Transaction Sizes and Institutional Investor Trading Patterns around Earnings Announcements

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Abstract: The use of observed transaction sizes to differentiate between "small" and "large" investor trading patterns is widespread. A significant concern in such studies is spurious effects attributable to misclassification of transactions, particularly transactions originating from large investors. Such effects can arise unintentionally, strategically, or endogenously. We employ comprehensive records of institutional trading activity (i.e., "large" traders), including their order sizes and overall position changes, to assess the degree to which such misclassifications can give rise to spurious inferences about "small" and "large" investor trading activities. Our analysis shows that these institutions are heavily involved in small transaction activity. It also shows that they increase their order sizes substantially in announcement periods relative to non-announcement periods, presumably as an endogenous response to the earnings news. And, in the immediate earnings announcement period, transaction size based inferences about their directional trading are quite misleading--producing spurious "small trader" effects and, more surprisingly, erroneous inferences about "large trader" activity.

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Keywords: Large Traders, Small Traders, Earnings Expectations, Post-earnings-announcement drift, Transaction Sizes.

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1. Introduction

A considerable body of research, building on early work by Cready (1988) and Lee (1992) explores how investor information processing activity as expressed through trading differs by investor attributes. Many such analyses infer trader attributes indirectly, using transaction size as a noisy measure of whether an investor is small or large. [1] The substantive interpretation of such analyses depends directly on the validity of these transaction size to trader type linkages. Small trades in these studies are commonly attributed to individual investors while large trades are attributed to institutions. However, as is also recognized by studies in the area, these categorizations are imperfect. For example, large investor orders are often broken up either intentionally or mechanically causing the resulting small trades to be misclassified as reflecting small investor activity. Arguably, such distortions are random and so simply add noise to these transaction size based designs. Alternatively, if they are systematic, (e.g., they are related to the price adjustment process that is taking place), then linking size-stratified trading findings with investor scale becomes quite problematic. In particular, systematic aspects arising from small transaction activities of large investors or, conversely, large transaction activities of small investors, constitute alternative explanations for supposed differences between small and large investors.

In this study we employ a detailed database on institutional transactions available from Ancerno Ltd. to investigate how transaction size based inferences correspond to the actual

[1] A review of the literature subsequent to Cready (1988) and Lee (1992) identified over 30 published papers employing transaction size based techniques with 10 of them appearing in year 2010 or later. Most of these explicitly link these techniques to the idea of isolating individual or "small investor" from institutional or "large investor" trading activity, although very few of them (e.g., O'Neil and Swisher, 2003) appeal to a more generic notion that trade size reflects how "informed" a trade is. That is, "large" transactions reflect informed trading while "small" transactions reflect uninformed or "noise" trading apart from any explicit linkage to the size of investor making the trade.

changes in positions occurring among a substantial number of institutional investors. The database reports a unique identifier for each institutional investor, a unique identifier for each ticket submitted to a broker, the size of the ticket, the size of the volume executed by the broker as he works the order in smaller pieces (if any), the identity of the broker executing the order, whether the order was a buy or a sell, and the execution price. These data allow us to identify orders and announcement period position changes by each institutional investor covered by the database (the data cover roughly 10% of market trading volume). Also, as we have direct knowledge of orders including whether they are buy orders or sell orders, the analysis is not dependent on a noisy bid/ask based algorithm (e.g. Lee and Ready, 1991) in order to infer trade directions. Consequently, our analysis provides comparatively clear insights about the trading activity of the institutional investors it covers.

Our analysis suggests that transaction sizes are problematic at distinguishing large and small investor trading activity in three major respects. First, there is a considerable degree of variation in size or scale across the set of institutions covered by the Ancerno data. However, while there is evidence that average transaction size does increase with fund size, there is little indication that this effect carries over into commonly employed "small" and "large" transaction size categories. In our data, in fact, as much as 50% of large institutional investor trading activity occurs within small transaction and order size categories, and these proportions are highest for the largest quartile of institutions. That is, when categorized using size cutoffs, small transaction and order size activity seems to increase, not decrease, with institution size.

Second, we find that the order sizes of these institutional investors increase markedly in the earnings announcement period, rising around 40% relative to non-announcement period sizes. Consequently, transaction size itself seems to be an endogenous component of investor

response to information disclosures rather than an exogenous mechanism for partitioning "small" investors from "large" investors. This distinction is important. In our data trading activity increases by much higher percentages in large trade size categories relative to small trade size categories, consistent with the idea that investor responsiveness to earnings news increases with size/scale (Cready, 1988, Lee, 1992). However, the opposite is true when we examine response by institution size: smaller institution trading responses are substantially higher than large institution responses. It is the shift in order sizes, not differences in trading activity, that drives higher trading levels within large trade size categories.

Third, inferences about differences in "small" and "large" investor announcement period trading behaviors are impacted by the unreliable nature of the mapping between transaction size and investor size. For instance, in large transaction size categories positive relations exist between "large" (investor) net buying and analyst forecast error, consistent with Ayers et al. (2011) and Battalio and Mendenhall (2005). But for large position change categories, which are not impacted by how orders are entered or executed, these relations turn negative. There is simply no announcement period evidence that the institutional investors in our data are systematically trading in forecast error directions.[2]

Relatgedly, small trade size category net buying effects are uniformly opposite in sign from large trade size category net buying effects for both analyst and random walk forecast errors. Conventionally, such evidence would support the presence of striking systematic differences between small and large investor trading with respect to earnings news. However, there are no investors in our data that would fit any plausible notion of "small trader" as

[2] Analyses of broader sets of institutions such as Kaniel et al. (2012) indicate that at the aggregate institutions do appear to trade in an AFE-consistent fashion after earnings announcements and, in fact, in our data they also trade in an AFE-consistent fashion in the post-announcement period (i.e., days +6 to +66 after the announcement date). They do not seem to do so, however, in the immediate announcement period.

espoused in the current literature. Moreover, when the size partition is based on orders or position changes these trade size conditioned shifts disappear. That is, they seem to be an artifact of how orders are converted into transactions.

Importantly, our analysis identifies how a number of existing findings in the literature that are attributed to differences between individual and institutional traders also arise within trading sample consisting entirely of institutional investors. As such, it calls into question the validity of drawing inferences about differences between individual or small and institutional or large traders based on transaction size evidence. Demonstrating that the evidence is unreliable and prone to spurious findings, however, does not invalidate the conclusions reached using such evidence. Indeed, other studies using alternative approaches to identifying trading by investor types such as brokerage records (e.g., Taylor (2010, 2011)), exchange maintained audit files (Kaniel et al., 2012), and source-broker-inferred investor types (e.g., Griffin et al., 2008) provide support for several of the transaction-size-based findings that this analysis raises concerns about. Hence, our analysis does not necessarily invalidate conclusions reached by using transaction-size stratified evidence. It does, however, raise substantive concerns about the stand-alone reliability of such evidence.[3]

Finally, the Ancerno dataset we employ is restricted to mutual and pension funds. Thus, the analysis provides some direct insights about the trading patterns of these specific types of institutions with respect to earnings news. Consistent with the NYSE trading record based analyses of Kaniel et al. (2012) and the transactions-based evidence of Ayers et al. (2011), we

[3] Regrettably, direct data on investor trading data is comparatively limited. It is only available for certain comparatively short time periods (e.g., brokerage records of individual trading are from the 1990s) and often only covers course subsets of investors. For instance, the Kaniel et al. (2008, 2012) records do not differentiate between small and large individual investors and are only for NYSE trading (Barber et al., 2009 note that many discount brokers do not send orders to the NYSE for execution).

find that these investors do indeed tend to buy positive analyst forecast error and sell negative analyst forecast error stocks in the post-announcement period. That is, they trade to reduce analyst forecast error related post-announcement drift. However, in the immediate announcement period they do not appear to behave in a very sophisticated fashion in that they are, at best neutral, and in some instances actively contrarian with respect to earnings news. Assuming that these particular institution types are less sophisticated than other types, such behavior is consistent with the holdings based evidence provided by Ke and Ramalingegowda (2005) who find that only more sophisticated institutional investors profit off of drift related trading.

2. Related Literature

2.1 Transaction Size Based Analyses

The linkage of transaction sizes to underlying trader size is introduced as a mechanism for evaluating differences in trading patterns across investor types in Cready (1988) who concludes that large traders, particularly institutional traders, are more responsive and more quickly responsive to earnings news than are smaller traders. Lee (1992) builds on the Cready analysis by employing the surrounding bid-ask quotes to infer trade direction (Lee and Ready, 1991). He finds that small traders tend to buy after earnings announcements irrespective of the direction of the earnings news and, like Cready, finds that large traders are more responsive and more quickly responsive to earnings news than small traders. Subsequent studies find that small traders are more responsive to random walk forecast errors (Bhattacharya, 2001; Battalio and Mendenhall, 2005), to pro-forma earnings numbers (Bhattacharya et al., 2007; Allee et al., 2007), and less responsive to financial report complexity (Miller, 2010).

Several studies examining directional trading also find evidence of large and small traders trading in opposite directions from each other. Battalio and Mendenhall (2005) (henceforth BM) find that, with respect to analyst forecast error, small traders are net sellers while large traders are net buyers in the announcement period. Ayers et al. (2011) find a similar pattern holds in the post-announcement period. They also find evidence that large traders appear to trade against the random walk forecast error in the post-announcement period while small traders trade in the direction of the random walk forecast error. Moreover, Battalio et al. (2012) find that small and large traders trade in opposite directions in response to accrual information.

Trade size based analyses are also used to ascertain the relative composition of investors trading in response to conference calls (Frankel et al. 1999; Bushee et al. 2003). That is, to what extent are such calls primarily benefitting large traders? They are also used to assess differences between small and large investor responses to analyst recommendations (Malmendier and Shanthikumar, 2007; Mikhail et al., 2007) and the relative usefulness of EDGAR filings to small versus large investors (Asthana et al., 2004). And, in the tax literature, trade size based designs are used to discriminate between tax driven trading differences between individuals and institutions (e.g., Seida, 2001; Ayers et al., 2008; Li, 2010;).

2.2 **Transaction Size and Investor Type**

Given its centrality to the large/small trader literature, the reliability of transaction sizes as a means of identifying underlying trader sizes and types is a crucial concern that is addressed to some degree in the literature. Cready (1988), in fact, cites share ownership data collected by the NYSE as supporting the notion that trades sizes increase with individual investor portfolio sizes while Lee (1992) notes that an analysis of a proprietary set of institutional orders by Chen

and Lakonishok (1991) which finds that fewer than 10% of these orders are under $10,000 in value.

The degree to which observed trade sizes accurately portray trader attributes is also directly evaluated in several analyses. Lee and Radhakrishna (2000) find that while market orders are not generally split up in execution, when such splits do happen they tend to coincide with substantive price changes, which is of particular relevance to trading activity during earnings announcement periods since price changes on announcement days are typically larger than those on other days. They also report a high degree of correspondence between market order and transaction sizes and whether the trade is being initiated by an individual or institutional investor. They also find that large trades are almost entirely attributable to institutions. However, their data are limited in that they cover only three months of trading for 144 firms. It also focuses on orders coming through the Superdot system which, though it covers a majority of the trading activity on the NYSE, also reflects a higher percentage of individual investor trading activity relative to the market as a whole.

Barber, Odean and Zhu (2009), using detailed brokerage records of individual orders and transactions, identify a strong general link between small investor net buying based on these records and net buying inferred from transaction data. However, it is of some relevance to directional trading metrics that their analysis (table 1) also indicates that individual investors are strong net buyers when engaging in small trade size activities, and are strong net sellers in the large ($50,000 and above category) trade size category. That is, there is an underlying marginal tendency for individual investors to buy small and sell large.

In contrast to fairly common concerns about large investor trade activity taking the form of small transactions, the notion that large trade size activity is dominated by institutional investors is generally accepted. Campbell et al. (2009), however, do explore this idea empirically by examining the relation between changes in quarterly institutional holdings and trading activity across transaction size categories. They find that an estimation based moving cutoff substantially outperforms fixed cutoff points (e.g., trade sizes in excess of $30,000) in identifying institutional ownership changes. However, they do conclude that transaction sizes in excess of $30,000 are revealing of institutional trading activity. But, of direct relevance to the findings we report, they find that small transactions (transactions of less than $2,000) are also revealing of institutional trading activity, particularly when the traded stock has a high level of institutional ownership.

Collectively the existing evidence strongly supports the notion that large transaction size trading is predominately generated by institutional investors while individual investor activity appears to be a major factor in small transaction size trading. However, it is also clearly the case that large traders do trade in small trade sizes and that some individuals, particularly individuals who hold very large portfolios, engage in large trades. And, while such out-of-category activity seems unlikely to dominate, it still may impact at the margin. For instance, if small trade size activity by individuals in a given setting is random, then even comparatively low amounts of systematic small trade size activity by institutions will, given sufficient sample size, lead to the detection of significant marginal effects in small transaction size metrics that have nothing to do with small traders.

2.3 Earnings Announcement Trading

Given its centrality in the literature employing transaction sizes as a means of drawing inferences about differences in small and large traders, our analysis focuses on earnings related trading. Cready (1988) and Lee (1992) conclude that large traders are more responsive to earnings news based on comparisons on the degree to which large trade size activity increases relative to small trade size activity. They also find that large trader responses are speedier by comparing the relative concentrations of large and small trader responses. Hence, their evidence suggests that relative to small trade size, large trade size increases are higher and relatively more concentrated in the immediate announcement period (e.g., day or hour of the announcement disclosure).

Lee (1992) also evaluates directional trade response to earnings news. He finds that net buying occurs in small trade size categories regardless of the direction of the earnings news. Bhattacharya (2001), however, provides a much more detailed evaluation of how differing metrics for assessing earnings news provoke differing responses in small and large investors. He argues that smaller investors may be mostly unaware of either analyst forecasts or more sophisticated time series earnings expectations models. He hypotheses and finds that they are more responsive to seasonal random walk earnings forecast errors (*SRWFE*) where expected quarterly earnings is simply the earnings from the same quarter of the prior year. Interestingly, particular in light of some of the evidence that will be presented in this paper, he also finds that large investor trading is negatively related to both simple random walk and analyst forecast error (*AFE*) magnitudes. That is, large investors seemingly simply actively avoid trading on forecast errors. An alternative explanation, that the evidence presented in our analysis lends particular credence to, is that it is not so much that large investors avoid trading on these errors, but rather

that their forecast related trading activity is not showing up in the form of large transaction sizes (which is how Bhattacharya measures large traders).

BM builds on the Bhattacharya analysis by introducing directional trading metrics based on the Lee and Ready (1991) algorithm. BM find that net buy activity of large investors (again measured by transaction size) is positively associated with *AFE* and unrelated to *SRWFE*. Alternatively, the net buy activity of small investors is positively associated with *SRWFE*. Shanthikumar (2012), however, presents evidence that this directional trading impact becomes well-defined only when the earnings change is preceded by prior same direction earnings changes, reflecting a behavioral "momentum" effect. With respect to *AFE*, BM find that small transaction size net buying is negatively associated with *AFE*.[4] This relation is puzzling because a significant association implies that small traders are observing the signal and responding to it. However, the paper argues that small investors are generally unaware of these analyst forecasts that they are apparently responding to (in a rather odd fashion).

Ayers et al. (2011) extend the BM analysis to examine trading patterns by large and small investors in the post-announcement period. Their analysis, in fact, revisits issues initially addressed in Shanthikumar (2004) concerning the relation between small and large directional trade size activity and post-earnings-announcement drift (PEAD). Shanthikumar focuses mostly on *SRWFE* and presents a more mixed picture of small and large trader post-earnings-announcement trading activity wherein large traders, but not small traders, trade in the first few weeks after the announcement date in direction of the forecast error. Ayers et al. find that in the post-announcement period small trade size net buying is clearly in the direction of the random

[4] They initially focus on six groups of trades based on number of shares traded and later in their main analysis, similar to Bhattacharya (2001), they define small trades as shares traded less than 500 shares and large trades as shares traded more than 5,000 shares.

walk forecast error but is contrary to the analyst forecast error. While for large trade sizes, net buying is contrary to the random walk forecast error but consistent with the analyst forecast error. They also find that the magnitude of the random walk PEAD effect is negatively related to announcement period small trade size net buying and positively related (marginally significant) to announcement period large trade size net buying, a result which is similar to findings reported in Shanthikumar. The magnitude of the analyst forecast PEAD effect, however, is unrelated to small investor net buying and negatively related to large investor announcement period net buying.

In contrast with the transaction size based line of inquiry that has characterized much of the work on earnings announcement driven trading differences between small and large traders, recent efforts have also employed more direct measures of individual and institutional trading to examine their announcement and post-announcement trading activity. Hirschleifer, Myers, Myers, and Teoh (2008) and Taylor (2010, 2011) employ brokerage house records of individual trades in the 1991 to 1996 time period to examine relations between individual investor trading behavior and PEAD. Hirschleifer et al. find some evidence that individual investor net buying in the immediate post-announcement period is negatively related to subsequent returns. This effect appears to be unrelated to earnings surprises since the drift coefficient (on random walk earnings surprise) is unaffected by the inclusion of individual investor net buying as an additional explanatory variable. Taylor (2010) finds that directional individual investor trading, particularly trading by less active individuals, around earnings announcements is more negatively associated with subsequent returns than is generally true.[5] Taylor (2011) finds that the announcement period

[5] Hirschleifer et al. (2008) also present evidence of an inverse relation between net buy and subsequent return. Such a relation is, in fact, broadly consistent with the general negative relation identified in Odean (1999)). However, evidence in Kaniel et al. (2012) based on NYSE individual investor trading records detects a positive relation

earnings surprise coefficient magnitude is larger and the post-earnings announcement drift magnitude is larger when individual announcement period trading is surprise contrarian (i.e., it is opposite in direction to the surprise).

