

**Institutional Foresight**  
**Do institutions profit from repurchase announcements?**

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# **Institutional Foresight**

## **Do institutions profit from repurchase announcements?**

### **Abstract**

In contrast to the actual repurchase event, the announcement time is a period of heightened uncertainty for institutional investors because they compete against the firm and insiders not knowing if the firm will follow through. We use daily intermarket sweep order (ISO), biweekly short interest, and quarterly 13(f) data to examine how institutions trade in this asymmetrically informed environment. After stratifying the ISO trades based on the firm and insider signals, we find that ISO traders are net sellers during a time when prices are expected to increase. Similarly, short sellers appear to be mistiming their short positions, opening when prices are low and closing when prices are high. These findings suggest that institutions could be prematurely selling their shares cheaply. With the exception of transient investors selling their stockpile of pre-announcement shares as prices rise, it appears that some institutions are overlooking the short-term upside potential.

# **Institutional Foresight**

## **Do institutions profit from repurchase announcements?**

### **1. Introduction**

Are institutional investors always informed? Regarded as sophisticated traders by both academics and practitioners, institutional investors may have the ability to interpret information from corporations in order to trade profitably. In our paper, we show that this perception may not always be true, particularly around repurchase announcements. The information signaled in repurchase announcements by the firm and its insiders to investors about the valuation and future growth of the company has a significant announcement effect (Ofer and Thakor 1987). Many researchers have documented the significant positive market reactions to repurchase announcements (Ikenberry, Lakonishok, and Vermaelen 1995; Peyer and Vermaelen 2009; Bargeron, Kulchania, and Thomas 2011). Hence, informed traders can make a profit by buying the stock at a lower price before the price appreciation, and then selling the stock at a higher price at the peak of the price appreciation.

However, institutional profitability is affected by the activities of two other parties: the firm and its registered insiders. In the context of our study of repurchase announcements, there are three players—the firm, insiders, and institutional investors. All three are informed, but clearly, information asymmetry exists. Institutional investors—the biggest investors in U.S. equities holding approximately 75 percent of U.S. stocks (Alexander, Peterson, Beardsley 2014)—are known to have superior research skills. They trade based on information about upcoming events only if the expected profit is higher than the cost of obtaining the private information (Admati and

Pfleiderer 1988). As an integral part of the company, the insiders<sup>4</sup> have private information that they can use to manage their personal portfolios. The presence of private information alters the trading patterns of all market participants. The insiders must consider how their transactions affect prices and trade size in the current and future trades (Kyle 1985). If their information advantage is short-lived, the insiders are more likely to execute their trades in a short period of time. Conversely, if the insiders expect the information advantage to be long-lasting, they are more likely to spread their trades over consecutive months. In both scenarios, the insiders experience significant abnormal returns (Cicero and Wintoki Working Paper Series). Finally, we have the announcing firm that is supposedly the most informed about its current financial condition and future earnings. The firm also has the advantage of deciding if it will follow through with actual shares repurchases and the timing of such repurchases. In our sample, 35 percent of the firms do not follow through. Thus, repurchase announcements can create a period of heightened uncertainty. For this reason, we examine institutional foresight at the time of the *announcement*. If institutional investors are truly more informed, they should be able to trade profitably before the actual repurchases.

Our paper differs from prior research in two regards: (1) we focus on the institutional investors' decisions around the announcement, and (2) we use three different data sources: quarterly 13(f) data, biweekly short interest data, and daily intermarket sweep order data. In De Lisle, Morscheck, and Nofsinger (2014), they provide evidence of institutional selling around repurchases. Their findings relate specifically to the actual repurchase period when most of the repurchase decisions are already made public. Arguably, less is known about the firm's intentions during the announcement period. Additionally, because institutional investors hold the majority of U.S. equities, logically, they would take the opposite side of the firms' actual repurchases for the

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<sup>4</sup> We define an insider as any person who is directly or indirectly own more than 10% of the firm's equity or who is an officer or director of the company according to Section 16 of the Securities Exchange Act of 1934

right price. They are the liquidity providers when the firms are actually repurchasing. However, institutional investors are not subject to strong counterparty purchases during the days before the announcement. The authors also do not assess if institutions benefit economically from trading around repurchases. In our paper, we find evidence of institutional net buying and profit for transient investors, and net selling and significant losses for ISO traders and short sellers. To our knowledge, there is no existing literature that discusses institutional trading profitability around repurchase announcements where the company itself is party to forthcoming stock transactions. The second main difference is our usage of three databases to provide a more comprehensive understanding of institutional trading, covering traders in long and short positions at the quarterly, biweekly, and daily frequency. Our exploration goes beyond the 13(f) filings to include activities of ISO traders and short sellers. These three data frequencies allow us to examine institutional trading from the big-picture viewpoint to the day-to-day perspective.

We first start with the 13(f) data as they provide a broad understanding of institutional trading behavior for a wider range of time. We use this database to examine how institutional investors trade around repurchase announcements before assessing institutional profitability. We find that institutional investors are aware of these events, and they actively trade during the quarters around the announcement. Institutional investors exhibit a positive or neutral trade imbalance up until the announcement quarter. At which point, institutions begin to sell shares of the announcing firms. This negative trade imbalance persists for the following six consecutive quarters, and then institutional trading reverts back to the pre-announcement trend.

Furthermore, we also examine institutional trading by investor type based on the Bushee (2001) classifications. We find that transient institutional investors—the institutions with high portfolio turnover and diversified holdings with a focus on short-term gains—make up almost 42%

of the total institution trading volume in our sample. These investors appear to be aware of the price appreciation after the announcement. They hold on to their long position until the announcement quarter when they start selling the accumulated shares for more than the initial purchase price. Transient investor's net selling trend during the quarters  $[0, +3]$  is associated with positive and significant cumulative average abnormal return of 5.55%\*\*\*. After capturing the short-term gains, these investors revert back to their normal buying trend in  $Q+4$ .

With a big-picture understanding, we continue the analysis with a closer examination at the daily frequency using ISO data. We use ISO to evaluate institutional trading for two main reasons: (1) they are typically used by institutions and (2) ISO data provide the exact timestamp, price, quantity, and trade condition to calculate institutional profit (Chakravarty, Jain, Upson, and Wood 2012). Our analysis finds that institutional investors exhibit a negative trade imbalance during the  $[-5, +5]$  days around repurchase announcements, and this selling trend leads to significant losses especially in the long term.

In addition to examining institutional trading activities from the long position perspective, we also analyze the trading activities of short sellers, who specifically increase or decrease their short interest depending on whether they predict the prices to go up or down, respectively. Although the sequence of opening and closing the portfolios are flipped for long-only institutions and short sellers, both are considered as sophisticated traders and both are hypothesized to take similar economic exposure to repurchase announcements (Christophe, Ferri, and Angel 2004). If the short sellers are to avoid significant loss, we expect them to exhibit a neutral response or significant decrease in short selling around repurchase announcements, which are associated with future price increases. Rather, we find evidence of significant abnormal short selling during the three biweekly periods after the announcement. This abnormal short interest occurs at a time when

the post-announcement price run-up has just started. Stock prices have not reach their peaks. In fact, the price appreciation lasts beyond the abnormal short selling period, creating fewer opportunities for short sellers to close their short positions profitably at a lower price. In summary, we find that ISO traders and short sellers are not taking advantage of the possible gains around the announcement period. Conversely, transient investors appear to be profiting from the post-announcement price appreciation by selling shares they accumulated during the pre-announcement quarters. The findings are robust when compared to that of our control sample of non-announcing firms, sample of announcing firms during non-announcing time, and sample of non-contemporaneous events. Our in-depth analysis of institutional trading in a period of heightened information asymmetry around repurchase announcements shows that some institutions are overlooking the potential short-term profits. Figure 1 provides a visual summary of institutional trading and profit.

