quarters could reflect similar biases.

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[23] The evidence from other windows hints at a broader regularity of selling in the days prior to subsequent earnings announcements and buying in the days after these announcements. In Qtr t+1, there is significant net buying in window [+1, +5] and insignificant buying in windows [+6, +15] and [+16, +25]. In Qtr +2, there is insignificant selling in window [-1, -10], though no suggestion of significant buying subsequent to the announcement. In Qtr +3, there is insignificant selling in window [-1, -10] and significant buying in window [+6, +15]. Furthermore, in Qtr +4, there is significant selling in window [-1, -10] and significant buying in window [+6, +15]. Finally, there is significant selling during all subsequent quarters in window [-1, -2].

Investor classes based on affluence and trading frequency

We next consider whether trading effects are concentrated in the classes of investors for which we might expect naïve trading to be most likely to occur. More affluent investors and/or more active traders are more likely to be experienced in stock market trading. It is therefore possible that they are more sophisticated in their trading. This suggests that they may be better at avoiding errors in trading in response to earnings announcements, or may even be good at exploiting drift.

Panel A (Panel B) of table 8 tests whether net purchases are significantly different for extreme good news (bad news) and non-news earnings announcements for three different classes of investors (affluent investors, active traders, and general investors). The table also examines the reaction to subsequent earnings announcements for each of these investor classes.[24]

Put Table 8 about here.

For affluent investors, favorable earnings news is associated with a general tendency toward net selling after subsequent quarterly earnings announcements. Furthermore, affluent investors are generally net buyers before subsequent earnings announcements but again, these results are frequently not significant. While this pattern is consistent with sophisticated exploitation of the concentration of drift at subsequent earnings announcements, this buying and selling is frequently not significant. Furthermore, there is significant net buying prior to the earnings announcement in Qtr +4, even though there is no positive drift on average associated with the fourth quarterly earnings announcement after the initial surprise. Finally, the (uniform

[24] Dividing our sample into classes reduces the power of these tests.

but insignificant) net selling after the initial earnings surprise by affluent investors does not exploit drift.

For the general class of individuals (i.e., individuals who are not affluent and are not active traders), few results are significant. However (not reported in the table) we find that in Qtr +4 after the initial surprise, there is marginally significant net selling both on the date of the one-year-later earnings announcement, and on the two days after. While we do not wish to overemphasize what could be randomly significant coefficients, it is worth noting that a similar but more significant one-year-later net selling effect exists for the active traders.

The most interesting effects are found for active traders. Active traders are significant net buyers in the first 15 days after the initial positive earnings surprise and are insignificant net buyers in the majority of windows in the remaining quarters.[25] Such buying after subsequent earnings announcements is ill-suited for exploiting the drift concentrated at these announcements. However, the significant buying in the 10 days prior to earnings announcements in Qtr +1 to +3 is consistent with sophisticated trading. Thus, the pattern of trading by active traders does not seem to be either closely aligned with, or unambiguously opposed to exploiting the drift. Rather, Qtrs +2 and +3 seem to reveal an overall tendency toward net purchases in the days preceding and following these earnings announcements. This is consistent with an attention effect.

In summary, the evidence on investor trading does not clearly indicate that any of the classes are systematically trading so as to generate the concentration of the drift at subsequent earnings announcement dates. Thus, the evidence does not lend support to the hypothesis that individual investors drive PEAD.

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[25] Although not significant in any of the windows presented, the effect is significant over the entire [+1, +25] day window in the second quarter.

In addition, there is no clear indication that any investor class is systematically exploiting the concentration of the drift at subsequent earnings announcement dates. Thus, there is also no clear support for the opposite hypothesis that individual investors are trading in ways that arbitrage away the drift. The evidence does, however, support the existence of attention effects.

Panel B of table 8 describes the net purchases by investor class at an initial bad news earnings announcement and at earnings announcements following the initial bad news. In the 25 days immediately following bad earnings news, the volume of cumulative net purchases is positive and growing for all classes, but the volume of net purchases after day +5 is relatively modest for affluent traders. This evidence, taken in isolation, suggests that affluent individuals may be more sophisticated and therefore less prone to buying heavily into a negative expected drift. However, after good earnings news, affluent investors are the only class who are net sellers (i.e., after good news, affluent investors trade against the drift) which does not seem sophisticated.