Most recently, Kaniel, Liu, Saar, and Titman (2012) employ the NYSE's Consolidated Equity Audit Trail Data, which cover all NYSE executed orders over the 2000 to 2003 time period to examine earnings announcement related trading. For each order, these data, in particular, indicate whether or not it is attributable to an individual investor. Their evidence indicates that in the post-announcement period individual investors trade in a contrarian fashion to both pre-announcement returns and to announcement news, measured as either analyst earnings surprise or announcement period returns. Griffin, Shu, and Topaloglu (2008, 2012) evaluate NASDAQ trading over the 1997 to 2002 time period where the type of investor engaged in a trade is inferred based on linking investor types and brokerage houses where orders originate. They find that institutional trading imbalance (net buying) in the announcement period positively predicts returns over the following 65 trading days.

3. Research Issues

Our analysis encompasses three distinct areas of inquiry with respect to institutional and transaction-size stratified trading at and after earnings news releases: (1) In assimilating earnings news, are the directional attributes of small trades by institutions consistent with the directional attributes of large trades by institutions? (2) Are transaction-based inferences about institutional

between pre-announcement individual trade imbalance and earnings announcement return which is incremental to the general positive relation between individual investor net buying and returns documented in Kaniel et al. (2008). And, transaction size based evidence in table 4 of Ayers et al. (2011) suggests a positive marginal relation between announcement period small trade size net buying and post-announcement period return.

earnings announcement and post-earnings-announcement trading consistent with the underlying order entries and position changes that are actually taking place? And, (3) how do the types of institutions covered in our data (i.e., Pension and Mutual Funds) trade in response to earnings news and to what extent do such response vary with institution size?

3.1 Institutional Small Trade Activity

Institutions can become involved in small trade activity for a number of reasons. For instance, if they enter a large order as a limit order, it may end up being broken up as it is executed against multiple market orders. Alternatively, institutions may simply favor making only small changes in their holdings at any given point in time. That is, they simply, as a matter of course, choose to trade small. Finally, they may undertake to make a large change in position by entering a series of small orders. Such behavior is documented in Barclay and Warner (1993), who term it "stealth trading".[6]

In general, transaction size based analyses assume that large/institutional trader activity in small transaction size categories are either adding noise to the analysis, or are biasing against detecting hypothesized individual investor trading patterns. That is, any results are obtained in spite of the presence of small trade size activity by institutions, not because of such activity. We evaluate this premise by evaluating whether announcement and post-announcement period trading in small trade sizes by institutions is consistent with or contrarian to: (1) existing findings in the transaction size based literature on small trader trading in these time periods; and, (2) with large trade size trading by these same institutions. If, in particular, large investor trading impacts are to be ruled out as a source of the existing small trader announcement and post-announcement

[6] See also Kyle 1985; Cornell and Sirri 1992; Meulbroek 1992; Barclay and Warner 1993; Anand and Chakravarty 2007; and Akins et al 2011.

period findings in the literature, then small transaction size net buying should either be unrelated to or positively related to analyst forecast errors (per BM and Ayers et al.) and unrelated or negatively related to random walk forecast errors. The relations between small transaction size net buying and the two earnings surprise measures should also be consistent with the relations obtained for large transaction size trading.

3.2. Institutional Large Transaction Activity

If institutional traders are engaged in small trade size activity, it follows that such activity has systematic implications for large trade size activity as well. For example, if institutional sell orders largely appear in the data as small transactions while their buy orders do not, then it follows that the large transaction metrics are distorted as measures of institutional trading activity by the systematic absence of these buy transactions. Or, if institutions tend to trade smaller (i.e., they move to smaller order sizes) in some settings, then they will tend to disappear from large trade size metrics even though they are still really actively involved in trading.

The data used in this study provide information on both transactions and the cumulative changes in positions for institutional investors. Hence, we examine whether the degree to which institutional large transaction activity in response to earnings news is consistent with what is actually happening in terms of their overall position changes. That is, does large transaction size based evidence provide reliable inferences about what is really going on at the total holdings levels among institutional investors? We also evaluate the degree to which institutions maintain trade size conformity. That is, is there any evidence that they systematically shift order sizes in a fashion that leads to erroneous inferences about their underlying levels of activity?

3.3 Earnings Announcement Trading by Pension and Mutual Funds

Our data pertain to trading activity by pension and mutual funds. These two types of institutional investors are an important component of the overall population of institutional investors as revealed by the fact that those covered in our data typically account for around 10% of total market volume. However, compared to other types of institutions they are arguably less sophisticated. Particularly pertinent here are the findings reported in Ke and Ramalingegowda (2005). Using quarterly institutional holdings data they find evidence that transient institutions (Bushee, 2001) trade in a drift exploiting manner but that other types of institutions (i.e., quasi-indexers and dedicated) do not. Similarly, Griffin et al. (2008) find evidence that general institutional trading is opposite that of announcement period returns while hedge funds trade in the same direction as announcement return. Hence, it is also of interest to examine the role of pension fund and mutual fund investors in the context of the PEAD phenomenon. Are these types of investors neutral players? Do they trade to exploit the drift? Or, do they possibly trade in a drift sustaining fashion? This last possibility is particularly intriguing in that the scale at which these investors operate is clearly sufficient to impact pricing at the margin.

Consistent with the approaches taken in Hirschleifer et al. (2008) and Ayers et al. (2011) we examine whether earnings announcement trading by pension and mutual fund institutional investors at the announcement dates is in a drift enhancing or drift contrarian direction. Similarly, in the post-announcement period we examine whether their trading is consistent with reducing the drift or whether it is impeding the price adjustment process. Consistent with returns to scale arguments postulated in Wilson (1975), Ohlson (1975) and Cready (1988) as well as the transient institutional evidence in Ke and Ramalingegowda (2005), we examine whether these

observed drift contingent trading patterns change depending on the scale/activity level of the institution as noisily revealed by their aggregate annual level of trade activity.

4. Research Design

The key innovative aspect of our analysis is the use of detailed daily institutional trading data from Ancerno Ltd. (formerly Abel and Noser).[7] The Ancerno dataset covers institutional trading activity corresponding to roughly 10% of the overall institutional trading volume over the 1998-2010 period (Puckett and Yan, 2011). The database does not provide the name of the institutional investor; however, each institution is identified with a unique client code making it possible to keep track of daily trades in each firm for each investor in the database.[8] Ancerno reports a unique identifier for each client, a code for every manager operating under a client, a code for each broker through which trades are executed, firm identifiers (CUSIP and TICKER symbol), trade date, execution volume, execution price, and whether the trade is a buy or sell. Hence, distinct from prior literature on large investor trading behaviors in announcement periods we are able to directly evaluate both orders and net position changes by large investors.

4.1 Institutional Trading Metrics

Our analysis relies on three distinct institutional investor trading metrics generated from the Ancerno data: (1) directional transactions (2) directional orders; and (3) directional cumulative daily position changes. A directional transaction for a given institutional investor in a given security is measured as the number of shares executed in a specific recorded stock

[7] Institutional trading data from Ancerno has been used by Irvine, Lipson, and Puckett (2007), Pucket and Yan (2011), Jegadeesh and Tang (2010), Goldstein, Irvine, Kandel, and Wiener (2009), Chemmanur, He, and Hu (2009), and Goldstein, Irvine, and Puckett (2010).

[8] Data representatives at Ancerno Ltd. have indicated that they believe clients submit to Ancerno all their trades for transaction cost analysis including trades executed in the "upstairs" or "dark" market.

exchange transaction where the buy/sell determination is based on the order associated with the transaction. A directional order is the number of shares entered into the system as a single buy/sell order by a given institutional investor. Directional position change is the sum of all directional transactions that occur in a given day.[9]

Prior literature uses various cutoff points to classify transactions in the TAQ data as small vs. large. We employ three sets of cutoff points to classify transactions, orders, and position changes into small and large trade size categories. First, as in BM, a transaction, order, or position change is considered large if it equals or exceeds 5,000 shares and small if it consists of fewer than 500 shares. Second, as in Ayers et al. we classify a transaction, order, or position change as large if dollar value of shares executed equals or exceeds $30,000 and small if the dollar value of shares executed is less than or equal to $5,000. Third, as a dollar value based alternative, we also use $10,000 (small) and $50,000 (large) cutoffs (Bhattacharya, 2007; Shantikumar, 2004).

Two approaches are used for forming aggregate directional trading measures: (1) following BM we create an excess net-buy metric (denoted *Ex_NetNumBuy*) based on the counts of buy and sell trades; (2) following Ayers et al. (2011) we create a volume based buy-sell imbalance metric (denoted *Ex_NetBuy*) using the number of shares executed in a given buy or sell transaction, order, or position change. We calculate the daily average excess net-buy for both the earnings announcement period [-1,+1] and the post-announcement period [+6,+65]. Below we describe the methodology we employ to calculate these metrics.

[9] All of the reported results are robust to defining position change based on the either the sum of directional orders placed in a day (irrespective of whether or not they are executed that day) or the sum of executed directional transactions that were both placed and executed in that same trading day.

4.1.1 Count based excess net-buy

Consistent with BM, *Ex_NetNumBuy* for each stock *i* and day *k* is the difference between the total number of buys $\sum_{n=1}^{M} BUY_{in}$ and the total number of sells $\sum_{m=1}^{N} SELL_{im}$ where *M* is the total number of buys on day *k* in stock *i* and *N* is the total number of sells on day *k* in stock *i*. *BUY* and *SELL* indicate whether a given transaction, order, or position change is a buy or sell, respectively. The daily net number of buys on day *k* for stock *i* is*:* $NetNumBuy_{ik}$=$\sum_{n=1}^{M} BUY_{in} - \sum_{m=1}^{N} SELL_{im}$. A positive (negative) $NetNumBuy_{ik}$ indicates net buying (net-selling) in stock *i* on day *k.*

In order to calculate the excess net-buy measure, BM adjust the average daily net number of buys during the three-day announcement period with the average daily net number of buys during pre- and post-announcement periods. Since we also examine the post-earnings announcement trading behavior of institutional investors, consistent with Ayers et al., we use only the pre-announcement period as the benchmark in calculating the normal daily net number of buys. We then adjust the daily net buy in announcement and post-announcement periods with the normal daily net buy from the benchmark period. Specifically, we calculate the daily average excess net number of buys during the event period [-1,+1] and the post earnings announcement period [+6,+65] for each trade size category based on transactions, orders, and position changes as:

$$Ex\_NetNumBuy_i[k_1,k_2] = \frac{(\sum_{\tau=k_1}^{k_2} NetNumBuy_{i\tau})/(k_2-k_1+1) - \sum_{\tau=t-60}^{t-6} NetNumBuy_{i\tau}/55}{\sum_{\tau=t-60}^{t-6} TotalNumBuy_{i\tau}/55} \quad (1)$$

where *t* is firm *i*'s earnings announcement date. k_1 and k_2 range from -1 to +1 for the earnings announcement window and from +6 to +65 for the post-earnings announcement window,

respectively. $TotalNumBuy_{it}$ is the sum of the number of transactions, orders, or position changes that take place in firm i's stock on day t in a given trade size category. In order to remain consistent with BM, we employ this measure throughout the analysis involving classification of transactions, orders, and position changes as small and large with respect to the number of shares executed (i.e. <500 shares and >5,000 shares). [10]

4.1.2 Net share volume based excess net-buy

Consistent with Ayers et al.'s (2011) *Ex_NetBuy* is based on the buy-sell order imbalance (i.e., number of shares bought minus sold) in stock i on day k , as $BMS_{ik} = (\sum_{m=1}^{M} Buy_{ikm} - \sum_{n=1}^{N} Sell_{ikn})$ where *M (N)* is the total number of shares bought (sold) on day k for stock i.[11] A positive (negative) net-buy, *BMS,* means net-buying (net-selling) activity. The excess net-buy during the announcement and post-announcement periods relative to the pre-announcement period of [-60, -6] is:

$$Ex\_NetBuy_i[k_1, k_2] = \frac{(\sum_{\tau=k_1}^{k_2} BMS_{i\tau})/(k_2 - k_1 + 1) - \sum_{\tau=t-60}^{t-6} BMS_{i\tau}/55}{\sum_{\tau=t-60}^{t-6} BPS_{i\tau}/55} \qquad (2)$$

where t is firm i's earnings announcement date. k_1 and k_2 range from -1 to +1 for the earnings announcement period and from +6 to +65 for the post-earnings announcement period, respectively. The numerator is the average daily *net* number of shares bought over the $[k_1,k_2]$ period minus the average daily net number of shares bought over the benchmark period, [-60,-6]. The denominator, $\sum_{\tau=t-60}^{t-6} BPS_{i\tau}/55$, is the daily average number of shares bought *plus* number

[10] Results are qualitatively similar if we calculate the excess net buy using net number of shares bought as in Ayers et al. instead of net number of transactions and classify trades as small and large using number of shares traded in a given transaction, order, or position change.

[11] Specifically, BMS measures the number of buy shares minus number of sell shares.

of shares sold during the benchmark period. The excess net-buy metric in equation (2) therefore represents the net-buy activity on Day *t* in excess of the 55-day benchmark period net-buy activity, all scaled by the benchmark period total trading activity. We employ this measure when dollar value trade size cutoffs (i.e., <$5,000, <$10,000, >$30,000, >$50,000) are employed as this is broadly consistent with existing research employing dollar value cutoffs. We also employ this basic approach when we examine directional institutional investor trading in our sample as a whole.

4.2 Regression Models

Consistent with BM and Ayers et al. we use the following general regression framework in order to examine the relation between forecast errors and excess net buy during the announcement and post announcement periods:

$$Ex\_NetNumBuy_{it} \text{ or } Ex\_NetBuy_{it} = \beta_0 + \beta_1 AFE_{it} + \beta_2 SRWFE_{it} + \varepsilon_{it} \qquad (3)$$

where $Ex\_NetNumBuy_{it}$ and Ex_NetBuy_{it} are measures of excess buy for security i for time period t as described in the prior section. AFE_{it} is the analyst forecast error obtained by subtracting the consensus analyst forecast from the actual earnings per share on IBES and scaling by share price at the end of the most recent quarter prior to the earnings announcement date ($AFE_{it} = (EPS_{it} - CEPS_{it})/P_{it-1}$)). The consensus analyst forecast ($CEPS_{it}$) is the mean of the analyst earnings per share forecast issued during the 90 day period prior to the earnings announcement.[12] $SRWFE_{it}$ is the seasonal random walk forecast error calculated as the seasonally differenced quarterly earnings before extraordinary items per share in COMPUSTAT scaled by price from one quarter before the earnings announcement ($SRWFE_{it} = (EPS_{it} - EPS_{it-4})/P_{it-1}$). Consistent with BM, Ayers et al., and Bernard and Thomas (1990) we code *AFE* and

[12] We also use the median analyst forecast over the [-90,-2] period as the consensus forecast and obtain very similar results.

SRWFE by within-quarter decile. Then, we equally space the coded decile scores from -0.5 (lowest decile) to +0.5 (highest decile).

We also explore the relationship between excess net buy and forecast errors separately for large and small investors. As Ancerno does not identify institutions by name or provide information about institutional holdings, we are not in a position to directly classify institutions into size quartiles based on portfolio magnitudes (i.e., total assets under management). Instead, we infer institution sizes based on values of annual trading activities as reflected by the Ancerno trading records. Specifically, in each year for each institution in the database we sum up the total dollar value of its trades. Institutions (as identified by their Ancerno identifiers) in the highest quartile in a given year are identified as large traders for that year. Relative to the total assets under management this approach is sensitive to the frequency with which an institution turns over its portfolio. Consequently, it tends to classify active traders as larger and passive traders as smaller. However, to the extent that trader activeness is also indicative of sophistication, then this bias is broadly consistent with the notion of trader sophistication increasing with size.

As in Ayers et al. we explore the relationship between post earnings announcement drift and announcement window excess net buy using our sample through the following general regression framework:

$$DRIFT_i = \beta_0 + \beta_1 EXL_{it} + \beta_2 EXS_{it} + \beta_3 AFE_{it} + \beta_4 SRWFE_{it} + \beta_5 EXL_{it} * AFE_{it} + \beta_6 EXS_{it} * AFE_{it} + \beta_7 EXL_{it} * SRWFE_{it} + \beta_8 EXS_{it} * SRWFE_{it} + \boldsymbol{\delta} \times Controls_{it} \quad \varepsilon_{it} \qquad (4)$$

where *DRIFT* is the cumulative abnormal returns over the day +6 to day +65 window relative to the announcement. Abnormal return is defined as the firm return in excess of the corresponding Fama-French size and book-to-market 25 portfolio benchmark return. *EXL* and *EXS* are large and small trade size based announcement period net buy metrics (i.e., they correspond to

$Ex\_NetNumBuy_{it}$ and Ex_NetBuy_{it} measures described in the prior section). The vector of control variables includes the following: *CAR[-1,1] (CAR[-60,-3])* defined as the cumulative returns over the day -1 to +1 (day -60 to -3) trading window relative to the earnings announcement day in excess of the corresponding Fama-French size and book-to-market 25 portfolio benchmark return; *TransCost*, a measure of transaction cost defined as in Ayers et al. (2011). *TransCost* takes on values between 0 and -1 and is equal to -1 times the average of scores on the following three dimensions: (1) the decile ranking scaled to between 0 and 1 of market value at the end of the earnings announcement quarter, (2) the decile ranking (scaled to between 0 and 1) of trading volume over the preceding fiscal year ending in the earnings announcement quarter, and (3) an indicator variable that equals 1 if price at the end of the earnings announcement quarter is greater than $10, and 0 otherwise (Ayers et al, 2011; Bhushan 1994; Kimbrough 2005).[13]

4.3. Data and Sample

We obtain institutional trading data from Ancerno Ltd (formerly Abel and Noser) over the 2003-2009 period.[14] Ancerno, a transaction cost analysis firm, reports trades by pension plan sponsors (e.g., CALPERS and YMCA retirement fund) and money managers (e.g., Vanguard and Fidelity). Ancerno also reports trades by clients classified as brokers but we eliminate these and focus on trades by funds only. The database includes a unique identifier for each institutional investor, a unique identifier for each ticket submitted to a broker (*orderid*)[15], the size of the ticket, the size of the volume executed by the broker, the identity of the broker executing the

[13] The set of control variables is the same as that employed in Ayers et al with the exception that we also include the two *CAR* variables in some specifications. We do this given the evidence in Griffin et al. (2008, 2009) and Kaniel et al. (2012) that institutional as well as individual trading is related to past and contemporaneous return. In general, however, our results are insensitive to the inclusion or exclusion of these return measures.