The rest of the paper is organized as follows: section 2 presents a discussion of previous literature; section 3 presents our hypotheses; section 4 presents the data; sections 5 provides the findings; and section 6 provides conclusions.

## **2. Literature Review**

There are two main hypotheses widely discussed in repurchase literature: free cash flow and information signaling. The first hypothesis explains that repurchases can be used to reduce the cash available to the firm's management (Jensen 1986). The author describes free cash flow as the cash left over after the firm has invested in all available positive NPV projects. The firm will repurchase shares using the cash available to prevent managers from investing in negative NPV projects. The information signaling hypothesis explains that the firm uses repurchases to signal positive future earnings. If the firm believes that its shares are undervalued, it can signal such

information to the market using repurchase announcements (Bhattacharya 1979, Miller and Rock 1985, and Vermaelen 1981).

In both hypotheses, information asymmetry exists. In the free cash flow hypothesis, if there are no profitable investments, the decision to repurchase or invest in the negative NPV projects depends on the benefits to the insiders. In the information signaling hypothesis, the insiders can buy more of the firm's stocks at a lower price and sell these shares at a higher price after the post-announcement price run-up. However, in the latter hypothesis, the information asymmetry between the firm, insiders and investors is higher. The firm and its insiders can announce without committing to any actual repurchases. Because of this flexibility and private information, investors are at a disadvantage. In fact, false signaling can transfer a large amount of wealth from the investors to the insiders (Fried 2005).

To reduce opportunities to manipulate the market, lawmakers have established key regulations to increase transparency. Beginning in January 2004, the SEC requires that the announcing firm discloses its repurchase activities every quarter. They must disclose the total number of shares repurchased during the previous quarter, the average price paid for those shares, the number of shares that were purchased as a part of a previously announced plan, and the maximum number of shares that could be repurchased. Although the new regulation aims to curb the firm's incentive to exploit the investor's information disadvantage, the disclosure is not made public until months after the transaction. This delay makes the disclosure less useful in reducing information asymmetry in the market, especially during the announcement period.

Apart from requiring firms to disclose their repurchasing information, lawmakers also established Rule 10b-5, which requires insiders 1) to refrain from trading the firm's shares when they have "material" nonpublic information or 2) to disclose the information. However, to be

charged with breaking Rule 10b-5, the insiders have to *intentionally* deceive others. Fraud due to negligent behavior will not invoke Rule 10b-5. Furthermore, the information has to be “material,” giving the insiders an unfair advantage to unduly influence the market. Otherwise, the insiders are free to trade because they have not violated Rule 10b-5. Interestingly enough, insiders are most active around large repurchases and the abnormal returns are higher when net insider buying exists compared to when insiders are net sellers (Bonaime and Ryngaert 2013). These findings show that proving insiders are in violation of Rule 10b-5 requires considerable evidence. Simply knowing that insiders are active around repurchases and have the opportunity to profit is not enough. Evidence of intentional manipulation using material, nonpublic information must exist. While there are regulations in place to reduce the firm and insiders’ ability to profit from trading with investors using private information, information asymmetry still influence the trading decisions of the firm, insiders, and investors.

Although institutional investors may be at a disadvantage by not having private information, they may be able to interpret signals conveyed by the firm and insiders. There is evidence of institutional trading profitability. Researchers find that institutions have significant stock-picking skills (Grinblatt and Titman 1993, Daniel, Grinblatt, Titman, and Wermers 1997, Chen, Jegadeesh, and Werner 2000, and Wermers 2000). In Bushee (2001), the author classifies institutional investors in to three types based on portfolio turnover and investment horizon. The author finds that transient investors, who have high portfolio turnover and highly diversified portfolio holdings, prefer near-term expected earnings, and that their myopic trading strategy generates significant abnormal returns. These transient investors are different from the other two types. Dedicated institutional investors have very low portfolio turnover and larger average portfolio investments. Quasi-indexer institutional investors also have low portfolio turnover but

highly diversified portfolio holdings. Both dedicated and quasi-indexer investors have longer investment horizons. More recently, Baker, Litov, Wachter, and Wurgler (2010) find that mutual funds can trade profitably around earnings announcements because of their ability to forecast earnings-related fundamentals. They also find that mutual fund buys consistently outperforms their sell trades. Nevertheless, these findings are for earnings announcement.

The current literature about institutions and repurchases explains that the repurchasing firms can buy their shares back at a bargain price if the firms have little institutional interest (De Cesari, Espenlaub, Khurshed, and Simkovic 2012). Without institutional involvement, the firms are able to take further advantage of the information asymmetry by buying back shares from less informed traders. However, institutional investors are active around actual repurchases; they are net sellers when the firms are implementing repurchases (De Lisle, Morscheck, and Nofsinger 2014). These findings suggest that institutional investors are possibly aware of the profit opportunities and may be buying around repurchase announcement events. We hypothesize that institutions are able to trade profitably by buying around the announcement time and selling around the actual repurchase period. Using this strategy, institutional investors can accumulate shares at a lower price before the post-announcement price run-up, and sell the shares back to the firms at the peak of the price appreciation.

### **3. Hypotheses and Methods**

We test the central or main null hypothesis that institutional investors are able to trade profitably around the announcement time, especially with information signaled by the firm and insiders. To fully understand how the different levels of information affect institutional investors, we calculate institutional trading profits for ten different scenarios shown in Figure 2. The scenarios are separated by the direction of insider transactions—net buy, net sell or neutral—and

the firm's follow-through decision—actual repurchase versus announcement-only. We reformulate our central hypotheses in the context of each scenario as follows.

Correspondingly, the main question about institutional profitability is conditional on the different levels of signaling from the firms and registered insiders. The first hypothesis uses the full sample; it tests if institutional investors are able to trade profitably using only the information from the announcement. We evaluate institutional performance by measuring the profitability of institutional buy and sell trades (Irvine, Lipson, and Puckett 2007). Following their methodology, we calculate profit using ISO buy and sell prices and CRSP daily closing prices. ISO prices for trades initiated on day  $i = -5, -4, -3, -2, -1$  relative to the announcement day are used as the prices for the starting trades in the pre-announcement period. ISO prices for trades initiated on day  $i = +1, +2, +3, +4, +5$  are used as the prices for the starting trades in the post-announcement period. ISO prices for trades initiated on day  $i = 0$  are the prices for trades initiated on the announcement day. These prices are then compared to the CRSP daily closing prices on various test dates. CRSP daily closing prices are used as the prices of the ending trades on day  $j = +5$  and  $+90$ .

$$Profit_{buy} = \frac{CRSP \text{ closing price}_j - Buy \text{ price}_i}{Buy \text{ price}_i}$$

$$Profit_{sell} = \frac{Sell \text{ price}_i - CRSP \text{ closing price}_j}{Sell \text{ price}_i}$$

We include as control variables the number of shares authorized in the announcement, the firm's market capitalization, EPS surprise, market risk premium, SMB, HML and, UMD. EPS

forecast surprise measures the difference between the actual and mean analyst forecast divided by the share price (Keung, Lin, and Shih 2010; Baker, Litov, Wachter, and Wurgler 2010)..