In summary, the evidence subsequent to bad news announcements does not support the hypothesis that any of these individual investor classes drive the concentration of PEAD at later earnings announcement dates. Nor does it support the hypothesis that any of these individual investor classes are systematically trading to exploit the concentration of drift.

As a further test (not reported here), we have partitioned investors into three classes based on the gender and marital status of the head of the household (as described briefly in Section IV). In brief, there is no indication that any of the classes are driving the concentration of PEAD at subsequent earnings announcements.

VII. CONCLUSION

This paper examines whether trading by individual investors drives post-earnings announcement drift, and describes how individual investors trade conditional on extreme earnings surprises. At a broad level, several regularities are of interest. First, the ability of individual trades to predict future returns (Odean 1999) extends to trades taken in response to extreme earnings surprises, and this effect is not subsumed by PEAD. Second, the evidence is consistent with an earnings attention effect: extreme earnings surprises trigger greater trading and greater net buying. Third, abnormal trading is stronger for negative earnings surprises than for positive earnings surprises. Fourth, in the first 17 trading days after an extreme earnings surprise, net buying is fairly similar regardless of whether the surprise is good news or bad news, but starting on day +18, net buying after bad news significantly exceeds net buying after good news.

Turning to the main question of the paper, we find no evidence in our sample that trading by individual investors following extreme earnings surprises causes post-earnings announcement drift. Such trading would need to restrain the efficient adjustment of market prices to earnings surprises. In other words, if individuals were causing PEAD, they would engage in earnings-contrarian trading, buying aggressively after adverse earnings news and selling after favorable news. However, individuals are strongly significant net buyers in first three weeks following both favorable and unfavorable earnings surprises. Furthermore, while we find that net buying by individual investors in the five days following an extreme earnings surprise is a significant negative predictor of future abnormal returns, these returns are unrelated to PEAD.

Our tests provide clear evidence that in our dataset individual investors are *not* the source of PEAD. If trading by individuals were the source of PEAD, then net purchases made by

individual investors following an initial earnings announcement would be able to subsume part or all of the ability of the earnings surprise to predict subsequent abnormal returns. However, this is not the case. Although individual trades are a significant predictor of future stock returns, including ranked net purchases in a regression of SUE on abnormal returns does not weaken the predictive power of the earnings surprise at all. Nor does including the earnings surprise weaken the predictive power of individual trades. Thus, two distinct market inefficiencies seem to exist. The first is PEAD. The second is that, the ranked net purchases made by individual investors in reaction to extreme earnings surprise are negative predictors of future abnormal returns. Finally, analysis by investor class suggests that high-capital investors are less 'skilled' at picking losers following unusual extreme earnings surprises, that ranked net purchases made by general investors following unusual extreme earnings surprises are stronger predictors of negative future returns, and that this effect is strongest for actively-trading investors.

Because PEAD is especially strong at the time of the next three quarterly earnings announcements, following extreme negative earnings surprises, smart arbitrageurs should time their buying to be immediately after subsequent earnings announcements rather than immediately before, and time their selling to be immediately before rather than immediately after. If individual investors are naïve with respect to the concentration of PEAD at subsequent earnings announcements and are thereby impeding price adjustement, we expect them to be making opposing trades. Thus, a further prediction of the hypothesis is that given a very unfavorable earnings surprise, individual investors will be net buyers immediately preceding the next three earnings announcements, and will be net sellers immediately following. The evidence, however, does not confirm such a pattern either for individuals as a group, or for subclasses based upon affluence, frequency of trading, gender, or marital status.

There are some limitations to the tests we perform. Although the number of data points in the sample is large, it includes only those individuals who use a single major brokerage firm over a six-year period. Other groups of individuals may behave differently, and it is conceivable that the behavior of individuals during this time period was for some reason anomalous. Furthermore, there may be further sub-categories of individuals who cannot be identified using the category information of the dataset, but who may behave differently.

In summary, there is a clear answer to the question posed in the title of this paper. In our dataset, there is no indication that trading by the individual investors drives post-earnings announcement drift. What, then, is the source of PEAD? There are several possibilities. One is that the effect is a spurious consequence of some sort of measurement problem, such as the imperfect measurement of risk. A second is that individuals drive PEAD in a way that is not identifiable using our dataset. For example, some sub-category of individuals whose membership is unrelated to affluence or frequency of trading may be naive with respect to earnings announcements. Finally, it is possible that some subset of institutional investors generates PEAD, as a result of agency incentives or cognitive biases.