[14] While Ancerno data are available starting in 1997, the data do not encompass substantial numbers of institutions until 2003. Hence, we begin our analysis with the 2003 data.

[15] In cases where *orderid* is not specified by Ancerno, we use the *client code*, *lognumber*, stock identifier (ticker), and *onumber* (the first record number of the block) in order to identify tickets.

order, whether the order was a buy or a sell, and the execution price. Each entry in the database corresponds to an executed trade.

Table 1 provides descriptive statistics on the trading activity of 802 unique institutional investors in the Ancerno database over the 2003-2009 period. In a given year, the total dollar (share) volume across all Ancerno investors is roughly $4.1 trillion (140 billion shares). This number ranges from $7.2 billion (264 million shares) for the smallest quartile of investors to $3.9 trillion (132 billion shares) for the largest quartile of investors. Thus, the largest 25% of investors in the Ancerno database account for more than 90% of the trading volume in a given year. The total number of transactions in a given year by all Ancerno clients is roughly 28.2 million while the total number of orders submitted for execution in a given year is 9.5 million. The number of daily position changes in a given year is 4.8 million. These three numbers suggest that large orders and position changes seem to be executed in smaller transactions. Especially, for the largest quartile of investors, the number of transactions is almost six times the number of position changes while for the smallest investors the number of transactions is only 50% larger than the number of position changes.

The average investor in the Ancerno database generates a total dollar (share) volume of $11 billion (382 million shares) in a given year through 77,395 transactions, 26,656 orders, and 13,013 daily position changes. The largest investors in the database are roughly 20 (25) times larger than those in the third quartile with respect to the total dollar (share) volume traded in a given year. The average transaction size across all Ancerno clients is $158,788 (5,610 shares). The corresponding figures for small and large investors are $37,192 (1,391 shares) and $169,729 (5,996 shares), respectively. The average order size is almost double the average transaction size

while the average daily position change is roughly five times large than the average transaction size.

Chordia et al. (2011) report that the percentage of "large" transactions (those in excess of $10,000) shifted from over 90% to under 50% between 1993 and 2008 with almost all of the shift occurring after 2005.[16] We evaluate the impact of this shift in our data at a descriptive level in table 2, which provides average trade sizes by year for each of the four institution size quartiles. Panel A reports the time series evolution of the average transaction size while panels B and C report order size and position change averages. Consistent with Chordia et al., the post-2005 average transaction sizes are sharply lower in the largest size quartile. This decline is mirrored in the order data, indicating that the largest quartile of institutions have decreased order sizes substantially after 2005. Moreover, there is little indication of any sort of shift in position change magnitudes over this time period. Hence, large institutions appear to have become far more prone to using multiple orders to achieve given position changes in the post-2005 time period. This behavior also seems to be limited to only the largest institutions as there is little indication of any similar sorts of shifts in order and transaction sizes in the other three quartiles.[17]

[17] Given this shift in behavior we repeat all of our analyses using just the pre-2006 data. These analyses are provided in the Appendix. Relative to our reported results, we interpret these results as broadly consistent with those reported in our main tables. We also note those instances where there are substantive differences when only the pre-2006 period data are used. Finally, in our analyses of the future return prediction properties of announcement period imbalances, we report the 2003 to 2005 results as it is this period that overlaps with the time period examined in Ayers et al., and we only find evidence that imbalances are predictive in this time period.

5. Results

5.1 Trade Size and Institution Size

We open the empirical analysis by examining the extent to which the assumption that transactions sorted by size accurately reflects the relative size or scale of traders holds within the Ancerno data. We also further explore the degree to which it holds across the three measures of trading activity that we employ: (1) transactions; (2) orders; and, (3) position changes.

Table 3 reports trading activity counts for three small trade size categories (<500 shares, <$5,000, and <$10,000) and three large trade size categories (>5,000 shares, >$30,000, >$50,000) by investor size quartile. For each count, its percentage of the total number of trades by investors in the given size class are also reported. These percentages reflect the level of overall trade activity by an investor size group that shows up in a given size category. Panel A reports counts and percentages based on executed transactions, panel B reports based on submitted orders, and panel C reports based on daily position changes.

In the panel A transactions analysis the relative activity of the largest two quartiles of investors in each of the three small trade size categories exceeds that of the smallest quartile of investors. For instance, 32.78% of the quartile 1 (smallest) investor trading activity occurs in transaction sizes of less than $5,000, which is substantially lower (significant at the .01 level) than the relative activity level of the quartile 3 (46.31%) and the quartile 4 (largest) investors (43.28%) in this same small trade size category. That is, relative to small investor activity, a greater share of large investor activity shows up as small trade sizes.[18] In the large transaction

[18] In the 2003 to 2005 time period, reported in the Appendix, these small transaction (and order) size activity percentages are 10 to 15 percentage points lower, consistent with the higher transaction (and order) sizes occurring in these years. And, in the case of transactions, while these percentages are uniformly significantly larger for quartile

size categories, however, the quartile 4 percentages are highest in all cases but one (the quartile 2 percentage for the >$30,000 size categories), consistent with large transaction size categories capturing trading activity by the largest institutions.

Panel B considers order sizes which, unlike transactions, are not subject to distortion due to how they are executed. Relative to panel A the counts in panel B are much smaller, reflecting the strong tendency of orders to being broken up in execution. And, consistent with order break-ups being related to order size, the relative trading percentages are now smaller in the small trade size categories and larger in the large trade size categories. However, as was true for transactions, for all three small trade size categories the quartile 1 percentage is significantly smaller than the companion quartile 4 percentage. So, the largest institutions appear more prone to entering small orders than do the smallest institutions. For the large trade size categories it is again the case that the quartile 4 percentages exceed the quartile 1 percentages across all three large trade size categories. However, the quartile 4 percentages generally do not exceed the percentages for the intervening quartiles (quartiles 2 and 3) which suggests a degree of ambiguity exists in the relation between categorized large order sizes and trader size.

In panel C the level of analysis shifts to position changes. Here, how an institution packages its orders ceases to impact the trading metric provided the orders are executed within a single trading day. And, it is only at this level that we find the expected relation between trade size frequencies and investor size across all trade size categories. Specifically, unlike the case for orders and transactions, in the three small trade size categories the quartile 1 percentages are substantially larger than their quartile 2 through 4 counterparts. And, in the three large categories

3 relative to all other quartiles, the quartile 4 percentages are slightly smaller than the quartile 1 percentages for the <500 share size category.

the pattern reverses—the quartile 4 percentages exceed their quartile 1 through 3 counterparts by wide margins.

Collectively, the evidence in the three panels supports the notion that for institutional investors substantive divergences do exist between transaction based and position change based inferences. The position change finding here is what is expected--relative participation rates by the largest investors are low in small trade size categories and high in large trade size categories. The order size and transaction findings, while mostly supportive of a link between the largest investors and large trades, are not at all supportive of a link between small (in a relative sense) investors and small trade sizes. Indeed, trading activity by the largest investors seem to dominate both large and small trade size trading activity when either transactions or orders are used to measure trade size. Finally, from the broader perspective of all investors in the market, the institutions in the Ancerno database are arguably all quite large. Consequently, we should expect that the bulk of their trading activity should also be classified as large. For position changes this expectation holds as, depending on the trade size metric used, only between 15.47% and 27.53% of the position changes in our data are classified as small. In contrast, for transactions these percentages range between 43.13% and 59.61%.

5.2. Earnings Announcement Period Analysis

Table 4 provides summary statistics on the sample of 55,112 earnings announcements employed in our analysis. Actual earnings per share figures and analyst earnings forecasts are obtained from I/B/E/S. We eliminate observations where the earnings announcement date in the I/B/E/S is not within two trading days of the earnings announcement date reported on COMPUSTAT. We obtain data on fiscal quarter end price and shares outstanding from

COMPUSTAT. We drop all firm-quarter observations where stock price is below $1.00 and the market value of the firm is less than $10 million as of the most recent fiscal quarter end prior to the earnings announcement date. When calculating the excess net buy metrics, we require the stock to be traded at least on 3 trading days during the pre-announcement period (days -60 to -6). In order to ensure that our results are not driven by outliers, we eliminate observations in the top and bottom 1% with respect to the *SRWFE*, *AFE*, and *Excess Net Buy* metrics.

In our sample the mean *AFE* is -0.0004 and mean *SRWFE* is -0.0031. Both of these means are significant at the .05 level. Overall abnormal returns in both the pre-announcement and post-announcement periods are negative. The announcement period return, however, is positive and significant, consistent with the findings of an announcement period risk premium reported in Ball and Kothari (1991). In the extreme good news quintiles (*AFE* and *SRWFE* quintile 5) returns before during and after the earnings announcement are all positive and significant. In the extreme bad news quintiles, however, return before and during the announcements are negative and significant, but post-announcement returns while negative, lack statistical significance. Hence, while the evidence is consistent with post-earnings announcement drift, its magnitude does not seem to be particularly strong in our sample, particularly on the negative side.

Existing transaction size conditioned analyses focus on both unconditional differences between small and large trader trading (beginning with Cready (1988) and Lee (1993)) and earnings news conditioned trading. Table 5 provides analyses pertinent to unconditional announcement period trading. Panel A presents percentage increases in announcement period transactions (relative to day -60 to -6 averages) for the four size quartiles of Ancerno traders. All four groups exhibit marked increases in trading activity, with transaction counts rising by

31.77%, dollar value rising by 61.99%, and share volume rising by 64.62%. However, these increases are not uniform across size quartiles. The increases in quartile 4 (the largest quartile) are substantially smaller than those observed in the other three quartiles (all of these differences are significant at the .01 level). For instance, in terms of dollar value of trading the quartile 4 increase is 59.89% while the increases in the other three quartiles ranges between 79.90% and 94.15%. That is, the largest institutional investors are comparatively less responsive to earnings news than other institutions.

Panel A also reports that transaction sizes increase by 35.65% when measured as dollar values and by 37.48% when measured as shares. Such increases could be due either to institutions increasing order sizes or to increased aggregation of orders in execution in announcement periods. The panel B order analysis, however, indicates a similar rise in order sizes of 39.92% and 42.15%. Hence, in announcement periods it appears that institutions increase their order sizes by sizable amounts. This result, however, is consistent with the general idea that per capita volume should rise in high information content public information release periods (Kim and Verrecchia, 1991).

Institutions shifting to larger order sizes in earnings announcement periods have two important implications for understanding existing empirical evidence relying on size-stratified transaction designs. First, it suggests that an increase in event period average transaction size does not necessarily imply that disproportionate numbers of large investors are acting on the information. Order and transaction sizes may simply be increasing because those institutions that do transact are doing so on a much larger scale relative to the scale at which they typically operate. Second, it is inconsistent with earnings disclosures being stealth trading dominated

events. That is, if these investors are engaging in stealth trading in the announcement period then order sizes should decrease, not increase.

The panel B order analysis also indicates that the overall percentage increase in orders is only 16.51%, which is substantially smaller than the overall increase in transactions of 31.77%. Hence, the larger orders being entered by these investors in the announcement period seem more prone to being broken up in execution. Such break-ups may, in particular, reflect a rise in limit order activity in which large orders are entered, but are executed as a series of smaller transactions against incoming orders.

Panel C of table 5 presents the % increases in orders and transactions as well as the net buy measures for the three small and the three large share size strata. In the three small size categories the increases in transactions range between 22.70% and 24.35%. However, the levels of order increases in these same categories are negligible, ranging between 1.91% and 3.46%. Hence, almost all of the increases in announcement period small transaction activity in our data are due to larger orders being downsized when executed as transactions. There is also no evidence of any sort of non-zero net buy effect within these three size categories. In contrast, for the three large trade size categories percent increases in transactions range between 43.61% and 53.43% while increases in orders range between 30.77% and 43.86%. These higher percentages in larger transaction size categories are consistent with the increases in mean transaction and order sizes documented in panels A and B. And, in these categories there is also broad evidence of negative net buying, with only the net buy for orders of over 5,000 shares lacking significance at conventional levels.[19]

[19] When the analysis is limited to the 2003 to 2005 time period there is actually evidence of positive net buying in the small trade size categories while the evidence of net selling in the large trade size categories is weaker. There is

Table 6 reports regressions of announcement period net buying within the various size categories on *AFE* and *SRWFE*. Panel A uses transactions to determine trade sizes and net buying. In the three large trade size categories the *AFE* coefficients are uniformly positive and significant (at the .10 level or better). This relation is consistent with large investors trading in a drift-reducing fashion and conforms with existing empirical large transaction size based evidence (as well as non-transactions based evidence on institutional trading). For the three small trade size categories, however, the *AFE* coefficient is negative, and significant at the .10 level or better for the <500 share and <$5,000 categories. While this result is consistent with what BM find for small transaction sizes, it is clearly not consistent with what is happening with these same investors at the large transaction size level. Moreover, BM attribute these results to (unsophisticated trading by) small traders and there are arguably no such traders in the Ancerno data we employ. And, it is not easily explained as Ancerno investors taking the opposite ("passive") side of forecast error contrarian small investor market orders since a negative coefficient indicates that their trading here itself is drift contrarian.[20]

The large and small transaction size based *SRWFE* coefficients are also directionally inconsistent. The large size coefficients are negative (significant at the .10 level in two of the three categories) while the small size coefficients are positive (all significant at the .05 level or better).[21] The positive small trade size coefficient signs are consistent with the evidence in BM and Ayers et al. that small investors trade in a drift reducing manner with respect to *SRWFE*.

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also evidence of positive net buying for this time period in the panel A transactions and panel B orders analyses for the largest quartile of institutions.

[20] Whether individual investors are, in fact, trading in a drift contrarian fashion with respect to *AFE* is unclear. Ayers et al. find no evidence of any relation between *AFE* and directional small transaction activity in the announcement period while Kaniel et al. (2012) find no evidence that directional individual investor orders (inferred directly from NYSE trading records) are related to *AFE* after controlling for pre-announcement return driven trading.

[21] In the 2003 to 2005 time period, however, these large trade size *SRWFE* coefficients lack significance for transactions, but do remain negative and significant (.05 level) for the corresponding large order size categories.

However, the Ancerno data does not have small traders in the traditional sense, so this result is again at odds with expectations. That is, we might expect: (1) no relation; (2) a relation that it is contrarian to the small trader relation documented in the literature; (3) a relation that is consistent with that found in the large trade size categories. The positive small transaction size coefficients are significant, not contrarian to existing evidence on small trader trading, and are contrarian to the companion large trade size results.

Panel B shifts the level of analysis to orders, and so directly reflects trading actions taken by the institutional traders covered by the data. Here, the relations for both *AFE* and *SRWFE* are negative and mostly significant across all trade size categories.[22] That is, these institutional investors are, on average, entering contrarian to forecast error (*AFE* or *ARWFE*) orders in the announcement period. The negative *SRWFE* coefficients in the small share size categories as well as the negative *AFE* coefficients in the large share size categories are also inconsistent with the positive coefficients reported for these categories in the panel A transactions-based analyses. These directional reversals suggest that large *AFE* contrarian orders are being screened out of the large transaction size categories while non-small *SRWFE* consistent orders are being screened into small transaction size categories. As these results are robust to whether orders are or are not executed in the announcement period it seems that *AFE* contrarian and *SRWFE* consistent orders are particularly prone to being broken up in execution. This asymmetric order execution effect underscores the problematic nature of using transaction sizes to measure scale-related directional trading activity. That is, the panel A analysis suggests that large trade size traders are buying on

[22] In the 2003 to 2005 time period orders analysis the *SRWFE* coefficients lack significance and the *AFE* coefficient for the >5,000 share size category is positive and significant (.10 level). The >$30,000 and >$50,000 *AFE* coefficients are also positive, but lack significance. In the panel C position change estimations, however, all three of these coefficients are negative.

AFE while small trade size traders are buying on *SRWFE* when, in fact, these investors are placing net sell orders on both errors irrespective of order size.

Panel C extends the analysis to position changes achieved by investors during the announcement period. All of the forecast error coefficients in the large trade size categories are negative and highly significant (.01 level) indicating, consistent with their orders, that when the position change is sizable these investors are trading in forecast error contrarian fashion in the announcement period. In the small position change categories, however, the coefficients lack statistical significance at conventional levels with the sole exception being a significant negative *SRWFE* coefficient in the <$10,000 size category. Overall, the evidence then suggests that large position changes are drift contrarian while small changes are mostly drift neutral. This conclusion is simpler and substantially different from what is implied by the conventional transaction size based analysis.