The second hypothesis tests if institutional investors are able to trade profitably using information from the announcement and insiders. Insider trades are a valuable source of information to investors because the insiders run the company and are much better informed about the firm's future prospects. The more often they trade the more information is revealed to the public, allowing investors to better allocate their resources and potentially make profitable trades (Manne 1966; Bernhardt, Hollifield and Hughson 1995). To test the hypothesis, we divide the full sample into three sub-samples based on net insider buying, selling, and a neutral position. Insider trade direction is determined based on their transactions during the previous six months when they are found to be most active (Chan, Ikenberry, Lee, and Wang 2012). Insider trading during the pre-announcement period gives investors some insight into management's confidence in the firm's future performance. If the insiders purchase more shares, the undervaluation signal appears more creditable to investors. Conversely, net insider selling will dampen the undervaluation signal (Bonaime and Ryngaert 2013). Given the three insider trade directions, we expect institutional profit to be the highest when institutions and insiders are both net buyers.

The third hypothesis tests if institutional investors can trade profitably given all the information from the insiders and firm, which include both announcement signals and the follow-through decision. We further divide the full sample into six sub-samples based on insider trading, and whether or not the firm actually repurchases shares within eight quarters. Given all the scenarios, we expect institutional profit to be the highest when all three players—institutions, insiders, and firm—are purchasing shares. The undervaluation signal is strongest when the insiders are net buyers and the firm follows through with actual repurchases. Combined, they signal to the market

that the firm is poised for positive future earnings. Hence, institutional investors can earn positive and significant profit if they buy more shares before the post-announcement price run-up. In contrast, increased institutional selling around such repurchases may indicate absence of institutional foresight.

#### **4. Data**

The data for share repurchases are from the Securities Data Company (SDC). Our repurchases sample<sup>5</sup> has 3,394 repurchase announcements from 1878 firms reported from September 2007 to December 2013. The firms announce the repurchase of approximately 242.67 billion shares and actually repurchase 37.79 billion shares at an average repurchase price of \$33.16. In total, these firms spent \$1.15 trillion to repurchase their shares (SDC). Companies can repurchase shares through open-market acquisitions, private negotiation, tender offers, Dutch auction, and accelerated share repurchases. Although there are several methods of repurchases, the open market method is the most popular.

Our institutional datasets are from three different sources: 1) TAQ for daily ISO data, 2) Compustat for biweekly short interest data, and 3) Thomson Reuters 13(f) for quarterly institutional trade summary. Although we evaluate institutional profitability using all three datasets, we focus on ISO because the data provide the timestamp, exact price, quantity, and trade condition to calculate institutional profit. In the other two datasets, we calculate profit by using Compustat and CRSP closing prices.

ISO are limit orders that automatically execute in designated markets while simultaneously submitting orders in the markets with better prices. ISO represent 31% of the volume and 38% of

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<sup>5</sup> In another sample, we excluded all repurchase announcements that coincide with other corporate news, such as dividend announcements, earnings announcements, merger and acquisition announcements, and stock splits, to avoid any confounding influence. Our results are robust even when the contemporaneous events are excluded.

trades in our sample. Fully integrated in September 2007, ISO are mainly used by informed institutional traders to sweep multiple markets of their liquidity, although possibly at an inferior price (Chakravarty, Jain, Upson, and Wood 2012). ISO traders are more concerned about execution speed and order fulfillment. Faster execution gives institutional investors more opportunities to trade profitably before price-sensitive information is released, for example, in repurchase announcements. Hence, we focus on ISO to determine if institutional investors can make a profit using a more aggressive trading mechanism.

We also analyze the trading activities of short sellers, which account for approximately 26% of the daily volume (Alexander, Peterson, Beardsley 2014), to determine if these sophisticated traders can benefit from repurchase announcements. Considering that there is a price appreciation after the announcement, we expect to see a significant decrease in short selling up to the price run-up. Short sellers stand to gain the most during the post announcement period. Our third dataset, Thomson Reuters 13(f), provides a big-picture summary of institutional trading. The 13(f) data provide required filings of institutional investment managers with over \$100 million in assets. We use the quarterly updates to understand long-term institutional trading and to determine if institutions profit in the quarters around the announcement. Lastly, for the other variables, we use analyst forecast data from I/B/E/S, accounting data from Compustat, and insider trading data from Thomson Reuter TFN U.S. Securities and Exchange Commission Form 4.

## **5. Findings**

### **5.1 Institutional trading imbalance**

Before we can answer questions related to institutional profitability, we first need to determine if institutional investors are actively trading around the repurchase announcements. Using the 13(f) data, we analyze institutional trading for eight quarters before and after the announcement quarter. The quarterly data frequency allows us to evaluate when institutional

trading is impacted by repurchase announcements and how long the effects last. Overall, we find that institutional trading is affected by repurchase announcements immediately in the announcement quarter, and the effects last for the following six consecutive quarters.

In Table 1, we show that the announcing firms during non-announcing time, quarters [-8, -5], are associated with significant positive or neutral institutional trade imbalance. The trade imbalances from Q-8 to Q-5 are 0.10%\*, 0.08%, 0.17%\*\*\*, and 0.22%\*\*\*. During the pre-announcement period of quarters [-4, -1], institutional investors exhibit similar trading patterns as in the non-announcement time. The trade imbalances from Q-4 to Q-1 are -0.04%, 0.12%\*\*\*, 0.28%\*\*\*, and -0.03%.

In fact, in our control sample of non-announcing firms, we find that there is a positive trade imbalance for the quarters around the announcement with varying degrees of significance. The positive trade imbalance range from 1.45%\*\*\* in Q-8 to 0.27% in Q+8. This control sample shows that the firms with no connections to repurchase announcements are associated with institutional net buying. So far without any influences from repurchase announcements, institutional investors take a neutral or positive trade imbalance position.

Once the firm announces repurchases in Q0, institutional investors change their trading behavior. They become net sellers. Institutional investors exhibit a trade imbalance of -0.50%\*\*\* starting in the announcement quarter, Q0, and the negative trade imbalance lasts for the next six quarters. The trade imbalances from Q+1 to Q+6 are -0.53%\*\*\*, -0.39%\*\*\*, -0.47%\*\*\*, -0.39%\*\*\*, -0.29%\*\*\*, and -0.08%\*\* respectively. After these quarters of significant net selling, institutional trading reverts back to a neutral trading position in Q+7, which means that repurchase announcements do affect institutional trading and the effects last for approximately seven quarters.