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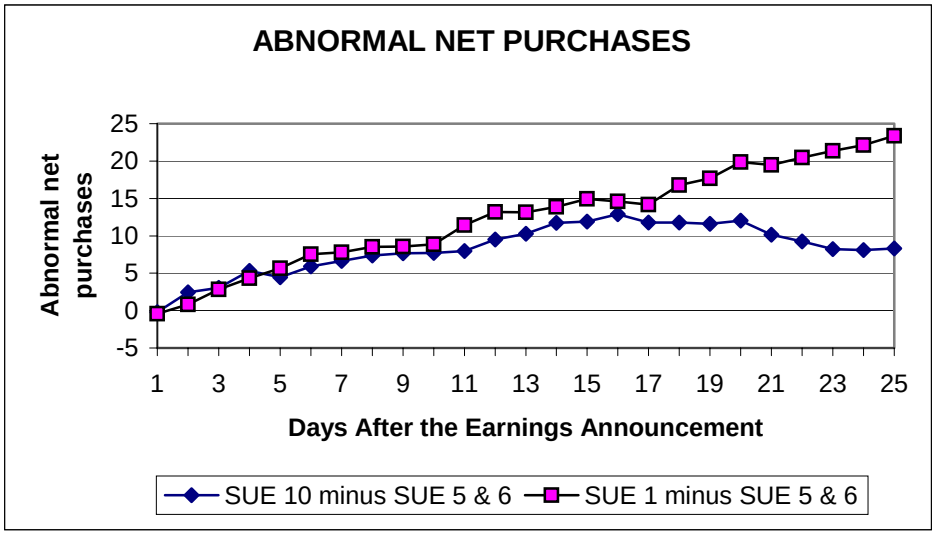
FIGURE 1
Cumulative Abnormal Net Purchases Relative to the Earnings Announcement Date



SUE 1 firms are firms with the most negative random walk earnings surprise, SUE 10 firms are firms with the most positive random walk earnings surprise, and SUE 5 & 6 firms are firms with the smallest random walk earnings surprise (in absolute value).
Net purchases is measured as the number of shares purchased minus the number of shares sold, scaled by millions of shares outstanding at the end of the fiscal quarter for which earnings is announced.

TABLE 1
Descriptive Statistics

Panel A: Average Trade Size in Dollars (Shares)

		$ Trade Size				
Year	Buy/Sell	Mean	Quintile 1	Median	Quintile 3	Trades
1991	Buy	$9,654	$2,213	$4,425	$9,325	197,277
		(653)	(100)	(200)	(500)	
1991	Sell	$12,399	$2,500	$5,200	$11,563	144,156
		(720)	(100)	(250)	(700)	
1992	Buy	$10,244	$2,388	$4,688	$9,625	186,819
		(645)	(100)	(200)	(500)	
1992	Sell	$12,957	$2,550	$5,400	$12,000	141,101
		(753)	(100)	(255)	(800)	
1993	Buy	$10,381	$2,500	$4,838	$10,000	181,008
		(700)	(100)	(200)	(600)	
1993	Sell	$12,385	$2,625	$5,450	$12,050	155,292
		(710)	(100)	(250)	(700)	
1994	Buy	$10,542	$2,475	$4,863	$10,250	152,609
		(695)	(100)	(250)	(700)	
1994	Sell	$12,508	$2,539	$5,500	$12,375	128,072
		(713)	(100)	(300)	(702)	
1995	Buy	$12,942	$2,788	$5,625	$12,125	178,391
		(689)	(100)	(225)	(700)	
1995	Sell	$14,961	$2,800	$6,125	$14,325	160,005
		(716)	(100)	(296)	(800)	
1996	Buy	$13,495	$2,900	$5,700	$12,750	186,003
		(700)	(100)	(200)	(700)	
1996	Sell	$16,554	$3,113	$6,768	$16,050	158,968
		(727)	(100)	(300)	(800)	

Panel B: Average $ Volume (Number) of Trades Per Investor Year by Investor Class

Investor Type	Mean	Q1	Median	Q3	Number of Investor-years
All Investors	$125,503	$7,416	$21,256	$67,767	275,062
	(10.34)	(1)	(4)	(10)	
High-Capital Investors	$105,623	$13,984	$38,841	$101,975	52,482
	(8.60)	(2)	(5)	(11)	
General Investors	$52,220	$5,563	$14,428	$37,700	189,512
	(6.15)	(1)	(3)	(7)	
Actively-Trading Investors	$577,042	$51,039	$158,276	$449,038	33,068
	(38.65)	(8)	(22)	(46)	

All trades of common shares made by investors from January 1991 to December 1996 inclusive. In panel A the unit of measurement is a single trade by any investor. In panel B the unit of measurement is a year of trading activity by a single investor.