An alternative approach to using our data to evaluate the announcement period behavior of large investor trading is to examine all position changes by large traders per se. That is, for trading by those institutions that the Ancerno data indicate are large as measured by the dollar value of their trading activity in a year. Table 7 reports correlations (panel A) and estimations of equation (1) for orders and position changes for all institutions, institutions in the largest quartile of institutions, and institutions in the bottom two size quartiles. For *AFE* these results suggest that the smaller traders in the data are responsible for much of the negative relation with announcement period net buying activity. The panel A correlations are much smaller for the institutions in the largest size quartile relative to their magnitudes for the bottom two quartiles. In the panel B regressions *AFE* lacks significance overall and in the largest investor size quartile. But, it is negative and highly significant (.01 level) in the bottom two quartiles. For *SRWFE*,

however, the effect is opposite. The negative relations are strongest for the top quartile investors, but are less negative or, in the case of the smallest quartile regressions, have positive signs. [23]

5.3. Post-Announcement Period Analysis

Table 8 repeats the table 6 analysis for the day +6 to day +65 post-announcement period. For transactions based net buying (panel A) the *AFE* coefficients are consistently positive and significant (.01 level) across all transaction size categories. This result is consistent with the transactions-based findings in Ayers et al., as well as the more direct evidence on institutional trading in Kaniel et al. (2012), and supports the notion that large investors trade in a drift reducing manner in the post-announcement period. The *SRWFE* coefficients are negative and significant (.05 level or better) in the three large trade size categories, which is again consistent with the evidence in Ayers et al. The small transaction size coefficients lack statistical significance at conventional levels.

Unlike what occurred in the announcement period analysis, shifting to orders or position changes (panels B and C) generates no substantial changes in the basic relations identified using transactions. The *AFE* coefficients remain positive and are generally significant at conventional levels in both panels. The *SRWFE* coefficients, remain negative and significant in the large trade size estimations, but are of mixed sign and, with the exception of the <500 order share size category, lack statistical significance at conventional levels. Hence, transaction size based inferences appear to provide plausible insights about investor size classified trading patterns over longer non-information-release periods.

[23] Kaniel et al. (2012) document that pre-announcement return negatively predicts announcement period buying by individual investors. Inclusion of return over days -60 to -1 is also negative and significant as a predictor of net buying in tables 7 (announcement period) and 9 (post-announcement period) in our data. Inclusion of this variable as an additional regressor, however, has no substantive impact on the estimated *AFE* and *SRWFE* coefficients reported in these tables.

Table 9 repeats the table 7 total trading activity by institution size analysis for the post-announcement period. It provides further confirmation that transaction size based inferences about investor trading in the post-announcement period are reliable Specifically, overall and in the largest size quartile *AFE* is positively related to excess buying while *SRWFE* is negatively related to excess buying. Interestingly, *AFE* and *SRWFE* lack significance in the bottom two institution size quartiles, suggesting that smaller institutions do not trade on either *AFE* or *SRWFE* in the post-announcement period.[24]

5.4. Announcement Period Imbalance and Post Earnings Announcement Drift

Ayers et al. also finds that small transaction size excess buying negatively impacts subsequent *SRWFE* drift while large transaction size excess buying negatively impacts *AFE* drift, but positively impacts *SRWFE* drift. Table 10 evaluates these drift relations in the Ancerno data. The table is based on trading from the 2003 to 2005 time period in the data as these are the years in our data that overlap with those employed in Ayers et al. and also precede the sharp decline in very large institutional order sizes that occurs in the later years in the sample. Moreover, it is only within these three years that we are able to replicate any of the key aspects of the Ayers et al. findings.

Consistent with our prior analyses, we conduct our analyses of the post-earnings-announcement-drift implications of announcement period trade imbalances on transactions, orders, and position changes partitioned into small and large size categories. We do limit the analysis to the dollar value size based partitions and associated dollar value based imbalance

[24] It is also the case, however, that the infrequent trading activity that characterizes the bottom two quartiles adds a a considerable degree of noise into these estimations. This added noise may account for the general absence of significance in these analyses. In this regard it is particularly noteworthy that the insignificant bottom quartile estimated *SRWFE* relations are actually larger in absolute magnitude than the significant top quartile *SRWFE* relations.

measures as these are the only sorts of metrics employed in Ayers et al.[25] The first two columns in the table replicate the transactions-based analyses reported in Ayers et al. using the same size partitions they employ (i.e., small < $5,000, and large > $30,000) and also using the set of higher cutoff values (small < $10,000 and large > $50,000) employed in our earlier analyses. For the Ayers et al. size partitions the interaction between *AFE* and *EXL* is negative but not significant while the interaction between *AFE* and *EXS* is negative and significant. These are directionally consistent with Ayers et al. However, in Ayers et al. the *EXL* interaction is significant while the *EXS* interaction is not significant at conventional levels. For *SRWFE*, on the other hand, the interaction with *EXL* is positive and significant while the interaction with *EXS* is negative and significant. Both of these results are consistent with those reported in Ayers et al. The *EXS* result here is of particular relevance as Ayers et al. attribute it to marginal price impacts due to small trader activity (their hypothesis 4). Specifically, the *SRWFE* drift is smaller to the degree that small traders, but not large traders, trade on it in a directionally consistent fashion in the announcement period. Of course, given that there are no such small traders in our data, an alternative interpretation is that it is somehow connected with the circumstances under which institutional small transactions arise in earnings announcement periods.[26]

The *EXL* and *EXS* interactions lack significance at conventional levels in the order and position change regressions reported in table 10. Hence, the potency of these interactions seems to be particularly strong at the transactions level. This shift is also consistent with the evidence

[25] Results using the share size partition and transaction count approach of BM yield results that are generally consistent with the <$10,000 and >$50,000 partitions that are reported in the tables 10 and 11.

[26] The positive and significant (.10 level) *EXS* coefficients in the two transactions activity regressions in table 10 are also of some interest here. These mirror the positive (but highly significant) reported in Ayers et al. for small transaction size announcement period net buy. While Ayers et al. do not provide an interpretation for this finding it is somewhat consistent with the findings in Barber et al. (2009) that small trades size net buy imbalance is positively associated with subsequent short run return. Kaniel et al. (2009) provide similar evidence based on NYSE trading records of individual trading. The evidence here, however, indicates that this effect also holds for small trades undertaken by institutional investors in the pre-2006 time period.

in table 6 that indicated relations between small and large trade size activity and earnings news differ substantially when moving from transactions to orders or position changes.

As an alternative to trade size stratification, table 11 uses net buying (for position changes and orders) across all of the institutional investors in the data to determine announcement period net buying.[27] There is no evidence in this analysis of any sort of relation, either unconditional or conditional on earnings news, between overall institutional directional trading and post-earnings announcement returns. This absence again points to the notion that the transaction-level effects documented in table 10 are a product of how institutional position changes are converted into transactions in the earnings announcement period.[28]

Linnainmaa (2010) finds that limit order driven selection bias accounts for much of the negative future return performance associated with individual investor trading patterns. As limit orders commonly covert large orders into a series of smaller transactions then they are certainly a possible explanation for relations between institutional investor trade size imbalances and future returns. We conduct a limited investigation of this possibility in the final set of columns of table 11 reports results for an alternate measure of announcement period buying activity by institutions—the change in the balance of unfilled net buy orders entered in the announcement period. This measure increases by the degree to which the balance of unfilled announcement period buy order volume exceeds sell order volume. As such, it measures limit order selection bias based on the level of unexecuted trade. However, while the change in unfilled net buy volume is a positive predictor of the drift period return (significant at the .05 level), there is no

[27] Absent trade size cutoffs there is no difference between position change analyses and transactions-based analyses and so we do not report the latter.

[28] In further untabulated analyses we performed the table 11 estimations using excess buy metrics based on just the largest quartile and, separately, on just the smallest quartile of Ancerno traders. These analyses did not reveal any substantive differences in the net buy implications of small and large Ancerno traders.

evidence that this effect is related to either *AFE* or *SRWFE*. The positive main effect for change in unfilled net buy, however, is consistent with the idea that relative to market orders, limit orders are also an inferior trading strategy for this group of institutions. That is, these investors appear to be systematically missing opportunities to acquire or hold underpriced securities and to avoid buying or sell overpriced securities.

6. Concluding Remarks

The literature, stemming from early work by Cready (1988) and Lee (1992), evaluating variation in investor trading patterns based on observed transaction sizes is extensive. Our analysis, however, raises several fundamental concerns about what sorts of conclusions we can reliably draw from such analyses with respect to differences between "small" and "large" investor trading behavior at information events. First, while mean transaction sizes do generally increase with investor size in our data, this relation does not survive in the typical course trade size partitions (e.g., transaction sizes of under 500 shares, under $10,000) employed in the literature. In particular, relative to small investors, large investor trading activity is more concentrated in small as well as large transaction size partitions. In contrast, for position changes, which are not distorted by how orders are executed or stealth trading activity, large investor activity is, as expected, relatively lower in the small size of position change partitions and relatively higher in large size of position change partitions. So, while an unexpected shift in small transaction activity may reflect a corresponding shift in "small" investor trading activity, our evidence indicates it could just as easily reflect a corresponding shift in "large" investor trading activity.

Second, in earnings announcement periods order sizes rise markedly, around 40%, relative to their non-announcement sizes across all investors.In our data this shift in order size effect leads to announcement period percentage increases in small transaction and order size categories that are substantially smaller than those observed in corresponding large trading categories. Conventionally, one would interpret such evidence as indicating that large traders are more active in announcement periods than small traders. However, when we examine trading activity by investor size the opposite is true—announcement period trading activity by smaller institutions is higher than that of large institutions.

More generally, this relation between order size and information arrival indicates that order sizes and, consequently, transaction sizes are highly endogenous. Indeed, from the perspective of theoretical models of trade response to information such as Kim and Verrecchia (1991) and Kandel and Pearson (1995), such endogenous order size relations are not that surprising. In these models per capita demand shifts (i.e., order sizes) change with differential precision (both pre-disclosure and in interpreting disclosures), the precision of the information being disclosed, and surprise magnitude. So, trader size is best thought of as simply one of several underlying sources of observed systematic patterns in small and large trade size responses to information disclosures.

Third, with respect to the existing literature on earnings news trading at earnings announcement dates, we are able to replicate the finding of a positive relation between large investor net buying and *AFE* reported by Ayers et al. (2011) and Battalio and Mendenhall (2005) based on large transactions. However, this result disappears if we employ either the orders or the net position changes underlying these transactions. This disappearance suggests that the positive effect documented in the literature is connected to the process by which orders are converted into

transactions. In particular, large contra-AFE orders seem particularly prone to being broken up in execution, causing them to show up as (numerous) small rather than large transactions.

The earnings announcement period analysis also indicates that large investor trading activity generates spurious "small" directional transaction size relations. Of particular concern, these small transaction size relations are opposite in direction from companion "large" transaction size relations. That is, we observe *AFE*-contrarian and *SRWFE*-consistent net buying in small transaction size categories and *AFE*-consistent and *SRWFE*-contrarian net buying in large transaction size categories. Conventionally, such opposite direction relations are interpreted as implying that large investors are responding differently than small investors to the information. However, if we turn to orders, these opposite direction effects disappear. They, like the erroneous evidence of *AFE*-consistent buying by large investors, appear to be an artifact of the process by which orders are converted into transactions.

In contrast to the announcement period evidence, our examination of post-announcement trading is largely consistent with the evidence documented in Ayers et al. In the large size categories net buying is in the direction of the *AFE* while net buying is opposite the direction of the *SRWFE* for transactions, orders, and position changes. In the small size categories there is no evidence of trading in the direction of the *SRWFE* and no evidence of trading against the direction of the *AFE.* As Ayers et al. find both of these effects in their small transaction size strata in the post-announcement period our non-finding indicates that they are not spuriously attributable to trading by large investors of the types covered by the Ancerno data. Hence, transaction size stratifications do appear to provide at least somewhat reliable insights about large trader activity over long non-event periods. However, their reliability in this setting also underscores how strikingly unreliable they are for drawing inferences about the trading activity

of large and small investors in short time periods where substantive information assimilation is taking place.

On a somewhat different dimension our analysis focuses on the trading activity of two specific types of institutions: mutual funds and pension funds. It finds little evidence to support the position that these institutions trade in the direction of forecast errors, *AFE* or *SRWFE,* in the announcement period. Indeed, the smaller funds trade against the *AFE* while the larger funds trade against the *SRWFE*. This evidence complements that reported in Ke and Ramalingegowda (2005) who find, based on changes in institutional holdings, that institutions vary in their trading responsiveness to drift related mispricing with only "transient" institutions changing their positions in a manner consistent with exploiting drift. Our evidence shows that at the announcement event mutual and pension funds are not in this group. Indeed, their trading activity in this period seems to facilitate drift. Consistent with this, outside of some limited transaction level findings, there is no evidence of a negative relation between their AFE-based announcement trading and post-announcement drift magnitude such as that reported in Ayers et al.

The analysis also supports the notion that collectively these institutions trade with the *AFE* in the post-announcement period, consistent with the transaction size based evidence in Ayers et al. as well as the NYSE institutional net buying analysis of Kaniel et al. (2012). However, this behavior is primarily a large institution phenomenon. There is no evidence of a significant relation in the bottom half of the institutions in our data. Thus, only the largest institutions here are *AFE* drift savvy, and even they do not exhibit such savvy until some days after the announcement release.

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Table 1
Description of Institutional Investor Trading Activity in the Ancerno Sample

	Investor size by annual trading volume				
	1=Small	2	3	4=Large	All
Yearly Aggregate Trading					
Total Dollar Volume ($ Mil)	7,169	37,832	158,394	3,884,838	4,0882,325
Total Share Volume (Mil)	264	1,390	6,058	132,828	140,540
Number of Transactions	197,268	644,266	2,132,318	25,296,094	28,269,945
Number of Orders	103,216	307,780	740,356	8,436,656	9,587,609
Number of Position Changes	132,788	367,046	693,679	3,585,826	4,779,339
Yearly Average per Investor Trading					
Dollar volume per Investor ($ 000s)	78,154	410,537	1,733,401	42,058,596	11,042,996
Share volume per Investor (000s)	2,892	15,198	66,949	1,446,575	382,122
Number of Transactions per Investor	2,165	7,071	23,885	276,950	77,395
Number of Orders per Investor	1,135	3,383	8,205	93,901	26,656
Number of Position Changes	1,445	3,977	7,575	39,054	13,013
Average Trade Size					
Average Transaction Size ($)	37,192	60,002	82,478	169,729	158,788
Average Transaction Size (Shares)	1,391	2,226	3,090	5,996	5,610
Average Order Size ($)	70,092	127,247	231,222	520,069	237,158
Average Order Size (Shares)	2,603	4,709	8,571	17,956	8,460
Average Position Change ($)	53,367	99,983	220,923	967,728	768,770
Average Position Change (Shares)	1,974	3,704	8,376	33,644	26,810

This table presents summary information on the trading activity of 802 institutional investors in the Ancerno dataset for the 2003-2009 period. Institutional Investors are sorted into four quartiles by total dollar value of shares executed in a given year. *Total dollar volume, Total share volume, Number of transactions,* and *Number of orders* are yearly totals for each investor quartile averaged across all years in the sample period. *Dollar volume per Investor, Share volume per Investor, Number of Transactions per Investor*, and *Number of orders per Investor* are averages across all investors in a given trading volume quartile in a given year and subsequently averaged across all years in the sample period. *Average Transaction Size, Average Order Size,* and *Average Position Change* are reported for average dollar value of shares and number of shares executed in transactions, orders, and daily position changes. Average trade sizes are also first calculated using trades by all investors in a given trading volume quartile in a given year and subsequently averaged across all years in the sample period.

Table 2
Average Trade Size

Panel A: Transactions

	Investor Size by annual trading volume											
	1=Small			2			3			4=Large		
	N	Dollar	Shares	N	Dollar	Shares	N	Dollar	Shares	N	Dollar	Shares
2003	144,139	39,347	1,601	359,102	64,296	2,812	1,153,588	76,797	3,309	10,643,446	246,237	9,946
2004	153,783	40,003	1,516	480,644	55,489	2,036	972,044	101,078	3,824	20,318,545	213,528	7,418
2005	142,156	41,486	1,460	485,710	67,870	2,401	1,539,983	87,163	3,200	17,822,055	214,481	6,844
2006	201,473	38,739	1,428	723,574	63,732	2,183	1,837,774	103,347	3,407	30,892,774	134,160	4,134
2007	320,569	32,760	953	734,687	72,080	2,049	2,539,622	78,063	2,433	39,847,131	118,827	3,281
2008	198,163	37,725	1,354	943,619	46,439	1,750	2,330,143	88,390	3,311	32,813,964	133,782	4,569
2009	220,592	30,282	1,424	782,523	50,110	2,350	4,553,072	42,508	2,150	24,734,740	127,090	5,777

Panel D: Orders

	Investor Size by annual trading volume											
	1=Small			2			3			4=Large		
	N	Dollar	Shares	N	Dollar	Shares	N	Dollar	Shares	N	Dollar	Shares
2003	84,095	67,440	2,743	177,156	130,320	5,700	670,353	132,156	5,695	4,102,986	638,742	25,800
2004	88,172	69,760	2,643	193,844	137,577	5,047	415,627	236,367	8,941	5,705,906	760,140	26,407
2005	78,582	75,033	2,640	235,960	139,645	4,938	506,553	264,962	9,728	5,498,150	695,227	22,184
2006	100,226	77,870	2,870	351,259	131,284	4,497	667,323	284,601	9,381	8,380,863	494,525	15,240
2007	150,563	69,743	2,029	340,129	155,670	4,425	746,263	265,550	8,276	10,547,901	448,876	12,394
2008	97,536	76,640	2,751	479,042	91,469	3,447	672,600	306,215	11,469	13,259,144	331,083	11,307
2009	123,335	54,161	2,547	374,281	104,767	4,913	1,503,774	128,701	6,510	11,561,642	271,889	12,360

Panel C: Position Changes

	Investor Size by annual trading volume											
	1=Small			2			3			4=Large		
	N	Dollar	Shares	N	Dollar	Shares	N	Dollar	Shares	N	Dollar	Shares
2003	124,525	45,376	1,847	291,240	78,350	3,425	531,014	164,898	7,119	2,793,971	864,782	35,144
2004	129,383	47,339	1,795	303,145	87,217	3,206	551,611	174,152	6,617	3,564,085	1,051,680	37,000
2005	123,707	47,606	1,675	342,474	93,908	3,327	592,848	222,984	8,204	3,072,674	1,107,448	35,538
2006	141,258	54,827	2,025	422,334	107,777	3,700	743,669	250,742	8,271	3,803,921	996,873	30,944
2007	153,374	66,996	1,957	395,206	131,646	3,758	724,353	267,173	8,345	4,026,836	1,052,663	29,404
2008	113,853	65,200	2,341	429,452	100,792	3,804	719,572	279,169	10,477	4,139,422	944,330	32,601
2009	143,414	46,220	2,178	385,470	100,190	4,708	992,683	187,346	9,597	3,699,876	756,322	34,877

This table presents average trade sizes in terms of dollar value of shares and the number of shares executed in a given transaction (Panel A), order (Panel B), and position change (Panel C) by investor size for each year in the sample period. Investors are classified into four quartiles in each year with respect to the total dollar value of shares executed in that year.