Furthermore, we can determine which institutions are more likely to be influenced by the announcements using the Bushee (2001) transient, dedicated and quasi-indexer classifications of institutional investors. As we suspected, transient investors seem to be influenced by the announcements. Figure 3 shows how transient investor trading pattern changes throughout the 17 quarters. During the non-announcement time, these investors are net buyers exhibiting a positive trade imbalance of 0.10%\* in Q-8, 0.19%\*\*\* in Q-7, 0.23%\*\*\* in Q-6, and 0.15%\*\*\* in Q-5 shown in Table 1. This trend continues into the pre-announcement quarters [-4, -1] with trade imbalances of 0.09%\*, 0.15%\*\*\*, 0.08%, and 0.00%. However, they become net sellers starting in the announcement quarter with a trade imbalance of -0.25%\*\*\*, and the net selling persists for the following three consecutive quarters with trade imbalances of -0.22%\*\*\*, -0.11%\*\*\*, and -0.13%\*\*\*. Moreover, the significant negative trade imbalance pattern during this time is associated with significant positive cumulative average abnormal return of 5.55%\*\*\*. Then in Q+4, these investors revert back to their neutral or net buying pattern with a trade imbalance of 0.07% rising to 0.38%\*\*\* in Q+8. We believe that transient institutional investors would be most affected by repurchase announcements compared to the other two types because they are more focus on short-term gains. Transient investors are more likely to be cognizant and responsive to corporate news. Although the other two investor types may be aware of the announcements, they are less likely to change their long-term goals in response to the news release.

With some understanding of how institutional investors trade on a quarterly frequency in a four year time span, we turn our attention to how institutions trade during the five days around the announcement. Our analysis of daily institutional trading covers three distinct periods similar to Jain and Wang (2013): the pre-announcement period is the five days [-5,-1] window leading up to the announcement date, day 0 is the announcement date, and the post-announcement period is the

five days [+1, +5] after the event date. Although we are studying the perceptiveness of institutional investors before and on the announcement date, we include the post-announcement period to evaluate the institutional investor's immediate reaction to the repurchase information.

Based on the well-documented, positive market reaction after the announcement, we expect institutional investors to be net buyers around these three periods. Purchasing these shares before the price run-up reaches its peak is a profitable strategy. Rather than observing a net buying trend, we found evidence of significant negative institutional trade imbalance <sup>6</sup> for all 11 days shown in Table 2. During the pre-announcement period, we expect institutional investors to take a neutral trading position because they may not be able to predict the timing of the announcement. Therefore, to see that these investors are presenting themselves as sellers even before the firms announce their repurchase intention is rather surprising. The significant trade imbalances of -0.8\*\*, -1.3\*\*\*, -1.2\*\*\*, -0.7\*\*\*, and -0.9\*\*\* on days [-5, -1] relative to the announcement day shown in Table 2 Panel A suggest that the institutional investors do not perceive value in these firms before the repurchase event. On the announcement day and during the post-announcement period, institutional investors would gain if they are net buyers. Yet, we observe significant negative trade imbalances during both periods ranging from -0.5\*\*\* to -1.8\*\*\* shown in Table 2 Panel B. The net selling trend suggests that institutional investors do not foresee the possible gains that follow repurchase announcements and are selling to the better informed traders.

To consider the effects of insiders, we separate the full sample based on whether the corporate insiders are net buyers or net sellers in the period surrounding the repurchase announcement. Our method of classifying insider trade direction is similar to that of Bonaime and

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<sup>6</sup> Trade imbalance is calculated as the net shares traded in the quarter normalized by the number of shares outstanding. Daily negative trade imbalance is expressed in basis points and quarterly negative trade imbalance is expressed in percentages.

Ryngaert (2013). The announcement event is considered net selling if insider sales exceed insider purchases by at least 0.01% of the firm's market capitalization. The announcement event is considered net buying if purchases exceeds sales by the same requirement. Otherwise, the event is associated with neutral insider trading. These classifications are based on the transactions of insiders during the previous six months relative to the announcement because insiders are found to be most active during this period based on the findings of Chan, Ikenberry, Lee, and Wang (2012). We find that institutional investors are not following the trading signals from insiders; institutional investors are still net sellers with trade imbalances ranging from -0.2 to -1.5 when insiders are net buyers.

Finally, we divide the full sample into six sub-samples based on insider trading and the firm's decision to follow through after the announcement. In the sub-samples where the firms follow through with actual repurchases within eight quarters, institutional investors are net sellers in both the pre- and post-announcement periods. In fact, the highest negative trade imbalance of 2.1\*\*\* is on day +1 in the subsample with the follow-through signal. This result is rather unexpected since the firm's follow-through signal should tell the institutions to purchase more shares. Table 2 also shows the institutional trades for the announcement-only subsamples given the different insider trading patterns. In all three announcement-only subsamples, institutional investors are generally net sellers although the net selling trend is not as strong as in the follow-through subsamples. In summary, we observe that institutional investors are strong net sellers during the days around repurchase announcements.

Our third source of sophisticated trading is the short interest data, reported biweekly during the middle of the month and at the end of the month. Similar to the negative trade imbalance intuition around the post-announcement price appreciation, we expect abnormal short selling to

occur closer to the peak of the price run-up when shorting makes the most sense. Therefore, short sellers should not trade during the immediate weeks around the repurchase announcement which is followed by price increases. To measure abnormal short selling we use two different methods. The first measure calculates abnormal short interest as the difference between the benchmark period short interest and the test period short interest. The second measure calculates the Christophe, Ferri, and Angel (2004) abnormal short selling as the average number of share sold short in the test period divided by the average number of shares sold short in the benchmark period minus one. The benchmark period in both figures is six biweekly periods before the announcement period, ending approximately one quarter before the announcement. Using both measures of abnormal short interest, we find significant abnormal short selling in the immediate three biweekly periods after the repurchase announcement as shown in Table 3 Panel B. The abnormal short interests in periods [+1, +3] are 0.22%\*, 0.27%\*\* , and 0.22%\* ; the CFA abnormal short interests in the same biweekly periods are 7.31%\*, 8.15%\*\* , and 7.87%\*. Again, we find evidence of abnormal selling around the announcement. With all three institutional datasets explaining similar trading behaviors, we now examine the profitability of these trades.

## 5.2 Institutional trading profitability

Using the exact pricing of the ISO trades, we are able to calculate profitability without using any proxies for the buy and sell transactions. Daily institutional profit is determined using ISO buy and sell prices and CRSP daily closing prices. We compute profitability using closing prices five and ninety days after the announcement to assess institutional short- and long-term performance. Table 4 shows the average profitability for all ISO buy-and-sell trades opened during the [-5, +5] days and closed on day +5 relative to the announcement ( $t=0$ ). Panel A shows the profits for all ISO buy trades, and Panel B shows the profits for all ISO sell trades.

We find that the institutional investors that bought during the five days before the announcement earn profits ranging from 0.60% on day -5 to 1.60%\*\*\* on day -1 shown in Table 4 Panel A. Conversely, institutional investors that sold their shares before the announcement have negative profits: -0.34% on day -5, -0.66%\* on day -4, -0.93%\*\* on day -3, -1.47%\*\*\* on day -2, and -1.13%\*\*\* on day -1 shown in Table 4 Panel B. Based on these results, institutional investors should be purchasing shares in the pre-announcement period so they can sell these shares later at a higher price. During the post-announcement period, purchasing shares appears to be not profitable as prices may have already risen; selling during this time seems to be more profitable than buying. For example, ISO sell trades on day +3 result in a positive and significant profit of 0.88%\*\*\*. In fact selling during the other days in the post-announcement period is also profitable, albeit not as high as on day +3. As for trading on the announcement day, ISO traders are better off buying than selling. Although the buy profit of 0.05% is not significantly different from zero, the sell profit is -0.48% which is lower than that of the buy strategy.