TABLE 2
Abnormal Trading Following Extreme Earnings Surprises – All Firms

Panel A: Good News (SUE 10) Firms Vs. No News (SUE 5 and 6) Firms

N = 20,022 firm-quarters	Buys	Sells	Net Purchases
days +1 to +5	23.730	19.271	4.458
	(10.98)	(11.22)	(1.86)
days +6 to +15	24.329	16.897	7.431
	(11.23)	(8.40)	(2.94)

Panel B: Bad News (SUE 1) Firms Vs. No News (SUE 5 and 6) Firms

N = 20,019 firm-quarters	Buys	Sells	Net Purchases
days +1 to +5	11.984	6.337	5.646
	(7.42)	(5.89)	(3.18)
days +6 to +15	20.141	10.856	9.285
	(8.87)	(5.38)	(3.46)

Mean difference and (t-statistics) between extreme earnings surprise firms and no earnings surprise firms. Panel A (B) tests the mean number of shares traded of SUE 10 (SUE 1) firms against the mean number of shares traded of SUE 5 and 6 firms in the days immediately following the earnings announcements. Shares traded are scaled by millions of shares outstanding at the end of the fiscal quarter for which earnings is announced.

TABLE 3
Abnormal Trading Following Extreme Earnings Surprises – Small Firms

Panel A: Good News (SUE 10) Firms Vs. No News (SUE 5 and 6) Firms

N = 6,797 firm-quarters	Buys	Sells	Net Purchases
days +1 to +5	17.506	14.229	3.277
	(3.21)	(3.27)	(0.54)
days +6 to +15	8.137	-1.504	9.640
	(1.96)	(-0.29)	(1.62)

Panel B: Bad News (SUE 1) Firms Vs. No News (SUE 5 and 6) Firms

N = 6,803 firm-quarters	Buys	Sells	Net Purchases
days +1 to +5	5.575	-2.057	7.632
	(1.33)	(-0.69)	(1.59)
days +6 to +15	8.890	-5.401	14.29
	(1.64)	(-1.06)	(2.04)

Mean difference and (t-statistics) between extreme earnings surprise firms and no surprise firms. Panel A Panel A (B) tests the mean number of shares traded of SUE 10 (SUE 1) firms against the mean number of shares traded of SUE 5 and 6 firms in the days immediately following the earnings announcements. Shares traded are scaled by millions of shares outstanding at the end of the fiscal quarter for which earnings is announced.

Small firms are firms with market value of equity less than the median.

TABLE 4
Net Purchases by Investor Class

Panel A: Good News (SUE 10) Firms Vs. No News (SUE 5 and 6) Firms

	General Investors	*High-Capital Investors*	*Actively-Trading Investors*
N = Firm-quarters	18,121	13,902	17,504
days +1 to +5	1.159	-0.078	4.397
	(0.67)	(-0.11)	(2.29)
days +6 to +15	3.037	-0.820	6.931
	(2.20)	(-1.02)	(3.06)

Panel B: Bad News (SUE 1) Firms Vs. No News (SUE 5 and 6) Firms

	General Investors	*High-Capital Investors*	*Actively-Trading Investors*
N = Firm-quarters	18,125	13,902	17,504
days +1 to +5	1.527	3.022	1.141
	(1.46)	(3.70)	(0.66)
days +6 to +15	3.691	0.962	5.956
	(1.64)	(1.02)	(3.26)

Coefficients and t-statistics (below in parentheses) from a regression of net purchases on an indicator variable equal to 1 for firms with extreme earnings surprise and 0 for firms with little or no earnings surprise, and a measure of market-wide trading.
Net purchases is measured as the number of shares purchased minus the number of shares sold in the window, divided by millions of shares outstanding at the end of the fiscal quarter for which earnings is announced.

Extreme earnings surprise is defined as SUE 10 firms in panel A (good news firms) and SUE 1 firms in panel B (bad news firms). Little or no earnings surprise is defined as SUE 5 and SUE 6 firms.