Table 3
Number and Percentage of Trades Classified as Small and Large based on Transactions, Orders, and Position Changes for Various Investor Sizes

Panel A: Transactions

	Small Size Categories						*Large Size Categories*					
Investor Size	<500 Shares		<$5,000		<$10,000		>5,000 Shares		>$30,000		>$50,000	
	N	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*
1=Small	765,358	*55.43*	452,718	*32.78*	673,993	*48.81*	69,589	*5.04*	356,559	*25.82*	230,011	*16.66*
2	2,221,407	***49.26***	1,345,736	***29.84***	1,947,774	***43.19***	403,406	***8.94***	1,490,948	***33.06***	1,040,378	***23.07***
3	9,018,046	***60.42***	6,912,112	***46.31***	8,535,811	***57.19***	1,558,000	***10.44***	4,106,091	***27.51***	3,135,588	***21.01***
4=Large	105,954,728	**59.84**	76,633,942	**43.28**	96,609,051	**54.56**	22,735,397	**12.84**	52,455,442	**29.62**	41,507,051	**23.44**
Total	117,959,539	59.61	85,344,508	43.13	107,766,629	54.46	24,766,392	12.52	58,409,040	29.52	45,913,028	23.20

Panel B: Orders

	Small Size Categories						*Large Size Categories*					
Investor Size	<500 Shares		<$5,000		<$10,000		>5,000 Shares		>$30,000		>$50,000	
	N	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*
1=Small	302,060	*41.81*	153,371	*21.23*	246,174	*37.07*	83,177	*11.51*	298,393	41.30	217,172	*30.06*
2	789,962	***36.71***	412,408	***19.17***	629,327	***29.25***	398,483	***18.52***	1,054,231	***49.00***	821,117	***38.16***
3	2,223,681	***42.91***	1,441,043	***27.81***	1,953,984	***37.70***	1,172,994	**22.63**	2,385,154	***46.02***	1,989,836	***38.40***
4=Large	28,367,363	**48.03**	19,223,184	**32.55**	25,158,587	**42.60**	13,241,774	**22.42**	24,546,968	41.57	20,636,400	**34.94**
Total	31,683,066	47.21	21,230,006	31.63	27,988,072	41.70	14,896,428	22.20	24,546,968	42.14	23,664,525	35.26

Panel C: Position Changes

	Small Size Categories						*Large Size Categories*					
Investor Size	<500 Shares		<$5,000		<$10,000		>5,000 Shares		>$30,000		>$50,000	
	N	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*
1=Small	384,509	*41.37*	185,400	*19.95*	318,395	*34.25*	73,476	*7.90*	342,491	*36.85*	227,778	*24.51*
2	765,352	***29.79***	336,720	***13.11***	612,404	***23.84***	396,471	***15.43***	1,280,990	***49.86***	939,440	***36.56***
3	1,355,834	***27.92***	758,509	**15.62**	1,167,194	***24.04***	1,263,317	***26.02***	2,794,684	***57.55***	2,285,364	***47.07***
4=Large	6,705,340	**26.71**	3,895,305	**15.52**	5,900,150	**23.51**	9,618,090	**38.32**	15,270,345	**60.84**	13,351,589	**53.19**
Total	9,211,035	27.53	5,175,934	15.47	7,998,143	**23.91**	11,351,354	33.93	19,688,510	58.85	16,804,171	50.23

This table presents the number and percentage of trades classified as small and large using transactions (Panel A), orders (Panel B), and position changes (Panel C). Columns 1 and 4 use the number of shares executed in classifying trades as small (<500 shares) and large (>5,000 shares). In columns 2 and 5 (3 and 6) trades are classified as small and large if the dollar value of shares executed is less than $5,000 ($10,000) and $30, 000 ($50,000) respectively. The percentage of trades classified as small (large) is calculated by dividing the total number of trades in that category by the total number of trades in the small, intermediate, and large categories. Quartile 1, 2, and 3 percentages that differ from quartile 4 percentages (significant at the .01 level) are *italicized*. Quartile 2, 3, and 4 percentages that differ from quartile 1 percentages (significant at the .01 level) are **bolded**.

Table 4
Earnings Announcement Sample Forecast Errors and Cumulative Abnormal Returns in the Announcment and Post-Announcement Periods

	N	Mean	Median	Std. Dev.	5th Pctl.	95th Pctl.
AFE	55,112	**-0.0004**	**0.0004**	0.0116	-0.0148	0.0118
SRWFE	55,112	**-0.0031**	**0.0011**	0.0465	-0.0591	0.0394
CAR[-60,-3]	55,112	**-0.42%**	**-0.31%**	20.25%	-31.20%	29.29%
CAR[-1,1]	55,112	**0.24%**	**0.12%**	9.30%	-13.90%	14.44%
CAR[+6,+65]	55,112	**-0.31%**	**-0.46%**	22.44%	-32.56%	31.42%
AFE Quintile 5:						
AFE	11,022	**0.0102**	**0.0065**	0.0087	0.0033	0.0354
SRWFE	11,022	**0.0069**	**0.0064**	0.0595	-0.0724	0.1075
CAR[-60,-3]	11,022	**3.60%**	**2.73%**	24.15%	-32.01%	41.34%
CAR[-1,1]	11,022	**4.06%**	**2.91%**	10.69%	-10.21%	21.28%
CAR[+6,+65]	11,022	**1.01%**	**0.39%**	24.88%	-36.65%	39.20%
AFE Quintile 1:						
AFE	11,023	**-0.0142**	**-0.0065**	0.0178	-0.0710	-0.0023
SRWFE	11,023	**-0.0242**	**-0.0089**	0.0721	-0.1851	0.0606
CAR[-60,-3]	11,023	**-4.45%**	**-3.85%**	27.63%	-47.96%	36.49%
CAR[-1,1]	11,023	**-3.65%**	**-2.89%**	11.12%	-21.15%	11.74%
CAR[+6,+65]	11,023	-0.49%	**-0.64%**	31.79%	-43.96%	42.76%
SRWFE Quintile 5:						
AFE	11,020	**0.0035**	**0.0025**	0.0139	-0.0139	0.0272
SRWFE	11,020	**0.0398**	**0.0202**	0.0444	0.0093	0.1733
CAR[-60,-3]	11,020	**2.80%**	**2.12%**	23.84%	-31.96%	39.63%
CAR[-1,1]	11,020	**1.84%**	**1.22%**	10.17%	-12.76%	18.45%
CAR[+6,+65]	11,020	**1.21%**	**0.88%**	26.59%	-35.70%	37.96%
SRWFE Quintile 1:						
AFE	11,019	**-0.0069**	**-0.0017**	0.0195	-0.0555	0.0146
SRWFE	11,019	**-0.0542**	**-0.0251**	0.0683	-0.2768	-0.0097
CAR[-60,-3]	11,019	**-3.22%**	**-2.73%**	27.53%	-46.21%	37.70%
CAR[-1,1]	11,019	**-1.38%**	**-1.30%**	11.89%	-19.00%	16.08%
CAR[+6,+65]	11,019	-0.40%	**-0.72%**	31.25%	-44.69%	44.92%

This table presents descriptive statistics on firm specific variables for the firms in the earnings announcement sample which includes all quarterly earnings announcements during the 2003-2009 period. Means and medians in **bold** are significantly different from 0 at the .05 level (two-tailed test). ***AFE*** is the analyst forecast error obtained by subtracting the consensus analyst forecast from the actual earnings per share on IBES scaled by share price at the end of the most recent quarter prior to the earnings announcement date. The consensus analyst forecast is the mean of the analyst earnings per share forecasts issued during the 90 day period prior to the earnings announcement. ***SRWFE is*** seasonal random walk forecast error calculated as the seasonally differenced quarterly earnings before extraordinary items per share scaled by the absolute value of share price from one quarter before the earnings announcement. ***CAR[t_1,t_2]*** is cumulative abnormal return from day t_1 to t_2 relative to the announcement day defined as the firm return in excess of the corresponding Fama-French size and book-to-market 25-portfolio benchmark return. The panel also presents summary statistics for these variables for the largest and smallest AFE and SRWFE deciles. Means (Medians) significant at the 5% level or better based on regular t-test (Wilcoxon signed-rank test) are indicated in **bold**.

Table 5
Earnings Announcement Period Trading Activity

Panel A: Announcement Period Transactions Metrics:

			% Increase in Dollar Volume		% Increase in Share Volume		
Investor Size	N	% Increase	Total	Per Trans.	Total	Per Trans.	Ex NetBuy
	I	II	III	IV	V	VI	VII
1=Small	26,058	**49.91**	**80.83**	**41.66**	**83.86**	**44.02**	**-0.044**
2	39,104	**47.70**	**79.90**	**35.08**	**82.97**	**37.07**	**-0.059**
3	45,237	**44.45**	**94.15**	**48.66**	**96.60**	**50.35**	**-0.075**
4=Large	52,863	**29.58**	**59.89**	**36.27**	**62.70**	**37.97**	**-0.026**
All	52,928	**31.77**	**61.99**	**35.65**	**64.62**	**37.48**	**-0.057**

Panel B: Announcement Period Order Metrics:

			% Increase in Dollar Volume		% Increase in Share Volume		
Investor Size	N	% Increase	Total	Per Order	Total	Per Order	Ex NetBuy
	I	II	III	IV	V	VI	VII
1=Small	21,339	**51.96**	**88.87**	**37.06**	**92.31**	**38.31**	**-0.085**
2	35,198	**47.46**	**89.14**	**30.93**	**92.32**	**33.24**	**-0.068**
3	43,045	**37.14**	**103.02**	**45.29**	**106.02**	**47.29**	**-0.040**
4=Large	52,523	**11.97**	**61.96**	**44.68**	**64.56**	**46.67**	**-0.012**
All	52,928	**16.51**	**65.10**	**39.92**	**67.91**	**42.15**	**-0.044**

Panel C: Trade Size Stratified Announcement Period Trading

	Transactions			**Orders**			**Position Changes**		
	N	% Increase	Ex NetBuy	N	% Increase	Ex NetBuy	N	% Increase	Ex NetBuy
	I	II	III	IV	V	VI	VII	VIII	IX
Small Trades									
<500 Shares	51,166	**22.70**	-0.003	49,347	**1.91**	-0.006	49263	**-4.43**	0.008
<$5,000	51,574	**23.52**	-0.004	49,653	**3.46**	-0.001	49447	**-2.52**	0.001
<$10,000	52,349	**24.35**	0.007	51,054	**3.07**	0.009	51174	**-3.23**	0.003
Large Trades									
>5,000 Shares	49,114	**53.43**	**-0.045**	49,224	**43.86**	-0.007	49520	**26.57**	**-0.022**
>$30,000	50,174	**43.61**	**-0.056**	50,045	**30.77**	**-0.049**	50321	**17.24**	**-0.074**
>$50,000	48,891	**46.93**	**-0.066**	48,998	**34.64**	**-0.053**	49276	**19.90**	**-0.079**

This table presents descriptive statistics on earnings announcement period, [-1,+1], trading activity. Numbers in **bold** are different from 0 at the .05 level (two-tailed test). Panel A (Panel B) reports trading metrics calculated using transactions (orders) for investors grouped with respect to total annual trading volume. Percentage increases are relative to the benchmark period of [-60,-6]. In panels A and B column II presents the percentage increase in average daily trade counts from the [-60,-6] window to the [-1,+1] window. Column III reports the percentage increase in average daily total dollar volume executed while column IV reports the percentage increase in dollar volume executed per transaction (order). Columns V and VI report the percentage increase in average daily total share volume executed and dollar volume executed per transaction (Panel A) and order (Panel B). Column VII reports excess net buy defined as in Ayers et al. (2011) for transactions (Panel A) and orders (Panel B). In panel C, Columns II, V, and VIII report percentage increase in transaction, order, and position change counts respectively from the [-60,-6] window to the [-1,1] window for small and large trades based on various cutoffs. Columns III, VI, and IX report excess net buy calculated using transactions, orders, and position changes respectively. Excess net buy for dollar value based trade classifications is calculated as in Ayers et al. (2011) while the excess net buy for share based trade classifications is calculated as in Battalio and Mendenhall (2005). Values that differ significantly from 0 at the .05 level are **bolded**.

Table 6
Regressions of Institutional Excess Net-Buy During Earnings Announcement Periods on Forecast Errors

Panel A: Announcement Period Net Buying in Large and Small Transactions

	Small Size Categories			*Large Size Categories*		
	<500 Shares	<$5,000	<$10,000	>5,000 Shares	>$30,000	>$50,000
AFE(Rank)	-0.064**	-0.056*	-0.042	0.044*	0.118***	0.095***
	(-2.41)	(-1.92)	(-1.55)	(1.72)	(3.69)	(2.76)
SRWFE(Rank)	0.067***	0.068**	0.067***	-0.053**	-0.053*	-0.046
	(2.59)	(2.41)	(2.65)	(-2.25)	(-1.75)	(-1.44)
Intercept	-0.002	-0.003	0.008	-0.046***	-0.057***	-0.067***
	(-0.24)	(-0.36)	(0.99)	(-6.33)	(-6.34)	(-7.48)
N	51,166	51,574	52,349	49,114	50,174	48,891
R^2 (%)	0.0137	0.0093	0.0096	0.0088	0.0270	0.0151

Panel B: Announcement Period Net Buy Orders for Large and Small Orders

	Small Size Categories			*Large Size Categories*		
	<500 Shares	<$5,000	<$10,000	>5,000 Shares	>$30,000	>$50,000
AFE(Rank)	-0.044***	-0.012	-0.041***	-0.044***	-0.016	-0.024
	(-4.66)	(-1.10)	(-3.98)	(-3.38)	(-1.03)	(-1.49)
SRWFE(Rank)	-0.004	-0.027**	-0.023**	-0.067***	-0.111***	-0.109***
	(-0.47)	(-2.37)	(-2.23)	(-5.23)	(-7.11)	(-6.85)
Intercept	-0.029***	-0.028***	-0.028***	-0.004	-0.001	-0.000
	(-10.38)	(-8.23)	(-8.99)	(-1.04)	(-0.13)	(-0.05)
N	49,347	49,653	51,054	49,224	50,045	48,998
R^2 (%)	0.0497	0.0157	0.0559	0.1127	0.1242	0.1257

Panel C: Announcement Period Net Position Increases for Large and Small Position Changes

	Small Size Categories			**Large Size Categories**		
	<500 Shares	<$5,000	<$10,000	>5,000 Shares	>$30,000	>$50,000
AFE(Rank)	-0.011	-0.002	-0.001	-0.068***	-0.053***	-0.059***
	(-1.17)	(-0.34)	(-0.16)	(-5.90)	(-3.25)	(-3.54)
SRWFE(Rank)	0.001	-0.007	-0.025***	-0.065***	-0.127***	-0.125***
	(0.10)	(-1.02)	(-3.59)	(-5.80)	(-7.98)	(-7.66)
Intercept	-0.008***	-0.007***	-0.013***	-0.023***	-0.017***	-0.019***
	(-2.73)	(-3.54)	(-6.42)	(-6.77)	(-3.45)	(-3.88)
N	49,263	49,447	51,174	49,520	50,321	49,276
R^2 (%)	-0.0011	-0.0008	0.0257	0.2054	0.2034	0.2018

This table reports coefficient estimates from the following regression:

$$Ex\_NetNumBuy_{it} (or\ Ex\_NetBuy_{it}) = \beta_0 + \beta_1 AFE_{it} + \beta_2 SRWFE_{it} + \varepsilon_{it}$$

for small and large trade size categories using transactions (Panel A), orders (Panel B), and Position Changes (Panel C). In columns 1 and 4 in each panel the dependent variable is ***Ex_NetNumBuy$_{it}$***, the excess net number of buys, defined as in Battalio and Mendenhall [2005] (see eq. 1 in the text) during the earnings announcement period, days -1 to +1 relative to announcement date. In the other columns the dependent variable is ***Ex_NetBuy$_{it}$***, excess net buy during the [-1,+1] window defined as in Ayers et al. [2011] (see eq. 2 in the text). ***AFE (Rank)*** is the decile rank of analyst-based earnings surprise converted to [-0.5,0.5]. ***SRWFE(Rank)*** is the decile rank of seasonal random-walk earnings surprise converted to [-0.5,0.5]. ***AFE*** is calculated by subtracting the consensus analyst forecast from the actual earnings per share on IBES scaled by share price at the end of the most recent quarter prior to the earnings announcement date. The consensus analyst forecast is the mean of the analyst earnings per share forecasts issued during the 90 days prior to the earnings announcement. ***SRWFE*** is defined as the seasonally differenced quarterly earnings before extraordinary items per share scaled by the absolute value of share price from one quarter before the earnings announcement. t-statistics are in parentheses. *, **, and *** indicate statistical significance at the .10, .05, and .01 levels (two-tailed test) respectively. Standard errors are clustered by firm.