From the full sample, we find that traders profit when they buy before the announcement and sell after the announcement. This pattern holds true even when we divide the full sample by insider trading. Interestingly, when the announcement is associated with net insider buying, profits or losses are higher relative to the announcements associated with insider selling or neutral insider trading. For example, the ISO sell profits on day +3 for announcements associated with net insider buying, selling and neutral are 2.05%\*\*\*, 0.37%, and 0.34%, respectively. The ISO buy profit on day +4 for net insider buying, selling and neutral trading are -1.87%\*\*\*, -0.85%\*\*, and -0.09%, respectively. In Bonaime and Ryngaert (2013), the authors explain that repurchasing firms associated with net buying experience significantly higher abnormal returns relative to the firms with net insider selling. Similar to their findings for repurchasing firms, we observe that

institutional trading profits and losses around the announcement are amplified with net insider buying.

Finally, we dissect the profitability patterns according to both insider transactions and the firm's follow-through or announcement-only decision shown in Table 4. We find that institutional profits (losses) for ISO buy trades are higher (lower) when the firms follow through with actual repurchases. For instance, the buy profits during the pre-announcement period, days [-5, -1], for the subsample with net insider selling and the firm's follow-through are 1.06%\*\*, 1.07%\*\*, 1.09%\*, 1.71%\*\*\*, and 1.96%\*\*\*; the profits for the comparable announcement-only scenario are -0.30%, -0.72%, -0.51%, 0.08%, and 0.33%. The difference between the follow-through and announcement-only signals can be as large as 1.79%. When the firms only announce and do not repurchase, profits (losses) for ISO sell trades are higher (lower) than in the actual repurchase scenarios. The sell profits during the post-announcement period, days [+1, +5], for the subsample with net insider buying and the firm's follow-through are 1.43%, 1.85%\*\*, 1.75%\*\*, 0.71%, and -0.17%\*\*\*; the profits for the announcement-only scenarios are 2.44%, 1.27%, 2.69%\*, 3.38%\*\*, and -0.09%. The difference between the follow-through and announcement-only scenarios is as large as 2.67%.

We also extend our profit analysis to a longer time horizon to see if these trends still persist when the opening trades are closed +90 days after the announcement. We find that the institutional ISO buy trades opened in both the pre- and post-announcement periods result in significant and positive profits shown in Table 5. This finding is rather different from the short-term profit analysis where the buy trades opened only in the pre-announcement period result in profits. We believe the short +5 closing day does not capture the full length and effects of the post-announcement price run-up. Similarly, because the price appreciation lasts longer than five days after the

announcement, the sell trades opened in the post-announcement period and closed +90 days after the announcement result in significant losses. In the long run, selling during the 11 days around the announcement result in significant losses and buying during those days result in significant gains. Based on our finding that institutional investors exhibit significant negative trade imbalance during the 11 days, we conclude that they are not able to trade profitably.

With evidence that short sellers are also active around the announcement, we examine their ability to trade profitably. We calculate profit as the difference between the proceeds from the sale and the cost to close the position using CRSP closing prices. Table 6 shows the number of shares sold short and covered as well as the profits for several cumulative biweekly periods. We observe that the abnormal short selling that occurred in the post-announcement [+1, +3] biweekly period is not completely covered until the end of the +8 biweekly period. The significant abnormal short selling in the post-announcement [+1, +3] biweekly period actually leads to a significant loss because the cost to close the short position is higher than the revenue from the opening trades. Most noticeably, the short sellers' loss increases as we expand the trading window. We find that any trading intervals between the time of abnormal short selling, biweekly period +1, to the time that the shares are covered in biweekly period +8 result in a loss of 0.627%\*\*\*. The loss is a result of the short sellers' poor timing relative to repurchase announcement, they appear to be short selling the shares too soon. As we have shown with the long-run +90 day ISO profit, the price appreciation lasts beyond the first three biweekly periods so the significant short selling during the [+1, +3] biweekly period is premature. Similar to the ISO results, we conclude that short sellers are not able to trade profitably around repurchase announcements.

### 5.3 Factors influencing profitability

While there is strong evidence that institutional investors overall do not trade profitably around repurchase announcements, there are some institutions that have the foresight to benefit

from these announcements. Table 7 shows the regression results of institutional sell profit on closing day +90. We see that transient institutional investors are able to trade profitably. In the full sample, for every transient investors trading around the announcement sell profit increases by 0.14%\*\*\*. Furthermore, these traders are profitable regardless of how the insiders trade and whether the firm follows through with share repurchases. For example when the announcement is associated with net insider buying (selling) signal, the sell profit increases by 0.12%\*\*\* (0.11%\*\*\*) for every transient investors participating in the event. A similar trend is observed for the follow-through and announcement-only subsamples. The results are controlled by the number of shares authorized for repurchase, the number of shares outstanding, EPS surprise, market risk premium, SMB, HML, and MOM. During the pre-announcement period, these transient traders are net buyers. Once the price run-up occurs post announcement, these traders sell their shares as the price increases. Because these investors are more flexible they are able to take advantage of the announcement event until the price appreciation disappears, at which point they revert back to their normal trading behavior.

## **6. Conclusion**

Using three different data sources, we find that institutional investors do pay attention to firms announcing share repurchases. Institutional investors exhibit a neutral or positive trade imbalance in the eight quarters before the announcement. Then starting on the announcement quarter, they begin to actively sell shares of the announcing firms lasting for six more quarters. Out of the three institutional types, transient investors seem to have the ability to time their trades. They accumulate shares during the pre-announcement period to sell in the post-announcement period, which turns out to be a profitable strategy. Short sellers are also active around the announcement. They exhibit abnormal short selling during the [+1, +3] biweekly periods after

which point the significant shorting disappears. Unlike the transient investors, short sellers are not profiting from repurchase announcements. They open their short positions too soon at the beginning of the price appreciation, and close their short interest approximately 16 weeks after the announcement when the average price is still high. Short sellers appear to be selling prematurely and cheaply around repurchase announcements.

With some understanding how repurchase announcements affect trading on a long-term basis, we turn our attention to institutional trading at the daily frequency. We find that institutional investors are net sellers in all [-5, +5] days regardless of the information signaled by the insiders and firms. This is not a profitable sign for institutional investors since most firms experience a price increase after a repurchase announcement. Profitability pattern consistently shows that institutional investors make a profit when they purchase shares around the announcement, especially during the days leading up to the event. Our findings suggest that institutions with the exception of transient investors, who have a shorter investment horizon than the others, are generally not interested in altering their long-term trading strategy around repurchase announcements for short-term gains.