TABLE 5
Regressions of Abnormal Returns on Ranks of Standardized Unexpected Earnings (SUE), Market-To-Book (MTB), Size (MVE), RANK NET PURCHASES, and Momentum For All Investors

N = 10,932

Returns Window	Intercept	SUE	MTB	MVE	NET PURCHASES	Momentum	Adj_R^2
9 Months	0.092	0.011	-0.010	-0.010			1.22%
	(6.65)	(7.97)	(-5.88)	(-5.60)			
	0.114	0.011	-0.010	-0.010	-0.005		1.28%
	(7.16)	(8.01)	(-5.74)	(-5.79)	(-2.77)		
	0.090	0.011	-0.010	-0.011	-0.005	0.005	1.37%
	(5.12)	(8.01)	(-5.71)	(-5.85)	(-2.73)	(3.25)	
6 Months	0.048	0.009	-0.004	-0.008			1.15%
	(4.52)	(8.96)	(-3.45)	(-5.50)			
	0.063	0.009	-0.004	-0.008	-0.003		1.20%
	(5.21)	(9.00)	(-3.32)	(-5.68)	(-2.58)		
	0.047	0.009	-0.004	-0.008	-0.003	0.004	1.26%
	(3.51)	(9.00)	(-3.29)	(-5.73)	(-2.54)	(2.86)	

The sample size is measured in firm-quarters.
SUE includes those 11,480 firms with non-zero net buys in the 5 days following the earnings announcement and SUEs in deciles 1 to 3 or 8 to 10.
MTB is the decile rank of the firm's market-to-book ratio.
MVE is the decile rank of the firm's market value of equity.
RANK NET PURCHASES is calculated as the number of shares purchased minus the number of shares sold from day +1 to day +5 relative to the earnings announcement date, scaled by the number of shares outstanding at the end of the fiscal quarter for which earnings is announced.
Momentum is market-adjusted buy and hold returns for the 6 months prior to the earnings announcement date.
Abnormal returns are calculated as the buy and hold returns that begin on day +6 and end 6 or 9 months later (where a month is defined as 21 trading days) minus the buy and hold value-weighted market returns for the same period.

TABLE 6
Regressions of Abnormal Returns on Ranks of Standardized Unexpected Earnings (SUE), Market-To-Book (MTB), Size (MVE), RANK NET PURCHASES, and Momentum by Investor Classes

General Investors N = 6,999 firm-quarters

Returns Window	Intercept	SUE	MTB	MVE	RANK NET PURCHASES	Momentum	Adj_R^2
9 Months	0.076	0.011	-0.011	-0.006			1.10%
	(4.55)	(6.59)	(-5.11)	(-3.10)			
	0.099	0.011	-0.010	-0.007	-0.005		1.17%
	(5.16)	(6.58)	(-4.98)	(-3.26)	(-2.44)		
	0.079	0.011	-0.010	-0.007	-0.005	0.004	1.23%
	(3.74)	(6.56)	(-4.95)	(-3.31)	(-2.42)	(2.27)	
6 Months	0.051	0.009	-0.006	-0.007			1.04%
	(3.96)	(6.68)	(-3.47)	(-4.06)			
	0.066	0.009	-0.005	-0.007	-0.003		1.09%
	(4.46)	(6.67)	(-3.36)	(-4.19)	(-2.04)		
	0.047	0.009	-0.005	-0.007	-0.003	0.004	1.18%
	(2.89)	(6.66)	(-3.31)	(-4.26)	(-2.02)	(2.77)	

High-Capital Investors N = 3,246 firm-quarters

Returns Window	Intercept	SUE	MTB	MVE	RANK NET PURCHASES	Momentum	Adj_R^2
9 Months	0.118	0.007	-0.010	-0.010			0.88%
	(4.58)	(2.97)	(-3.27)	(-3.18)			
	0.136	0.007	-0.010	-0.010	-0.004		0.90%
	(4.58)	(2.89)	(-3.12)	(-3.34)	(-1.23)		
	0.113	0.007	-0.010	-0.010	-0.004	0.005	0.97%
	(3.51)	(2.88)	(-3.08)	(-3.41)	(-1.23)	(1.85)	
6 Months	0.040	0.006	-0.003	-0.005			0.46%
	(2.10)	(3.27)	(-1.34)	(-2.22)			
	0.051	0.006	-0.003	-0.005	-0.002		0.45%
	(2.28)	(3.20)	(-1.23)	(-2.35)	(-0.92)		
	0.037	0.006	-0.003	-0.005	-0.002	0.003	0.49%
	(1.55)	(3.20)	(-1.20)	(-2.40)	(-0.93)	(1.43)	