Table 7
Institution Size Based Analysis of Announcement Period Orders and Net Position Changes

Panel A: Pearson Correlations between Announcement Period Excess Net-Buy and Forecast Errors

	All Institutions		Institutions in the Top Trading Volume Quartile		Institutions In the Bottom Trading Volume Quartile		Institutions in the two Bottom Trading Volume Quartiles	
	Orders	Position Changes	Orders	Position Changes	Orders	Position Changes	Orders	Position Changes
AFE (Rank)	-0.043***	-0.032**	-0.037**	-0.029*	-0.093**	-0.062	-0.115***	-0.111***
(p-value)	<0.001	0.031	0.027	0.062	0.032	0.112	<0.001	<0.001
SRWFE (Rank)	-0.126***	-0.116***	-0.115***	-0.107***	-0.010	-0.007	-0.060***	-0.058**
(p-value)	<0.001	<0.001	<0.001	<0.001	0.451	0.532	<0.001	0.021
Observations	52,928		52,563		21,550		38,212	

Panel B: Regressions of Announcement Period Excess Net-Buy on Forecast Errors

	All Institutions		Institutions in the Top Trading Volume Quartile		Institutions In the Bottom Trading Volume Quartile		Institutions in the two Bottom Trading Volume Quartiles	
	Orders	Position Changes	Orders	Position Changes	Orders	Position Changes	Orders	Position Changes
AFE (Rank)	-0.012	-0.017	-0.022	-0.022	-0.080***	-0.094***	-0.097***	-0.093***
	(-0.78)	(-1.17)	(-1.49)	(-1.47)	(-2.62)	(-3.00)	(-4.42)	(-4.16)
SRWFE (Rank)	-0.111***	-0.103***	-0.105***	-0.097***	0.026	0.007	-0.037*	-0.059***
	(-7.51)	(-7.09)	(-7.00)	(-6.53)	(0.91)	(0.24)	(-1.75)	(-2.75)
Intercept	-0.003	-0.012***	-0.005	-0.013***	0.036***	0.029***	0.009	-0.004
	(-0.58)	(-2.79)	(-1.03)	(-2.88)	(4.35)	(3.40)	(1.44)	(-0.60)
Adj. R^2 (%)	0.127	0.129	0.122	0.107	0.023	0.035	0.0763	0.090

Panel A reports Pearson correlations between individual forecast errors and announcement period, days -1 to +1 relative to the announcement date, excess net buy, ***Ex_Net_Buy*** (see eq. 2 in the text) for various subsets of investors in the Ancerno sample. Panel B reports estimates from multiple regressions of announcement period excess net buy on both forecast errors included in the regression. For each group of investors, the results are reported using the order based excess net-buy and position change based excess net buy. ***AFE (Rank)*** and ***SRWFE(Rank)*** are as defined in table 6. t-statistics are in parentheses. *, **, and *** indicate statistical significance at the .10, .05, and .01 levels (two-tailed test) respectively. Standard errors are clustered by firm in both types of regressions.

Table 8
Regressions of Institutional Excess Net-Buy During Post-Announcement Period on Forecast Errors

Panel A: Post-Announcement Period Net Buying in Large and Small Transactions

	Small Size Categories			Large Size Categories		
	<500 Shares	<$5,000	<$10,000	>5,000 Shares	>$30,000	>$50,000
AFE (Rank)	0.101***	0.063***	0.107***	0.095***	0.096***	0.097***
	(5.14)	(3.10)	(6.10)	(8.30)	(6.91)	(6.99)
SRWFE(Rank)	0.000	0.012	-0.012	-0.027***	-0.032**	-0.028**
	(0.02)	(0.61)	(-0.76)	(-2.60)	(-2.36)	(-2.07)
Intercept	0.077***	0.056***	0.042***	0.018***	0.020***	0.017***
	(15.42)	(10.32)	(9.81)	(7.53)	(6.31)	(5.34)
N	51,166	51,574	52,349	49,114	50,174	48,891
R^2 (%)	0.0566	0.0201	0.0777	0.1547	0.0992	0.1016

Panel B: Post-Announcement Period Net Buy Orders for Large and Small Orders

	Small Size Categories			Large Size Categories		
	<500 Shares	<$5,000	<$10,000	>5,000 Shares	>$30,000	>$50,000
AFE(Rank)	0.051***	0.041***	0.065***	0.085***	0.101***	0.092***
	(3.03)	(3.07)	(5.51)	(9.67)	(7.20)	(6.67)
SRWFE(Rank)	0.037**	0.003	0.005	-0.028***	-0.033**	-0.039***
	(2.29)	(0.20)	(0.50)	(-3.45)	(-2.41)	(-2.95)
Intercept	0.043***	0.020***	0.020***	0.017***	0.018***	0.015***
	(10.27)	(5.91)	(7.30)	(9.60)	(5.40)	(4.74)
N	49,347	49,653	51,054	49,224	50,045	48,998
R^2 (%)	0.0473	0.0195	0.0781	0.2023	0.1092	0.0946

Panel C: Post-Announcement Period Net Position Increases for Large and Small Position Changes

	Small Size Categories			Large Size Categories		
	<500 Shares	<$5,000	<$10,000	>5,000 Shares	>$30,000	>$50,000
AFE(rank)	0.010*	0.003	0.023***	0.086***	0.118***	0.119***
	(1.67)	(0.37)	(3.22)	(10.01)	(8.20)	(8.31)
SRWFE(rank)	-0.008	-0.009	-0.006	-0.020**	-0.033**	-0.038***
	(-1.53)	(-1.37)	(-0.93)	(-2.48)	(-2.42)	(-2.75)
Intercept	-0.001	-0.001	-0.002	0.011***	0.020***	0.017***
	(-1.06)	(-0.43)	(-1.10)	(6.55)	(6.00)	(5.36)
N	49,263	49,447	51,174	49,520	50,321	49,276
R^2 (%)	0.0041	-0.0002	0.0220	0.2315	0.1434	0.1476

This table reports coefficient estimates from the following regression:

$$Ex\_NetNumBuy_{it} (or\ Ex\_NetBuy_{it}) = \beta_0 + \beta_1 AFE_{it} + \beta_2 SRWFE_{it} + \varepsilon_{it}$$

for small and large trade size categories using transactions (Panel A), orders (Panel B), and Position Changes (Panel C). In columns 1 and 4 in each panel the dependent variable is ***Ex_NetNumBuy$_{it}$***, the excess net number of buys during the post-earnings announcement period, days +6 to +65 relative to the announcement date, defined as in Battalio and Mendenhall [2005] (see eq. 1 in the text). In the other columns the dependent variable is ***Ex_NetBuy$_{it}$***, excess net buy during the [+6,+65] window defined as in Ayers et al. [2011] (see eq. 2 in the text). ***AFE (Rank)*** and ***SRWFE(Rank)*** are as defined in table 6. t-statistics are in parentheses. *, **, and *** indicate statistical significance at the .10, .05, and .01 levels (two-tailed test) respectively. Standard errors are clustered by firm.

Table 9
Institution Size Based Analysis of Post-Announcement Period Orders and Net Position Changes

Panel A: Pearson Correlations between Post-Announcement Period Excess Net-Buy and Forecast Errors

	All Institutions		**Institutions in the Top Trading Volume Quartile**		**Institutions In the Bottom Trading Volume Quartile**		**Institutions in the two Bottom Trading Volume Quartiles**	
	Orders	Position Changes	Orders	Position Changes	Orders	Position Changes	Orders	Position Changes
AFE (Rank)	0.054***	0.055***	0.062***	0.064***	-0.015	-0.012	0.040	0.033
(p-value)	<0.001	<0.001	<0.001	<0.001	0.346	0.365	0.297	0.315
SRWFE (Rank)	-0.034***	-0.029***	-0.026***	-0.021**	-0.060	-0.061	-0.017	-0.013
(p-value)	<0.001	<0.001	<0.001	0.015	0.190	0.170	0.321	0.353
Observations	52,928		52,563		21,550		38,212	

Panel B: Multiple Regressions

	All Institutions		**Institutions in the Top Trading Volume Quartile**		**Institutions In the Bottom Trading Volume Quartile**		**Institutions in the two Bottom Trading Volume Quartiles**	
	Orders	Position Changes	Orders	Position Changes	Orders	Position Changes	Orders	Position Changes
AFE (Rank)	0.125***	0.127***	0.154***	0.157***	0.006	0.009	0.051	0.042
	(7.35)	(7.60)	(8.34)	(8.65)	(0.11)	(0.18)	(1.50)	(1.26)
SRWFE (Rank)	-0.032**	-0.030*	-0.033*	-0.033*	-0.061	-0.063	-0.033	-0.026
	(-2.04)	(-1.93)	(-1.88)	(-1.92)	(-1.17)	(-1.21)	(-1.07)	(-0.87)
Intercept	0.036***	0.036***	0.041***	0.042***	-0.070***	-0.070***	-0.009	-0.007
	(9.01)	(9.08)	(9.26)	(9.63)	(-4.90)	(-5.02)	(-1.16)	(-0.90)
Adj. R^2 (%)	0.128	0.135	0.166	0.174	-0.003	-0.003	0.002	0.000

Panel A reports Pearson correlations between individual forecast errors and the post-announcement period, days +6 to +65 relative to the announcement date, excess net buy, ***Ex_Net_Buy*** (see eq. 2 in the text) for various subsets of investors in the Ancerno sample. Panel B reports estimates from multiple regressions of post- announcement period excess net buy on both forecast errors included in the regression. For each group of investors, the results are reported using the order based excess net-buy and position change based excess net buy. ***AFE (Rank)*** and ***SRWFE(Rank)*** are as defined in table 5. t-statistics are in parentheses. *, **, and *** indicate statistical significance at the .10, .05, and .01 levels (two-tailed test) respectively. Standard errors are clustered by firm in both types of regressions.

Table 10
Post-Earnings Announcement Drift and Size Stratified Institutional Earnings Announcement Period Trading Activity

	Transaction Activity		**Order Activity**		**Position Change Activity**	
	Small< $10,000 Large>$50,000	Small< $5,000 Large>$30,000	Small< $10,000 Large>$50,000	Small< $5,000 Large>$30,000	Small< $10,000 Large>$50,000	Small< $5,000 Large>$30,000
AFE (Rank)	0.011	0.013	0.005	0.004	0.015	0.010
	(0.97)	(1.16)	(0.43)	(0.34)	(1.33)	(0.83)
SRWFE (Rank)	0.029**	0.028**	0.024**	0.026**	0.030**	0.037***
	(2.33)	(2.25)	(1.98)	(2.13)	(2.36)	(2.88)
EXL	-0.000	-0.000	0.000	0.001	0.001	0.001
	(-0.17)	(-0.56)	(0.86)	(1.25)	(1.22)	(1.07)
EXS	0.001*	0.001*	0.001	0.001	-0.001	-0.001
	(1.89)	(1.91)	(0.90)	(0.51)	(-0.41)	(-0.82)
AFExEXL	-0.002	-0.002	-0.002	-0.002	0.000	0.000
	(-0.89)	(-0.98)	(-0.71)	(-0.78)	(0.17)	(0.00)
AFExEXS	0.005	0.005*	0.002	0.001	0.003	0.001
	(1.51)	(1.65)	(0.48)	(0.37)	(0.49)	(0.24)
SRWFExEXL	0.004	0.005**	0.002	0.003	0.002	0.002
	(1.50)	(2.11)	(1.12)	(1.42)	(0.67)	(0.91)
SRWFExEXS	-0.004	-0.007**	-0.005	-0.003	-0.007	-0.005
	(-1.35)	(-2.45)	(-1.12)	(-0.83)	(-1.25)	(-1.13)
TransCost (Rank)	-0.000	0.002	-0.001	-0.002	0.000	-0.003
	(-0.06)	(0.23)	(-0.08)	(-0.33)	(0.02)	(-0.43)
SRWFExTransCost(Rank)	0.031	0.030	0.023	0.028	0.033	0.050*
	(1.18)	(1.14)	(0.86)	(1.04)	(1.20)	(1.79)
AFExTransCost(Rank)	-0.003	-0.000	-0.016	-0.018	0.005	-0.006
	(-0.12)	(-0.00)	(-0.59)	(-0.67)	(0.18)	(-0.21)
CAR[-60,-3]	-0.018	-0.021*	-0.017	-0.018	-0.021*	-0.017
	(-1.60)	(-1.89)	(-1.50)	(-1.58)	(-1.88)	(-1.50)
Intercept	-0.001	0.000	-0.001	-0.002	-0.000	-0.002
	(-0.23)	(0.11)	(-0.29)	(-0.48)	(-0.15)	(-0.59)
Observations	15,052	15,193	14,783	14,499	14,892	14,433
Adj. R-square (%)	0.2143	0.2644	0.1427	0.1587	0.2305	0.2355

This table presents coefficient estimates for the 2003-2005 period from regressions of cumulative abnormal return during the post-earnings announcement window [days +6 to +65] on forecast errors and their interactions with excess net-buy during the announcement period [days -1 to +1], calculated using small and large trade transactions, orders, or position changes. Small size excess net buy values are denoted ***EXS*** and large size values are denoted ***EXL***. Abnormal return is defined as the firm return in excess of the corresponding Fama-French size and book-to-market 25-portfolio benchmark return. ***AFE (Rank)*** and ***SRWFE(Rank)*** are as defined in table 6. ***Transcost*** is a measure of transaction cost defined as in Ayers et al (2011) (see p. 22 above). ***Transcost(Rank)*** is the decile rank of ***Transcost***. ***CAR[-60,-3]*** is cumulative abnormal returns over the [-60,-3] window. t-statistics are in parentheses. *, **, and *** indicate statistical significance at the .10, .05, and .01 levels (two-tailed test) respectively. Standard errors are clustered by firm.

Table 11
Post Earnings Announcement Drift, Announcement Period Trading Imbalances and Unfilled Orders

	EX is Position Change Based Excess Net-Buy			**EX is Order Based Excess Net-Buy**			**EX is Change in Unfilled Orders**		
AFE[Rank]	0.013***	0.015	0.012	0.012***	0.015	0.012	0.012***	0.015	0.012
	(2.64)	(1.39)	(1.08)	(2.60)	(1.37)	(1.08)	(2.59)	(1.37)	(1.08)
SRWFE[Rank]	0.018***	0.032***	0.032***	0.018***	0.032***	0.031***	0.018***	0.032***	0.032***
	(3.62)	(2.68)	(2.61)	(3.63)	(2.65)	(2.59)	(3.63)	(2.68)	(2.61)
EX[-1,+1]	0.000	0.000	-0.000	0.001	0.001	0.000	0.003**	0.002**	0.002**
	(0.25)	(0.12)	(-0.21)	(1.44)	(1.22)	(0.74)	(2.55)	(2.42)	(2.12)
AFExEX[-1,+1]		-0.000	0.000		-0.000	-0.000		0.001	0.001
		(-0.01)	(0.04)		(-0.19)	(-0.15)		(0.18)	(0.19)
SRWFExEX[-1,+1]		0.002	0.001		0.003	0.003		0.002	0.002
		(0.60)	(0.54)		(1.24)	(1.19)		(0.63)	(0.63)
TransCost [Rank]		0.003	0.003		0.003	0.002		0.003	0.002
		(0.41)	(0.38)		(0.38)	(0.35)		(0.37)	(0.34)
SRWFExTransCost		0.038	0.037		0.037	0.036		0.038	0.037
		(1.45)	(1.39)		(1.41)	(1.35)		(1.45)	(1.38)
AFExTransCost		0.008	0.007		0.008	0.007		0.008	0.008
		(0.32)	(0.29)		(0.32)	(0.29)		(0.33)	(0.30)
CAR[-1,+1]			0.059***			0.056**			0.055**
			(2.66)			(2.49)			(2.49)
CAR[-60,-3]			-0.011			-0.011			-0.011
			(-1.02)			(-1.03)			(-0.99)
Intercept	-0.001	0.001	0.000	-0.001	0.001	0.000	-0.001	0.000	0.000
	(-0.56)	(0.19)	(0.12)	(-0.55)	(0.17)	(0.11)	(-0.59)	(0.15)	(0.09)
Observations	16,228	16,228	16,228	16,228	16,228	16,228	16,228	16,228	16,228
Adj. R-square (%)	0.2198	0.2172	0.2856	0.2341	0.2422	0.3023	0.2666	0.2659	0.3247

This table presents coefficient estimates from regressions of cumulative abnormal return during the post-earnings announcement window, days +6 to +65, on forecast errors and their interactions with excess net-buy (**EX**) during the announcement period for the 2003-2005 period. **EX** is calculated using position changes in columns 1-3, orders in columns 4-6, and unfilled orders in columns 7-9. ***Change in Unfilled Orders*** is the difference between total buy transaction orders and total buy transaction volume in a day minus the difference between total sell transactions orders and total sell transaction volume in a day. The unexpected change in announcement period unfilled orders is calculated as average ***Change in Unfilled Orders*** in the day -1 to +1 announcement period relative to its average daily value in the pre-announcement period [days -65 to -6] divided by the daily average total number of shares placed for execution during the benchmark period (see eq. 3 in the text). Abnormal return during the post-earnings-announcement period is defined as the firm return in excess of the corresponding Fama-French size and book-to-market 25-portfolio benchmark return. ***AFE (Rank)*** and ***SRWFE(Rank)*** are as defined in table 6. ***Transcost*** is a measure of transaction cost defined as in Ayers et al (2011) (see p. 22 above). ***Transcost(Rank)*** is the decile rank of ***Transcost***. ***CAR[-1,+1]*** (***CAR[-60,-3])*** is cumulative abnormal returns over the [-1,+1] ([-60,-3]) window. t-statistics are in parentheses. *, **, and *** indicate statistical significance at the .10, .05, and .01 levels (two-tailed test) respectively. Standard errors are clustered by firm.