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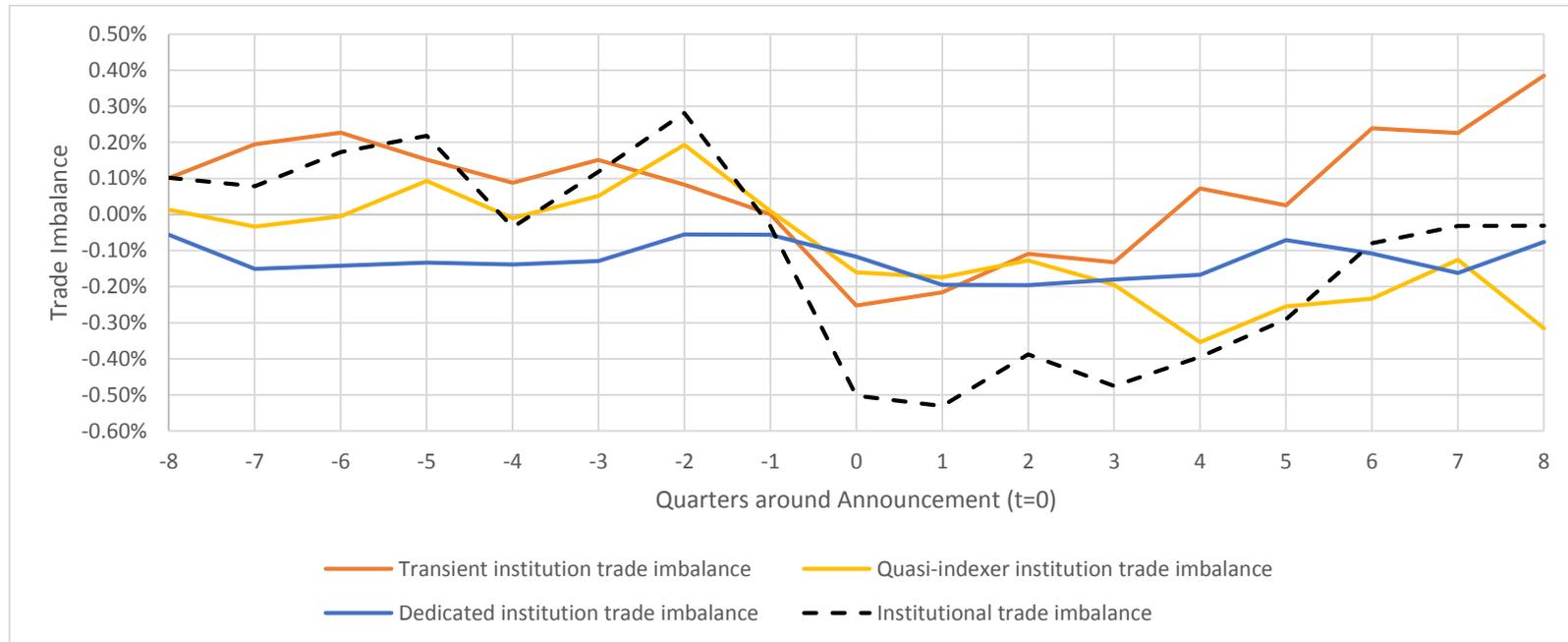
**Figure 2**  
**Sample Division by Hypothesis**

This figure shows how the full sample is divided for each of the three hypotheses. The first hypothesis (H1) tests if institutional investors are able to trade profitably using only the information from the announcement. H1 uses the full sample. The second hypothesis (H2) tests if institutional investors are able to trade profitably using information from the announcement and insiders. H2 divides the full sample into three sub-samples based on net insider buying, selling, and neutral position. The third hypothesis (H3) tests if institutional investors are able to trade profitably using information from the announcement, insiders and the firm's decision to follow through with implementation of actual repurchase transactions. H3 further divides the full sample into six sub-samples based on insider transactions, and whether or not the firm actually repurchases shares within 8 quarters.



**Figure 3**  
**Quarterly Institutional Trade Imbalance Separated by Investment Behavior**

This graph shows the trade imbalance of all institutional investors as well as those of the transient, quasi-indexer, and dedicated institutional investor around the announcement quarter ( $t=0$ ). Trade imbalance is calculated as the net shares traded, number of shares bought minus number of shares sold, in the quarter normalized by the number of shares outstanding. We separate institutional trading by three types according to Bushee (2001). Transient institutional investors have high portfolio turnover and highly diversified portfolio holdings. Transient investors are more focus on short-term gains. Dedicated institutional investors have very low portfolio turnover and larger average portfolio investments. Quasi-indexer institutional investors also have low portfolio turnover but highly diversified portfolio holdings. Both dedicated and quasi-indexer investors have longer investment horizons. Our control firm quarterly institutional trade imbalance is calculated using non-repurchase-announcing firms.



**Table 1**  
**Quarterly Institutional Trade Imbalance and Price**

This table shows the quarterly institutional trade imbalance for the quarters around the announcement (t=0). Trade imbalance is calculated as the net shares traded, number of shares bought minus number of shares sold, in the quarter normalized by the number of shares outstanding. We separate institutional trading by three types according to Bushee (2001). Transient institutional investors have high portfolio turnover and highly diversified portfolio holdings. Transient investors are more focus on short-term gains. Dedicated institutional investors have very low portfolio turnover and larger average portfolio investments. Quasi-indexer institutional investors also have low portfolio turnover but highly diversified portfolio holdings. Both dedicated and quasi-indexer investors have longer investment horizons. Our control firm quarterly institutional trade imbalance is calculated using non-repurchase-announcing firms. \*\*\*, \*\*, \* stand for statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Trade imbalance for quarters [-8, -1]

Quarterly Period	-8	-7	-6	-5	-4	-3	-2	-1
Number of announcements	2106	2230	2405	2482	2604	2702	2724	2748
Number of announcing firms	1013	1077	1241	1315	1427	1531	1560	1596
Institutional trade imbalance	0.10%*	0.08%	0.17%***	0.22%***	-0.04%	0.12%***	0.28%***	-0.03%
Transient institution trade imbalance	0.10%*	0.19%***	0.23%***	0.15%***	0.09%*	0.15%***	0.08%	0.00%
Dedicated institution trade imbalance	-0.06%	-0.15%***	-0.14%***	-0.13%***	-0.14%***	-0.13%***	-0.06%	-0.06%
Quasi-indexer institution trade imbalance	0.01%	-0.03%	-0.01%	0.09%*	-0.01%	0.05%	0.19%***	0.01%
Control firm institutional trade imbalance	1.45%***	1.13%***	0.70%**	0.64%**	0.67%**	0.69%***	0.73%***	0.49%**
Price	\$29.90	\$29.87	\$28.02	\$28.90	\$28.94	\$29.88	\$31.45	30.62

Panel B: Trade imbalance for quarters [0, +8]

Quarterly Period	0	1	2	3	4	5	6	7	8
Number of announcements	2750	2654	2626	2599	2515	2435	2396	2337	2267
Number of announcing firms	1596	1561	1529	1491	1438	1377	1371	1314	1293
Institutional trade imbalance	-0.50%***	-0.53%***	-0.39%***	-0.47%***	-0.39%***	-0.29%***	-0.08%**	-0.03%	-0.03%
Transient institution trade imbalance	-0.25%***	-0.22%***	-0.11%**	-0.13%***	0.07%	0.03%	0.24%***	0.23%***	0.38%***
Dedicated institution trade imbalance	-0.12%***	-0.19%***	-0.20%***	-0.18%***	-0.17%***	-0.07%*	-0.11%***	-0.16%***	-0.08%*
Quasi-indexer institution trade imbalance	-0.16%***	-0.17%***	-0.13%***	-0.20%***	-0.35%***	-0.25%***	-0.23%***	-0.13%**	-0.32%***
Control firm institutional trade imbalance	0.77%***	0.72%***	0.63%**	0.68%**	0.62%**	0.57%*	0.71%**	0.75%***	0.27%
Price	\$31.32	\$30.56	\$31.45	\$32.12	\$31.22	\$31.95	\$33.08	\$34.55	\$33.01