Actively-Trading Investors N = 7,016 firm-quarters

Returns Window	Intercept	SUE	MTB	MVE	RANK NET PURCHASES	Momentum	Adj_R^2
9 Months	0.108	0.008	-0.011	-0.008			0.89%
	(5.95)	(4.73)	(-5.04)	(-3.70)			
	0.137	0.008	-0.011	-0.009	-0.006		1.00%
	(6.65)	(4.89)	(-4.97)	(-3.94)	(-2.96)		
	0.108	0.008	-0.011	-0.009	-0.006	0.006	1.12%
	(4.82)	(4.89)	(-4.96)	(-4.01)	(-2.90)	(3.16)	
6 Months	0.054	0.007	-0.006	-0.005			0.76%
	(3.86)	(5.68)	(-3.32)	(-3.23)			
	0.072	0.008	-0.006	-0.006	-0.004		0.84%
	(4.59)	(5.82)	(-3.27)	(-3.43)	(-2.51)		
	0.052	0.008	-0.006	-0.006	-0.004	0.005	0.94%
	(3.02)	(5.82)	(-3.25)	(-3.49)	(-2.46)	(2.95)	

The sample sizes are measured in firm-quarters.
SUE includes those 11,480 firms with non-zero net buys in the 5 days following the earnings announcement and SUEs in deciles 1 to 3 or 8 to 10.
MTB is the decile rank of the firm's market-to-book ratio.
MVE is the decile rank of the firm's market value of equity.
RANK NET PURCHASES is calculated as the number of shares purchased minus the number of shares sold from day +1 to day +5 relative to the earnings announcement date, scaled by the number of shares outstanding at the end of the fiscal quarter for which earnings is announced.
Momentum is market-adjusted buy and hold returns for the 6 months prior to the earnings announcement date.
Abnormal returns are calculated as the buy and hold returns that begin on day +6 and end 6 or 9 months later (where a month is defined as 21 trading days) minus the buy and hold value-weighted market returns for the same period.

TABLE 7
Regressions of buys, sells, and net purchases on SUE indicators

Panel A: Good news firms (SUE 10) vs. No news firms (SUE 5 & 6)

N=20,022 (firm-quarters)	Qtr 0	Qtr +1	Qtr +2	Qtr +3	Qtr +4
Buys days –1 to –10		23.832	29.901	30.218	27.859
		(9.05)	(11.06)	(10.41)	(10.22)
Buys days +1 to +5	23.730	18.889	23.464	26.373	22.745
	(10.98)	(11.87)	(9.49)	(9.92)	(9.44)
Buys days +6 to +15	24.329	20.842	28.007	26.844	24.858
	(11.23)	(10.98)	(10.66)	(12.33)	(9.31)
Buys days +16 to +25	22.574	24.303	29.086	25.936	15.507
	(11.25)	(12.82)	(12.45)	(10.32)	(8.71)
Sells days –1 to –10		18.345	25.035	24.243	25.787
		(8.43)	(9.98)	(10.38)	(9.88)
Sells days +1 to +5	19.271	17.986	19.738	21.702	21.724
	(11.22)	(8.53)	(9.31)	(9.61)	(9.45)
Sells days +6 to +15	16.897	21.913	23.313	25.272	21.598
	(8.40)	(10.84)	(9.83)	(10.46)	(8.38)
Sells days +16 to +25	26.164	26.098	28.443	25.320	11.640
	(10.50)	(12.81)	(11.23)	(10.42)	(7.10)
Net purchases days –1 to –10		5.488	4.866	5.976	2.072
		(1.90)	(1.66)	(1.90)	(0.68)
Net purchases days +1 to +5	4.458	0.902	3.726	4.671	1.021
	(1.86)	(0.38)	(1.22)	(1.52)	(0.34)
Net purchases days +6 to +15	7.431	-1.071	4.694	1.572	3.260
	(2.94)	(-0.46)	(1.55)	(0.59)	(1.08)
Net purchases days +16 to +25	-3.590	-1.795	0.643	0.617	3.867
	(-1.52)	(-0.77)	(0.24)	(0.21)	(2.00)

Coefficients and t-statistics below in parentheses from a regression of various measures of trading on an indicator variable set equal to 1 for firms in SUE 10 and set equal to 0 for firms in SUE 5 and 6.