Transaction Sizes and Institutional Investor Trading Patterns around Earnings Announcements

APPENDIX
Supplemental Tables for Alternative Time Periods

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May, 2013

Table 3A: (2003- 2005)

Number and Percentage of Trades Classified as Small and Large based on Transactions, Orders, and Position Changes for Various Investor Sizes

Panel A: Transactions

	Small Size Categories						*Large Size Categories*					
Investor Size	<500 Shares		<$5,000		<$10,000		>5,000 Shares		>$30,000		>$50,000	
	N	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*
1=Small	196,496	*44.65%*	100,439	*22.82%*	173,518	*39.43%*	25,031	*5.69%*	134,921	*30.66%*	85,109	*19.34%*
2	544,197	***41.06%***	290,102	***21.89%***	475,895	***35.90%***	131,717	***9.94%***	493,073	***37.20%***	339,917	***25.65%***
3	1,761,946	***48.07%***	1,247,467	***34.03%***	1,634,573	***44.59%***	499,766	***13.63%***	1,353,425	***36.92%***	1,030,711	***28.12%***
4=Large	21,392,733	**43.85%**	12,684,964	**26.00%**	18,527,106	**37.98%**	9,170,977	**18.80%**	20,352,891	**41.72%**	16,224,012	**33.26%**
Total	23,895,372	44.08%	14,322,972	26.42%	20,811,092	38.39%	9,827,491	18.13%	22,334,310	41.20%	17,679,749	32.61%

Panel B: Orders

	Small Size Categories						*Large Size Categories*					
Investor Size	<500 Shares		<$5,000		<$10,000		>5,000 Shares		>$30,000		>$50,000	
	N	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*
1=Small	81,696	*32.57%*	35,857	*14.29%*	66,170	*26.38%*	30,826	*12.29%*	116,158	*46.31%*	83,082	*33.12%*
2	139,297	***22.95%***	50,601	***8.34%***	100,480	***16.55%***	138,069	***22.75%***	359,777	***59.28%***	279,258	***46.01%***
3	567,140	***35.61%***	381,719	***23.97%***	505,600	***31.75%***	411,008	***25.81%***	832,995	***52.31%***	695,396	***43.67%***
4=Large	4,897,530	**32.00%**	2,446,150	**15.98%**	3,966,800	**25.91%**	4,686,833	**30.62%**	8,478,061	**55.39%**	7,198,471	**47.03%**
Total	5,685,663	32.02%	2,914,327	16.41%	4,639,050	26.12%	5,266,736	29.66%	9,786,991	55.12%	8,256,207	46.49%

Panel C: Position Changes

	Small Size Categories						*Large Size Categories*					
Investor Size	<500 Shares		<$5,000		<$10,000		>5,000 Shares		>$30,000		>$50,000	
	N	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*
1=Small	150,518	*39.86%*	71,475	*18.93%*	129,579	*34.32%*	26,085	*6.91%*	132,668	*35.13%*	84,961	*22.50%*
2	263,880	***28.17%***	117,525	***12.54%***	225,250	***24.04%***	131,534	***14.04%***	447,025	***47.72%***	317,986	***33.94%***
3	331,115	***19.76%***	148,032	***8.84%***	275,336	***16.43%***	448,745	***26.78%***	1,058,508	***63.18%***	850,133	***50.74%***
4=Large	2,084,140	**22.10%**	1,084,041	**11.49%**	1,798,710	**19.07%**	3,899,740	**41.35%**	6,134,541	**65.05%**	5,380,129	**57.05%**
Total	2,829,653	22.78%	1,421,073	11.44%	2,428,875	19.56%	4,506,104	36.28%	7,772,742	62.58%	6,633,209	53.40%

This table presents the number and percentage of trades classified as small and large using transactions (Panel A), orders (Panel B), and position changes (Panel C). Columns 1 and 4 use the number of shares executed in classifying trades as small (<500 shares) and large (>5,000 shares). In columns 2 and 5 (3 and 6) trades are classified as small and large if the dollar value of shares executed is less than $5,000 ($10,000) and $30, 000 ($50,000) respectively. The percentage of trades classified as small (large) is calculated by dividing the total number of trades in that category by the total number of trades in the small, intermediate, and large categories. Quartile 1, 2, and 3 percentages that differ from quartile 4 percentages (significant at the .01 level) are *italicized.* Quartile 2, 3, and 4 percentages that differ from quartile 1 percentages (significant at the .01 level) are **bolded**.

Table A4 (2003-2005)
Earnings Announcement Sample Forecast Errors and Cumulative Abnormal Returns in the Announcement and Post-Announcement Periods

	N	Mean	Median	Std. Dev.	5th Pctl.	95th Pctl.
Price	16,873	28.48	20.94	81.60	4.70	57.50
Market Value ($Mil)	16,866	5,181	847	19,709	91	19,405
Analyst Following	16,873	5.40	4.00	5.21	1.00	16.00
AFE	16,873	**0.0004**	**0.0004**	0.0053	-0.0069	0.0076
SRWFE	16,873	**0.0028**	**0.0021**	0.0215	-0.0226	0.0316
CAR[-60,-1]	16,873	0.03%	-0.02%	15.97%	-24.95%	24.68%
CAR[-1,1]	16,873	**0.27%**	**0.35%**	7.45%	-11.81%	11.91%
CAR[+6,+65]	16,873	0.04%	-0.01%	16.51%	-25.61%	25.24%
AFE Quintile 5:						
AFE	3,370	**0.0076**	**0.0056**	0.0047	0.0033	0.0189
SRWFE	3,370	**0.0120**	**0.0091**	0.0294	-0.0303	0.0734
CAR[-60,-1]	3,370	**4.82%**	**3.67%**	18.72%	-22.87%	36.47%
CAR[-1,1]	3,370	**3.40%**	**2.43%**	8.41%	-8.46%	17.02%
CAR[+6,+65]	3,370	**2.15%**	**2.14%**	19.43%	-29.15%	34.42%
AFE Quintile 1:						
AFE	3,358	**-0.0079**	**-0.0052**	0.0067	-0.0246	-0.0023
SRWFE	3,358	**-0.0067**	**-0.0046**	0.0323	-0.0772	0.0450
CAR[-60,-1]	3,358	**-3.90%**	**-2.87%**	20.75%	-38.53%	26.97%
CAR[-1,1]	3,358	**-3.28%**	**-2.13%**	8.72%	-18.24%	7.93%
CAR[+6,+65]	3,358	-0.23%	0.05%	21.11%	-32.32%	32.98%
SRWFE Quintile 5:						
AFE	3,376	**0.0029**	**0.0020**	0.0068	-0.0066	0.0177
SRWFE	3,376	**0.0277**	**0.0177**	0.0243	0.0093	0.0990
CAR[-60,-1]	3,376	**3.01%**	**2.83%**	18.79%	-27.24%	33.85%
CAR[-1,1]	3,376	**1.49%**	**1.11%**	8.36%	-11.16%	14.98%
CAR[+6,+65]	3,376	**1.36%**	**1.82%**	19.70%	-30.94%	32.94%
SRWFE Quintile 1:						
AFE	3,349	**-0.0034**	**-0.0010**	0.0091	-0.0246	0.0091
SRWFE	3,349	**-0.0308**	**-0.0195**	0.0259	-0.0926	-0.0094
CAR[-60,-1]	3,349	**-2.75%**	**-2.41%**	20.89%	-36.38%	29.60%
CAR[-1,1]	3,349	**-1.67%**	**-1.03%**	8.95%	-16.18%	10.56%
CAR[+6,+65]	3,349	-0.52%	0.00%	22.10%	-33.38%	33.58%

This table presents descriptive statistics on firm specific variables for the firms in the earnings announcement sample which includes all quarterly earnings announcements during the 2003-2009 period. Panel A presents summary statistics for forecast errors and abnormal returns around earnings announcements. ***AFE*** is the analyst forecast error obtained by subtracting the consensus analyst forecast from the actual earnings per share on IBES scaled by share price at the end of the most recent quarter prior to the earnings announcement date. The consensus analyst forecast is the mean of the analyst earnings per share forecasts issued during the 90 days prior to the earnings announcement. ***SRWFE is*** seasonal random walk forecast error calculated as the seasonally differenced quarterly earnings before extraordinary items per share scaled by the absolute value of share price from one quarter before the earnings announcement. ***CAR[t_1,t_2]*** is cumulative abnormal return from day t_1 to t_2 relative to the announcement day defined as the firm return in excess of the corresponding Fama-French size and book-to-market 25-portfolio benchmark return. The panel also presents summary statistics for these variables for the largest and smallest AFE and SRWFE deciles. Means (Medians) significant at the 5% level or better based on regular t-test (Wilcoxon signed-rank test) are indicated in **bold**.

Table A5 (2003-2005)

`Earnings Announcement Period Trading Activity

Panel A: Announcement Period Transactions Metrics:

		%	% Increase in Dollar Volume		% Increase in Share Volume		Ex
Investor Size	N	Increase	Total	Per Trans.	Total	Per Trans.	NetBuy
	I	II	III	IV	V	VI	VII
1=Small	8,217	**39.87**	**62.50**	**31.45**	**66.16**	**34.72**	-0.015
2	12,199	**47.64**	**82.44**	**32.40**	**87.53**	**35.22**	-0.019
3	13,563	**40.39**	**92.58**	**45.38**	**95.56**	**46.89**	**-0.073**
4=Large	16,242	**39.99**	**76.94**	**38.30**	**79.00**	**39.82**	**0.016**
All	16,332	**39.83**	**76.88**	**36.14**	**79.03**	**37.66**	**-0.032**

Panel B: Announcement Period Order Metrics:

		%	% Increase in Dollar Volume		% Increase in Share Volume		Ex
Investor Size	N	Increase	Total	Per Order	Total	Per Order	NetBuy
	I	II	III	IV	V	VI	VII
1=Small	6,645	**46.54**	**67.21**	**22.29**	**71.12**	**25.39**	**-0.130**
2	10,881	**53.34**	**93.41**	**24.72**	**98.02**	**26.76**	**-0.143**
3	12,652	**45.02**	**105.51**	**38.37**	**109.39**	**41.33**	**-0.045**
4=Large	16,116	**24.03**	**77.49**	**35.82**	**79.55**	**37.66**	**0.038**
All	16,228	**28.08**	**78.86**	**31.71**	**80.98**	**33.50**	**-0.023**

Panel C: Trade Size Stratified Announcement Period Trading

	Transactions			**Orders**			**Position Changes**		
	N	% Increase	Ex NetBuy	N	% Increase	Ex NetBuy	N	% Increase	Ex NetBuy
	I	II	III	IV	V	VI	VII	VIII	IX
Small Trades									
<500 Shares	15,650	**30.15**	**0.062**	14,847	**11.10**	**0.063**	15,242	0.52	**0.046**
<$5,000	15,702	**30.57**	**0.030**	14,795	**14.62**	**0.048**	15,217	**3.59**	0.004
<$10,000	16,015	**32.55**	**0.077**	15,447	**13.43**	**0.079**	15,816	**1.73**	**0.016**
Large Trades									
>5,000 Shares	14,881	**57.96**	-0.013	14,947	**54.35**	0.006	15,120	**33.65**	-0.010
>$30,000	15,532	**47.74**	-0.026	15,455	**39.98**	-0.020	15,631	**24.38**	-0.027
>$50,000	15,168	**50.78**	**-0.050**	15,158	**44.94**	**-0.038**	15,345	**27.57**	**-0.038**

This table presents descriptive statistics on earnings announcement period, [-1,+1], trading activity for the 2003-2005 period. Panel A (Panel B) reports trading metrics calculated using transactions (orders) for investors grouped with respect to total annual trading volume. Percentage increases are relative to the benchmark period of [-60,-6]. In panels A and B column II presents the percentage increase in average daily trade counts from the [-60,-6] window to the [-1,+1] window. Column III reports the percentage increase in average daily total dollar volume executed while column IV reports the percentage increase in dollar volume executed per transaction (order). Columns V and VI report the percentage increase in average daily total share volume executed and dollar volume executed per transaction (Panel A) and order (Panel B). Column VII reports excess net buy defined as in Ayers et al. (2011) for transactions (Panel A) and orders (Panel B). In panel C, Columns II, V, and VIII report percentage increase in transaction, order, and position change counts respectively from the [-60,-6] window to the [-1,1] window for small and large trades based on various cutoffs. Columns III, VI, and IX report excess net buy calculated using transactions, orders, and position changes respectively. Excess net buy for dollar value based trade classifications is calculated as in Ayers et al. (2011) while the excess net buy for share based trade classifications is calculated as in Battalio and Mendenhall (2005). Values that differ significantly from 0 at the .05 level are **bolded**.

Table A6 (2003-2005)

Regressions of Institutional Excess Net-Buy During Earnings Announcement Period on Forecast Errors

Panel A: Announcement Period Net Buying in Large and Small Transactions

	Small Size Categories			***Large Size Categories***		
	<500 Shares	<$5,000	<$10,000	>5,000 Shares	>$30,000	>$50,000
AFE(Rank)	-0.164***	-0.144**	-0.110*	0.035	0.220***	0.185**
	(-2.93)	(-2.26)	(-1.94)	(0.65)	(3.08)	(2.47)
SRWFE(Rank)	0.161***	0.131**	0.124**	0.011	-0.024	-0.007
	(3.03)	(2.15)	(2.31)	(0.23)	(-0.35)	(-0.10)
Intercept	0.055***	0.024	0.072***	-0.015	-0.027	-0.052***
	(3.62)	(1.34)	(4.70)	(-1.03)	(-1.47)	(-2.75)
N	15642	15699	16014	14930	15516	15153
R^2 (%)	0.0692	0.0307	0.0306	-0.0084	0.0626	0.0412

Panel B: Announcement Period Net Buy Orders for Large and Small Orders

	Small Size Categories			***Large Size Categories***		
	<500 Shares	<$5,000	<$10,000	>5,000 Shares	>$30,000	>$50,000
AFE(Rank)	-0.026	0.008	-0.043*	0.052*	0.034	0.030
	(-1.23)	(0.32)	(-1.87)	(1.91)	(1.02)	(0.88)
SRWFE(Rank)	0.031	0.019	0.024	-0.071***	-0.068**	-0.064**
	(1.52)	(0.72)	(1.10)	(-2.69)	(-2.11)	(-1.99)
Intercept	0.000	-0.001	-0.003	0.000	0.007	0.007
	(0.02)	(-0.08)	(-0.44)	(0.02)	(0.83)	(0.78)
N	14847	14795	15447	14988	15455	15158
R^2 (%)	0.0057	-0.0074	0.0110	0.0419	0.0164	0.0130

Panel C: Announcement Period Net Position Increases for Large and Small Position Changes

	Small Size Categories			**Large Size Categories**		
	<500 Shares	<$5,000	<$10,000	>5,000 Shares	>$30,000	>$50,000
AFE(Rank)	0.013	0.005	0.014	-0.027	-0.035	-0.034
	(0.59)	(0.27)	(0.83)	(-1.14)	(-1.07)	(-1.03)
SRWFE(Rank)	-0.005	-0.007	-0.001	-0.045*	-0.099***	-0.098***
	(-0.21)	(-0.41)	(-0.04)	(-1.95)	(-3.17)	(-3.07)
Intercept	-0.000	-0.012***	-0.018***	-0.020***	-0.006	-0.008
	(-0.06)	(-2.58)	(-3.90)	(-3.10)	(-0.64)	(-0.86)
N	14864	14729	15517	15169	15611	15326
R^2 (%)	-0.0111	-0.0123	-0.0079	0.0374	0.0877	0.0823

This table reports coefficient estimates from the following regression for the 2003-2005 period:

$$Ex\_NetNumBuy_{it} (or\ Ex\_NetBuy_{it}) = \beta_0 + \beta_1 AFE_{it} + \beta_2 SRWFE_{it} + \varepsilon_{it}$$

for small and large trade size categories using transactions (Panel A), orders (Panel B), and Position Changes (Panel C). In columns 1 and 4 in each panel the dependent variable is ***Ex_NetNumBuy$_{it}$***, the excess net number of buys, defined as in Battalio and Mendenhall [2005] (see eq. 1 in the text) during the earnings announcement period, days -1 to +1 relative to the announcement date. In the other columns the dependent variable is ***Ex_NetBuy$_{it}$***, excess net buy during the [-1,+1] window defined as in Ayers et al. [2011] (see eq. 2 in the text). ***AFE (Rank)*** is the decile rank of analyst-based earnings surprise converted to [-0.5,0.5]. ***SRWFE(Rank)*** is the decile rank of seasonal random-walk earnings surprise converted to [-0.5,0.5]. ***AFE*** is calculated by subtracting the consensus analyst forecast from the actual earnings per share on IBES scaled by share price at the end of the most recent quarter prior to the earnings announcement date. The consensus analyst forecast is the mean of the analyst earnings per share forecasts issued during the 90 days prior to the earnings announcement. ***SRWFE*** is defined as the seasonally differenced quarterly earnings before extraordinary items per share scaled by the absolute value of share price from one quarter before the earnings announcement. t-statistics are in parentheses. *, **, and *** indicate statistical significance at the .10, .05, and .01 levels (two-tailed test) respectively. Standard errors are clustered by firm.