**Table 2**  
**Daily Intermarket Sweep Order Institutional Trade Imbalance**

This table reports the daily intermarket sweep order (ISO) institutional trade imbalance. Daily trade imbalance is calculated as the difference between the number of sell shares and the number of buy shares normalized by the number of shares outstanding. Daily trade imbalance is expressed in basis points of the number of shares outstanding of a company. Daily trade imbalance is calculated for days [-5, +5] around the announcement. The pre-announcement period spans from day -5 to -1, inclusive. The announcement day period is day 0. The post-announcement period spans from day +1 to +5, inclusive. Net insider trading direction is separated into three categories: net buying, net selling and neutral. Our method of classifying insider trade direction is similar to that of Bonaime and Ryngaert (2013). The announcement event is considered net selling if insider sales exceed insider purchases by at least 0.01% of the firm's market capitalization. The announcement event is considered net buying if purchases exceeds sales by the same requirement. Otherwise, the event is associated with neutral insider trading. These classifications are based on the transactions of insiders during the previous six months relative to the announcement because insiders are found to be most active during this period based on the findings of Chan, Ikenberry, Lee, and Wang (2012). We further divide the sample using the firm's decision to follow through during the eight quarters after the announcement similar to Bonaime (2012). \*\*\*, \*\*, \* stand for statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Daily ISO trade imbalance for the pre-announcement period

Number of firms	1878				
Number of announcements	3394				
Days around the announcement (t=0)	-5	-4	-3	-2	-1
Trade imbalance for full sample	-0.8***	-1.3***	-1.2***	-0.7***	-0.9***
Trade imbalance with net insider buying signal	-0.7**	-1.4***	-1.3***	-1.0***	-0.6
Trade imbalance with net insider selling signal	-0.8***	-1.3***	-1.5***	-0.8**	-0.8***
Trade imbalance with neutral insider trading signal	-0.8**	-1.0***	-0.5	0.1	-1.2***
Trade imbalance with net insider buying and firm's follow-through signals	-0.3	-0.4	-1.4***	-1.1***	-0.3
Trade imbalance with net insider selling and firm's follow-through signals	-0.8***	-1.3***	-1.4***	-0.6	-0.7**
Trade imbalance with neutral insider trading and firm's follow-through signals	-1.1**	-1.0***	-0.7**	-0.5	-1.1***
Trade imbalance with net insider buying and firm's announcement-only signals	-1.6*	-3.5	-1.0	-0.7	-1.4
Trade imbalance with net insider selling and firm's announcement-only signals	-0.6	-1.3**	-1.8***	-1.5*	-1.3**
Trade imbalance with neutral insider trading and firm's announcement-only signals	-0.1	-1.0*	0.2	1.8	-1.5**

Panel B: Daily ISO trade imbalance for the announcement and post-announcement period

Days around the announcement (t=0)	0	1	2	3	4	5
Trade imbalance for full sample	-0.9**	-1.8***	-0.9**	-0.8***	-0.5***	-0.6***
Trade imbalance with net insider buying signal	-1.5***	-1.3***	-0.7*	-0.8***	-0.2	-0.3
Trade imbalance with net insider selling signal	-0.7	-1.8***	-1.5**	-0.7**	-0.8***	-0.6**
Trade imbalance with neutral insider trading signal	-0.2	-2.6*	0.5	-0.9**	-0.6**	-1.1***
Trade imbalance with net insider buying and firm's follow-through signals	-0.6	-1.5***	-0.9	-0.7	-0.3	-0.5*
Trade imbalance with net insider selling and firm's follow-through signals	-0.1	-2.1***	-1.6**	-1.1***	-0.6**	-0.8***
Trade imbalance with neutral insider trading and firm's follow-through signals	0.3	-0.4	0.6	-1.1**	-0.7**	-0.9***
Trade imbalance with net insider buying and firm's announcement-only signals	-3.2	-0.9*	-0.4	-1.2**	0.1	0.0
Trade imbalance with net insider selling and firm's announcement-only signals	-2.6*	-0.8	-1.1*	0.4	-1.2**	-0.1
Trade imbalance with neutral insider trading and firm's announcement-only signals	-1.3	-8.6	0.4	-0.6	-0.2	-1.8**

**Table 3**  
**Biweekly Short Interest and Price**

The table shows the short interest and price for the biweekly periods around the announcement. Biweekly short selling is calculated as the short interest normalized by the number of shares outstanding. Short interest is calculated for the five biweekly periods before the announcement and eight biweekly periods after the announcement. Abnormal short interest is calculated using two different methods. The first measure calculates the abnormal short interest as the difference between the benchmark period short interest and the test period short interest. The second measure calculates the Christophe, Ferri, and Angel (2004) abnormal short selling as the average number of shares sold short in the test period divided by the average number of shares sold short in the benchmark period minus one. The benchmark period in both measures is six biweekly periods before the announcement period, approximately one quarter before the announcement. \*\*\*, \*\*, \* stand for statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Short interest for the pre-announcement period

Biweekly period	-5	-4	-3	-2	-1
Short interest	4.59%	4.60%	4.57%	4.59%	4.61%
Abnormal short interest	0.01%	0.02%	-0.01%	0.00%	0.02%
CFA abnormal short interest	1.35%	0.99%	0.41%	-0.95%	-0.57%
Price	\$ 29.22	\$ 29.11	\$ 28.88	\$ 28.63	\$ 28.36

Panel B: Short interest for the announcement and post-announcement period

Biweekly period	0	1	2	3	4	5	6	7	8
Short interest	4.70%	4.81%	4.85%	4.80%	4.80%	4.78%	4.79%	4.74%	4.74%
Abnormal short interest	0.11%	0.22%*	0.27%**	0.22%*	0.21%*	0.20%	0.20%	0.16%	0.15%
CFA abnormal short interest	5.55%	7.31%*	8.15%**	7.87%*	6.86%	6.36%	5.89%	6.07%	5.45%
Price	\$ 28.49	\$ 28.61	\$ 28.57	\$ 28.61	\$ 28.60	\$ 28.72	\$ 28.80	\$ 28.90	\$ 28.88

**Table 4**  
**Daily Intermarket Sweep Order Institutional Profitability**

This table shows the average profitability for all ISO buy-and-sell trades opened during the [-5, +5] days and closed on day +5 relative to the announcement (t=0). Institutional profit is determined using ISO buy-and-sell prices and CRSP daily closing prices. ISO prices for trades initiated on day  $i = [-5, +5]$  relative to the announcement day are used as the prices for the opening trades. These ISO opening prices are compared to the CRSP daily closing prices on day +5. Panel A shows the profits for all ISO buy trades and Panel B shows the profits for all ISO sell trades. \*\*\*, \*\*, \* stand for statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Profitability of institutional ISO buy trades closing on day +5 relative to the announcement day (t=0)