The first column measures trading around the current earnings announcement (quarter 0) and the following four columns measure trading around the following four earnings announcements (quarters +1 through +4).
Buys are measured as the number of shares purchased in the window, divided by the number of shares outstanding at the end of the fiscal quarter for which earnings is announced.
Sells are measured as the number of shares sold in the window, divided by the number of shares outstanding at the end of the fiscal quarter for which earnings is announced.
Net purchases is measured as the number of shares purchased minus the number of shares sold in the window, divided by the number shares outstanding at the end of the fiscal quarter for which earnings is announced.

Panel B: Bad news firms (SUE 1) vs. No news firms (SUE 5 & 6)

N=20,019 (firm-quarters)	Qtr 0	Qtr +1	Qtr +2	Qtr +3	Qtr +4
Buys days –1 to –10		13.752	11.684	14.307	12.333
		(6.59)	(6.11)	(6.27)	(5.57)
Buys days +1 to +5	11.984	10.344	9.224	8.942	8.384
	(7.42)	(5.54)	(5.05)	(4.15)	(4.98)
Buys days +6 to +15	20.141	16.832	18.506	21.358	19.321
	(8.87)	(6.92)	(7.49)	(7.69)	(7.06)
Buys days +16 to +25	19.583	18.105	18.786	14.794	7.546
	(9.27)	(8.19)	(7.20)	(6.35)	(6.37)
Sells days –1 to –10		12.877	14.208	18.108	18.388
		(5.82)	(6.72)	(7.76)	(8.14)
Sells days +1 to +5	6.337	5.147	10.314	9.683	10.180
	(5.89)	(3.72)	(6.53)	(6.28)	(6.08)
Sells days +6 to +15	10.856	12.168	18.813	12.916	12.637
	(5.38)	(6.39)	(6.30)	(4.91)	(4.55)
Sells days +16 to +25	11.157	16.749	17.832	15.973	7.800
	(6.16)	(8.33)	(8.05)	(7.46)	(5.40)
Net purchases days –1 to –10		0.875	-2.524	-3.800	-6.055
		(0.35)	(-1.05)	(-1.46)	(-2.64)
Net purchases days +1 to +5	5.646	5.197	-1.090	-0.742	-1.796
	(3.18)	(2.66)	(-0.48)	(-0.30)	(-0.85)
Net purchases days +6 to +15	9.285	4.665	-0.307	8.442	6.684
	(3.46)	(1.65)	(-0.10)	(2.52)	(1.92)
Net purchases days +16 to +25	8.425	1.356	0.954	-1.179	-0.254
	(3.41)	(0.51)	(0.34)	(-0.43)	(-0.16)

Coefficients and t-statistics below in parentheses from a regression of various measures of trading on an indicator variable set equal to 1 for firms in SUE 1 and set equal to 0 for firms in SUE 5 and 6.

The first column measures trading around the current earnings announcement (quarter 0) and the following four columns measure trading around the following four earnings announcements (quarters +1 through +4).
Buys are measured as the number of shares purchased in the window, divided by the number of shares outstanding at the end of the fiscal quarter for which earnings is announced.
Sells are measured as the number of shares sold in the window, divided by the number of shares outstanding at the end of the fiscal quarter for which earnings is announced.
Net purchases is measured as the number of shares purchased minus the number of shares sold in the window, divided by the number shares outstanding at the end of the fiscal quarter for which earnings is announced.

TABLE 8
Net purchases by affluence / trading frequency classes
at the initial earnings announcement
and at subsequent earnings announcements

Panel A: Good news firms (SUE 10) vs. No news firms (SUE 5 & 6)