Table A7 (2003-2005)
Institution Size Based Analysis of Announcement Period Orders and Net Position Changes

Panel A: Pearson Correlations between Announcement Period Excess Net-Buy and Forecast Errors

	All Institutions		Institutions in the Top Trading Volume Quartile		Institutions In the Bottom Trading Volume Quartile		Institutions in the two Bottom Trading Volume Quartiles	
	Orders	Position Changes	Orders	Position Changes	Orders	Position Changes	Orders	Position Changes
AFE (Rank)	0.029	0.027	0.031	0.017	-0.108	-0.119	-0.057	-0.064
(p-value)	0.368	0.86	0.362	0.588	0.148	0.118	0.245	0.186
SRWFE (Rank)	-0.106***	-0.090***	-0.093***	-0.090***	-0.070	-0.124*	0.026	-0.007
(p-value)	0.001	0.003	0.003	0.004	0.316	0.081	0.566	0.873
Observations	16,221		16,109		6,642		11,839	

Panel B: Regressions of Announcement Period Excess Net-Buy on Forecast Errors

	All Institutions		Institutions in the Top Trading Volume Quartile		Institutions In the Bottom Trading Volume Quartile		Institutions in the two Bottom Trading Volume Quartiles	
	Orders	Position Changes	Orders	Position Changes	Orders	Position Changes	Orders	Position Changes
AFE (Rank)	0.040	0.020	0.026	0.011	-0.093	-0.115*	-0.086**	-0.088**
	(1.28)	(0.64)	(0.81)	(0.36)	(-1.60)	(-1.94)	(-2.01)	(-2.02)
SRWFE (Rank)	-0.057*	-0.080***	-0.063**	-0.082***	-0.029	-0.082	0.022	-0.019
	(-1.87)	(-2.67)	(-2.03)	(-2.63)	(-0.55)	(-1.49)	(0.55)	(-0.47)
Intercept	0.007	0.003	0.011	0.007	0.071***	0.069***	0.005	-0.008
	(0.81)	(0.31)	(1.28)	(0.79)	(4.85)	(4.59)	(0.42)	(-0.72)
Adj. R^2 (%)	0.012	0.032	0.013	0.033	0.029	0.107	0.017	0.032

Panel A reports Pearson correlations between individual forecast errors and announcement period, [-1, +1], excess net buy, ***Ex_Net_Buy*** (see eq. 2 in the text) for various subsets of investors in the Ancerno sample. Panel B reports estimates from multiple regressions of announcement period excess net buy on both forecast errors included in the regression. For each group of investors, the results are reported using the order based excess net-buy and position change based excess net buy. ***AFE (Rank)*** and ***SRWFE(Rank)*** are as defined in table 5. t-statistics are in parentheses. *, **, and *** indicate statistical significance at the .10, .05, and .01 levels (two-tailed test) respectively. Standard errors are clustered by firm in both types of regressions.

Table A8 (2003-2005)
Regressions of Institutional Excess Net-Buy During Post-Announcement Period on Forecast Errors

Panel A: Post-Announcement Period Net Buying in Large and Small Transactions

	Small Size Categories			Large Size Categories		
	<500 Shares	<$5,000	<$10,000	>5,000 Shares	>$30,000	>$50,000
AFE (Rank)	0.062	0.020	0.054	0.118***	0.107***	0.115***
	(1.60)	(0.47)	(1.50)	(4.77)	(3.29)	(3.48)
SRWFE(Rank)	-0.000	-0.008	-0.036	-0.031	-0.051*	-0.039
	(-0.01)	(-0.20)	(-1.15)	(-1.38)	(-1.65)	(-1.27)
Intercept	0.078***	0.080***	0.066***	0.026***	0.029***	0.023***
	(8.33)	(7.17)	(7.80)	(5.19)	(4.07)	(3.15)
N	15642	15699	16014	14930	15516	15153
R^2 (%)	0.0068	-0.0114	0.0048	0.1613	0.0704	0.0817

Panel B: Post-Announcement Period Net Buy Orders for Large and Small Orders

	Small Size Categories			Large Size Categories		
	<500 Shares	<$5,000	<$10,000	>5,000 Shares	>$30,000	>$50,000
AFE(Rank)	0.021	-0.018	0.014	0.108***	0.109***	0.109***
	(1.28)	(-0.90)	(0.73)	(6.41)	(3.37)	(3.39)
SRWFE(Rank)	0.011	0.012	0.009	-0.013	-0.045	-0.027
	(0.71)	(0.62)	(0.52)	(-0.87)	(-1.44)	(-0.89)
Intercept	0.047***	0.047***	0.044***	0.025***	0.027***	0.021***
	(13.00)	(10.36)	(10.90)	(6.78)	(3.72)	(2.96)
N	14847	14795	15447	14988	15455	15158
R^2 (%)	0.0098	-0.0069	-0.0038	0.2834	0.0728	0.0761

Panel C: Post-Announcement Period Net Position Increases for Large and Small Position Changes

	Small Size Categories			Large Size Categories		
	<500 Shares	<$5,000	<$10,000	>5,000 Shares	>$30,000	>$50,000
AFE(rank)	0.023	0.010	0.027*	0.084***	0.085***	0.104***
	(1.55)	(0.64)	(1.65)	(4.71)	(2.72)	(3.35)
SRWFE(rank)	-0.037***	-0.026*	-0.023	-0.006	-0.026	-0.037
	(-2.72)	(-1.70)	(-1.54)	(-0.40)	(-0.91)	(-1.28)
Intercept	0.016***	0.006*	0.013***	0.016***	0.024***	0.022***
	(5.66)	(1.87)	(3.99)	(4.49)	(3.51)	(3.34)
N	14864	14729	15517	15169	15611	15326
R^2 (%)	0.0427	0.0081	0.0178	0.1650	0.0416	0.0702

This table reports coefficient estimates from the following regression:

$$Ex\_NetNumBuy_{it} (or\ Ex\_NetBuy_{it}) = \beta_0 + \beta_1 AFE_{it} + \beta_2 SRWFE_{it} + \varepsilon_{it}$$

for small and large trade size categories using transactions (Panel A), orders (Panel B), and Position Changes (Panel C). In columns 1 and 4 in each panel the dependent variable is ***Ex_NetNumBuy$_{it}$***, the excess net number of buys during the post-earnings announcement period, [+6,+65], defined as in Battalio and Mendenhall [2005] (see eq. 1 in the text). In the other columns the dependent variable is ***Ex_NetBuy$_{it}$***, excess net buy during the [+6,+65] window defined as in Ayers et al. [2011] (see eq. 2 in the text). ***AFE (Rank)*** and ***SRWFE(Rank)*** are as defined in table 5. t-statistics are in parentheses. *, **, and *** indicate statistical significance at the .10, .05, and .01 levels (two-tailed test) respectively. Standard errors are clustered by firm.

Table A9 (2003-2005)
Institution Size Based Analysis of Post-Announcement Period Orders and Net Position Changes

Panel A: Pearson Correlations between Post-Announcement Period Excess Net-Buy and Forecast Errors

	All Institutions		**Institutions in the Top Trading Volume Quartile**		**Institutions In the Bottom Trading Volume Quartile**		**Institutions in the two Bottom Trading Volume Quartiles**	
	Orders	Position Changes	Orders	Position Changes	Orders	Position Changes	Orders	Position Changes
AFE (Rank)	0.066***	0.070***	0.078	0.086***	0.182*	0.197**	0.034	0.018
(p-value)	<0.001	<0.001	<0.001	<0.001	0.051	0.030	0.576	0.769
SRWFE (Rank)	-0.022	-0.014	-0.015	-0.005	0.042	0.045	0.078	0.088
(p-value)	0.221	0.926	0.405	0.770	0.614	0.587	0.181	0.126
Observations	16,221		16,109		6,642		11,839	

Panel B: Multiple Regressions

	All Institutions		**Institutions in the Top Trading Volume Quartile**		**Institutions In the Bottom Trading Volume Quartile**		**Institutions in the two Bottom Trading Volume Quartiles**	
	Orders	Position Changes	Orders	Position Changes	Orders	Position Changes	Orders	Position Changes
AFE (Rank)	0.103***	0.103***	0.131***	0.127***	0.190**	0.205**	0.005	-0.018
	(2.94)	(2.96)	(3.42)	(3.35)	(2.04)	(2.29)	(0.08)	(-0.30)
SRWFE (Rank)	-0.048	-0.044	-0.060*	-0.061*	-0.019	-0.021	0.077	0.094
	(-1.43)	(-1.33)	(-1.66)	(-1.70)	(-0.23)	(-0.26)	(1.24)	(1.58)
Intercept	0.043***	0.044***	0.048***	0.049***	-0.115***	-0.108***	-0.038**	-0.042***
	(5.25)	(5.49)	(5.29)	(5.58)	(-4.97)	(-4.80)	(-2.50)	(-2.82)
Adj. R^2 (%)	0.051	0.052	0.074	0.072	0.027	0.040	0.000	0.006

Panel A reports Pearson correlations between individual forecast errors and the post-announcement period, [+6, +65], excess net buy, ***Ex_Net_Buy*** (see eq. 2 in the text) for various subsets of investors in the Ancerno sample. Panel B reports estimates from multiple regressions of post- announcement period excess net buy on both forecast errors included in the regression. For each group of investors, the results are reported using the order based excess net-buy and position change based excess net buy. ***AFE (Rank)*** and ***SRWFE(Rank)*** are as defined in table 5. t-statistics are in parentheses. *, **, and *** indicate statistical significance at the .10, .05, and .01 levels (two-tailed test) respectively. Standard errors are clustered by firm in both types of regressions.

Table A10 (2003– 2009)

Post-Earnings Announcement Drift and Size Stratified Institutional Earnings Announcement Period Trading Activity

	Transaction Activity		**Order Activity**		**Position Change Activity**	
	Small< $10,000 Large>$50,000	Small< $5,000 Large>$30,000	Small< $10,000 Large>$50,000	Small< $5,000 Large>$30,000	Small< $10,000 Large>$50,000	Small< $5,000 Large>$30,000
AFE (Rank)	0.015**	0.018**	0.016**	0.016**	0.018**	0.016**
	(2.02)	(2.48)	(2.21)	(2.10)	(2.38)	(2.15)
SRWFE (Rank)	0.017**	0.022***	0.013*	0.017**	0.017**	0.020**
	(2.24)	(2.90)	(1.75)	(2.24)	(2.17)	(2.53)
EXL	-0.001*	-0.001	-0.000	-0.000	-0.000	-0.000
	(-1.70)	(-1.34)	(-0.97)	(-0.81)	(-0.15)	(-0.18)
EXS	0.001	0.000	0.001	0.000	0.001	-0.001
	(1.14)	(0.15)	(0.77)	(0.06)	(0.47)	(-0.91)
AFExEXL	0.000	0.001	0.000	0.000	0.001	0.001
	(0.24)	(0.34)	(0.23)	(0.18)	(0.74)	(0.68)
AFExEXS	0.001	0.001	-0.003	0.001	-0.002	-0.001
	(0.61)	(0.62)	(-1.11)	(0.23)	(-0.50)	(-0.24)
SRWFExEXL	0.002	0.002	0.002*	0.002*	0.001	0.001
	(1.18)	(1.21)	(1.77)	(1.66)	(0.60)	(0.76)
SRWFExEXS	0.001	0.001	0.004	0.004	0.002	0.002
	(0.53)	(0.38)	(1.25)	(1.41)	(0.52)	(0.43)
TransCost (Rank)	-0.015***	-0.015***	-0.015***	-0.017***	-0.013***	-0.018***
	(-3.46)	(-3.29)	(-3.25)	(-3.79)	(-3.02)	(-3.97)
SRWFExTransCost(Rank)	0.028*	0.037**	0.021	0.029*	0.027*	0.034**
	(1.74)	(2.33)	(1.30)	(1.77)	(1.65)	(2.06)
AFExTransCost(Rank)	0.024	0.030*	0.027	0.026	0.030*	0.027
	(1.40)	(1.82)	(1.60)	(1.53)	(1.76)	(1.59)
CAR[-60,-1]	-0.019***	-0.020***	-0.021***	-0.023***	-0.022***	-0.021***
	(-2.85)	(-3.07)	(-3.15)	(-3.40)	(-3.32)	(-3.05)
Intercept	-0.008***	-0.008***	-0.008***	-0.009***	-0.007***	-0.010***
	(-3.99)	(-3.78)	(-3.73)	(-4.28)	(-3.51)	(-4.47)
Observations	48628	49390	48183	48034	48294	47807
Adj. R-square (%)	0.0902	0.1108	0.0926	0.1135	0.0895	0.1029

This table presents coefficient estimates from regressions of cumulative abnormal return during the post-earnings announcement window, [days +6 to +65], on forecast errors and their interactions with excess net-buy during the announcement period, [days -1 to +1], calculated using small and large trade transactions, orders, or position changes. Small size excess net buy values are denoted ***EXS*** and large size values are denoted ***EXL***.Abnormal return is defined as the firm return in excess of the corresponding Fama-French size and book-to-market 25-portfolio benchmark return. ***AFE (Rank)*** and ***SRWFE(Rank)*** are as defined in table 5. ***Transcost*** is a measure of transaction cost defined as in Ayers et al (2011) (see p. 22 in the text). ***Transcost(Rank)*** is the decile rank of Transcost. ***CAR[-60,-1]*** is cumulative abnormal returns over the [-60,-1] window. t-statistics are in parentheses. *, **, and *** indicate statistical significance at the .10, .05, and .01 levels (two-tailed test) respectively. Standard errors are clustered by firm in both types of regressions.

Table A11 (2003 – 2009)

Post Earnings Announcement Drift, Announcement Period Trading Imbalances and Unfilled Orders

	EX is Position Change Based Excess Net-Buy			**EX is Order Based Excess Net-Buy**			**EX is Change in Unfilled Orders**		
AFE[Rank]	0.009***	0.023***	0.023***	0.009***	0.023***	0.023***	0.009***	0.023***	0.023***
	(2.86)	(3.40)	(3.32)	(2.84)	(3.38)	(3.32)	(2.83)	(3.37)	(3.33)
SRWFE[Rank]	0.010***	0.031***	0.032***	0.010***	0.031***	0.032***	0.010***	0.031***	0.032***
	(3.42)	(4.25)	(4.39)	(3.43)	(4.23)	(4.38)	(3.44)	(4.24)	(4.39)
EX[-1,+1]	-0.000	-0.000	-0.000	0.000	0.000	-0.000	0.002**	0.002**	0.002**
	(-0.92)	(-0.90)	(-0.96)	(0.01)	(0.09)	(-0.05)	(2.15)	(2.23)	(2.07)
AFExEX[-1,+1]		0.001	0.001		0.000	0.000		-0.001	-0.001
		(0.67)	(0.72)		(0.00)	(0.04)		(-0.51)	(-0.53)
SRWFExEX[-1,+1]		0.002	0.002		0.002	0.002		0.002	0.002
		(1.22)	(1.17)		(1.59)	(1.56)		(0.67)	(0.71)
TransCost [Rank]		-0.016***	-0.017***		-0.016***	-0.017***		-0.016***	-0.017***
		(-3.75)	(-3.95)		(-3.75)	(-3.94)		(-3.75)	(-3.94)
SRWFExTransCost		0.057***	0.059***		0.056***	0.059***		0.057***	0.059***
		(3.61)	(3.71)		(3.59)	(3.69)		(3.61)	(3.71)
AFExTransCost		0.045***	0.044***		0.045***	0.043***		0.045***	0.043***
		(2.80)	(2.72)		(2.79)	(2.72)		(2.79)	(2.72)
CAR[-1,+1]			0.011			0.010			0.008
			(0.84)			(0.74)			(0.61)
CAR[-60,-1]			-0.019***			-0.019***			-0.019***
			(-2.91)			(-2.92)			(-2.91)
Intercept	-0.003***	-0.009***	-0.009***	-0.003***	-0.009***	-0.009***	-0.003***	-0.009***	-0.009***
	(-3.73)	(-4.33)	(-4.53)	(-3.71)	(-4.31)	(-4.51)	(-3.74)	(-4.33)	(-4.51)
Observations	52,928	52,928	52,928	52,928	52,928	52,928	52,928	52,928	52,928
Adj. R-square (%)	0.0686	0.1650	0.1955	0.0668	0.1628	0.1931	0.0761	0.1666	0.1958

This table presents coefficient estimates from regressions of cumulative abnormal return during the post-earnings announcement window, days +6 to +65, on forecast errors and their interactions with excess net-buy (**EX**) during the announcement period for the 2003 to 2005 period. **EX** is calculated using position changes in columns 1-3, orders in columns 4-6, and unfilled orders in columns 7-9. ***Change in Unfilled Orders*** is the difference between total buy transaction orders and total buy transaction volume in a day minus the difference between total sell transactions orders and total sell transaction volume in a day. The unexpected change in announcement period unfilled orders is calculated as average ***Change in Unfilled Orders*** in the day -1 to +1 announcement period relative to its average daily value in the pre-announcement period [days -65 to -6] divided by the daily average total number of shares placed for execution during the benchmark period (see eq. 3 in the text). Abnormal return during the post-earnings-announcement period is defined as the firm return in excess of the corresponding Fama-French size and book-to-market 25-portfolio benchmark return. ***AFE (Rank)*** and ***SRWFE(Rank)*** are as defined in table 5. ***Transcost*** is a measure of transaction cost defined as in Ayers et al (2011) (see p. 22 in the text). ***Transcost(Rank)*** is the decile rank of Transcost. **CAR[-1,+1]** (***CAR[-60,-1])*** is cumulative abnormal returns over the [-1,+1] ([-60,-1]) window. t-statistics are in parentheses. *, **, and *** indicate statistical significance at the .10, .05, and .01 levels (two-tailed test) respectively. Standard errors are clustered by firm in both types of regressions.