	Qtr 0	Qtr +1	Qtr +2	Qtr +3	Qtr +4
Affluent N=13,902					
Net purchases days –1 to –10		0.216	1.255	3.899	2.354
		(0.19)	(1.07)	(2.91)	(2.33)
Net purchases days +1 to +5	-0.078	-0.242	1.667	-1.226	0.197
	(-0.11)	(-0.25)	(1.10)	(-1.18)	(0.17)
Net purchases days +6 to +15	-0.820	-1.137	-0.712	-1.093	-0.009
	(-1.02)	(-1.30)	(-0.65)	(-0.94)	(-0.01)
Net purchases days +16 to +25	-1.247	-1.944	-1.628	-0.614	-1.049
	(-1.43)	(-2.18)	(-1.47)	(-0.62)	(-1.64)
General N=18,121					
Net purchases days –1 to –10		2.165	-1.413	-0.703	0.825
		(1.10)	(-0.90)	(-0.31)	(0.44)
Net purchases days +1 to +5	1.159	0.687	1.705	4.132	0.395
	(0.67)	(0.54)	(0.77)	(1.79)	(0.22)
Net purchases days +6 to +15	3.037	-0.253	1.603	1.295	-1.898
	(2.20)	(-0.20)	(0.77)	(0.94)	(-1.31)
Net purchases days +16 to +25	-3.011	-0.310	-0.779	0.817	-0.611
	(-2.04)	(-0.22)	(-0.46)	(0.56)	(-0.69)
Active traders N=17,504					
Net purchases days –1 to –10		4.227	7.352	5.398	0.269
		(1.85)	(2.73)	(2.30)	(0.10)
Net purchases days +1 to +5	4.397	-0.347	1.212	1.520	0.806
	(2.29)	(-0.15)	(0.53)	(0.64)	(0.30)
Net purchases days +6 to +15	6.931	0.550	4.042	1.955	6.201
	(3.06)	(0.26)	(1.57)	(0.78)	(2.18)
Net purchases days +16 to +25	-0.751	1.167	3.103	0.227	5.030
	(-0.37)	(0.56)	(1.35)	(0.08)	(2.60)

Panel B: Bad news firms (SUE 1) vs. No news firms (SUE 5 & 6)

	Qtr 0	Qtr +1	Qtr +2	Qtr +3	Qtr +4
Affluent N=13,902					
Net purchases days –1 to –10		1.978	0.827	-1.464	-2.541
		(1.84)	(0.83)	(-1.24)	(-2.44)
Net purchases days +1 to +5	3.022	2.143	0.410	1.842	1.279
	(3.70)	(2.39)	(0.54)	(1.41)	(1.13)
Net purchases days +6 to +15	0.962	-0.336	0.596	0.714	2.313
	(1.02)	(-0.40)	(0.52)	(0.68)	(1.77)
Net purchases days +16 to +25	0.867	0.544	-0.588	-2.465	-2.166
	(0.79)	(0.54)	(-0.64)	(-2.44)	(-2.24)
General N=18,125					
Net purchases days –1 to –10		-2.890	-2.057	-2.471	-2.630
		(-1.84)	(-1.57)	(-1.40)	(-2.18)
Net purchases days +1 to +5	1.527	1.166	-0.190	-2.898	-0.330
	(1.46)	(0.98)	(-0.16)	(-2.56)	(-0.29)
Net purchases days +6 to +15	3.691	2.738	-0.498	3.439	-1.139
	(1.64)	(1.32)	(-0.25)	(1.35)	(-0.44)
Net purchases days +16 to +25	4.618	1.158	1.283	1.269	-1.036
	(2.81)	(0.71)	(0.77)	(0.80)	(-1.23)
Active traders N=17,504					
Net purchases days –1 to –10		3.096	-1.884	-0.582	-2.898
		(1.48)	(-0.86)	(-0.28)	(-1.43)
Net purchases days +1 to +5	1.141	3.396	-1.114	0.134	-1.983
	(0.66)	(1.97)	(-0.52)	(0.06)	(-1.05)
Net purchases days +6 to +15	5.956	3.628	0.138	5.049	7.127
	(3.26)	(1.53)	(0.06)	(1.99)	(2.75)
Net purchases days +16 to +25	5.162	-0.382	-0.947	-2.248	2.452
	(2.56)	(-0.16)	(-0.38)	(-0.90)	(1.74)

Coefficients and t-statistics below in parentheses from a regression of net purchases on an indicator variable equal to 1 for firms with extreme earnings surprise and 0 for firms with little earnings surprise, and a measure of market-wide trading.
Net purchases is measured as the number of shares purchased minus the number of shares sold in the window, divided by the number shares outstanding at the end of the fiscal quarter for which earnings is announced.
Extreme earnings surprise is defined as SUE 10 firms in panel A (good news firms) and SUE 1 firms in panel B (bad news firms). Little earnings surprise is defined as SUE 5 and SUE 6 firms.