Number of firms	1878				
Number of announcements	3394				
Day of opening buy trades relative to announcement day (t=0)	-5	-4	-3	-2	-1
Profit for full sample	0.60%	0.75% **	0.85% **	1.25% ***	1.60% ***
Profit with net insider buying signal	-0.24%	0.62%	0.64%	1.21%	1.86% **
Profit with net insider selling signal	0.72% *	0.62%	0.69%	1.30% **	1.55% ***
Profit with neutral insider trading signal	1.68% ***	1.28% **	1.59% ***	1.22% **	1.29% ***
Profit with net insider buying and firm's follow-through signals	-0.38%	0.84%	0.81%	1.16%	2.10% ***
Profit with net insider selling and firm's follow-through signals	1.06% **	1.07% **	1.09% *	1.71% ***	1.96% ***
Profit with neutral insider trading and firm's follow-through signals	1.73% ***	1.36% **	1.96% ***	1.60% ***	1.77% ***
Profit with net insider buying and firm's announcement-only signals	0.07%	0.17%	0.29%	1.32%	1.39%
Profit with net insider selling and firm's announcement-only signals	-0.30%	-0.72%	-0.51%	0.08%	0.33%
Profit with neutral insider trading and firm's announcement-only signals	1.53%	1.05%	0.53%	0.14%	-0.07%

Day of opening buy trades relative to announcement day (t=0)	0	1	2	3	4	5
Profit for full sample	0.05%	-0.51%*	-0.42%	-0.87%***	-1.03%***	-0.05%*
Profit with net insider buying signal	-0.85%	-1.24%*	-1.07%*	-1.45%**	-1.87%***	-0.09%
Profit with net insider selling signal	0.29%	-0.17%	-0.06%	-0.62%*	-0.85%**	0.00%
Profit with neutral insider trading signal	0.96%***	-0.16%	-0.24%	-0.51%	-0.09%	-0.10%**
Profit with net insider buying and firm's follow-through signals	0.46%	-0.79%	-1.13%	-1.61%**	-1.53%**	-0.05%
Profit with net insider selling and firm's follow-through signals	0.50%	-0.06%	-0.09%	-0.33%	-0.54%	0.03%
Profit with neutral insider trading and firm's follow-through signals	1.32%***	-0.04%	-0.24%	-0.32%	-0.01%	-0.07%
Profit with net insider buying and firm's announcement-only signals	-3.41%*	-2.15%	-0.93%	-1.12%	-2.57%**	-0.18%
Profit with net insider selling and firm's announcement-only signals	-0.33%	-0.49%	0.01%	-1.51%	-1.76%*	-0.08%
Profit with neutral insider trading and firm's announcement-only signals	-0.09%	-0.49%	-0.23%	-1.05%	-0.32%	-0.17%**

Panel B: Profitability of institutional ISO sell trades closing on day +5 relative to the announcement day (t=0)

Number of firms	1878					
Number of announcements	3394					
Day of opening sell trades relative to announcement day (t=0)	-5	-4	-3	-2	-1	
Profit for full sample	-0.34%	-0.66%*	-0.93%**	-1.47%***	-1.13%***	
Profit with net insider buying signal	1.03%	-0.52%	-0.67%	-1.72%**	-1.01%	
Profit with net insider selling signal	-0.72%	-0.47%	-1.09%**	-1.49%***	-1.11%**	
Profit with neutral insider trading signal	-1.70%***	-1.37%***	-0.95%	-1.00%*	-1.42%***	
Profit with net insider buying and firm's follow-through signals	0.57%	0.20%	-0.10%	-1.90%**	-0.35%	
Profit with net insider selling and firm's follow-through signals	-1.21%**	-0.82%	-1.55%***	-1.94%***	-1.71%***	
Profit with neutral insider trading and firm's follow-through signals	-1.75%***	-1.42%**	-1.54%**	-1.71%***	-1.85%***	
Profit with net insider buying and firm's announcement-only signals	1.99%	-2.00%	-1.83%	-1.35%	-2.36%	
Profit with net insider selling and firm's announcement-only signals	0.76%	0.59%	0.29%	-0.17%	0.73%	
Profit with neutral insider trading and firm's announcement-only signals	-1.56%	-1.24%	0.66%	1.03%	-0.19%	
Day of opening sell trades relative to announcement day (t=0)	0	1	2	3	4	5
Profit for full sample	-0.48%	0.42%	0.60%**	0.88%***	0.81%***	-0.10%***
Profit with net insider buying signal	0.73%	1.76%**	1.66%**	2.05%***	1.59%**	-0.14%**
Profit with net insider selling signal	-1.19%***	-0.34%	0.09%	0.37%	0.47%	-0.10%***
Profit with neutral insider trading signal	-0.76%*	0.07%	0.10%	0.21%	0.34%	0.00%
Profit with net insider buying and firm's follow-through signals	-0.16%	1.43%	1.85%**	1.75%**	0.71%	-0.17%***
Profit with net insider selling and firm's follow-through signals	-1.32%***	-0.22%	0.18%	0.23%	0.25%	-0.12%***
Profit with neutral insider trading and firm's follow-through signals	-1.00%*	-0.06%	0.10%	0.20%	-0.08%	-0.02%
Profit with net insider buying and firm's announcement-only signals	2.54%	2.44%	1.27%	2.69%*	3.38%**	-0.09%
Profit with net insider selling and firm's announcement-only signals	-0.82%	-0.71%**	-0.16%	0.78%	1.14%	-0.04%
Profit with neutral insider trading and firm's announcement-only signals	-0.06%	0.43%	0.09%	0.22%	1.59%	0.05%

**Table 5**  
**Daily Intermarket Sweep Order Institutional Profitability**

This table shows the average profitability for all ISO buy-and-sell trades opened during the [-5, +5] days and closed on day +90 relative to the announcement (t=0). Institutional profit is determined using ISO buy-and-sell prices and CRSP daily closing prices. ISO prices for trades initiated on day  $i = [-5, +5]$  relative to the announcement day are used as the prices for the opening trades. These ISO opening prices are compared to the CRSP daily closing prices on day +5. Panel A shows the profits for all ISO buy trades and Panel B shows the profits for all ISO sell trades. \*\*\*, \*\*, \* stand for statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Profitability of institutional ISO buy trades closing on day +90 relative to the announcement day (t=0)

Number of firms	1878					
Number of announcements	3394					
Day of opening buy trades relative to announcement day (t=0)	-5	-4	-3	-2	-1	
Profit for full sample	5.56%***	5.86%***	6.34%***	6.20%***	6.41%***	
Profit with net insider buying signal	4.50%***	4.14%***	4.74%***	4.75%***	5.24%***	
Profit with net insider selling signal	6.00%***	6.57%***	7.02%***	6.65%***	6.68%***	
Profit with neutral insider trading signal	6.20%	6.82%	7.26%	7.46%	7.62%*	
Profit with net insider buying and firm's follow-through signals	3.35%*	3.25%*	4.40%**	5.39%***	4.50%**	
Profit with net insider selling and firm's follow-through signals	6.24%***	6.77%***	7.34%***	6.74%***	6.76%***	
Profit with neutral insider trading and firm's follow-through signals	2.58%**	2.82%**	3.29%**	3.61%***	4.16%***	
Profit with net insider buying and firm's announcement-only signals	6.98%**	6.05%**	5.46%*	3.38%	6.78%**	
Profit with net insider selling and firm's announcement-only signals	5.29%***	5.99%***	6.06%***	6.41%***	6.46%***	
Profit with neutral insider trading and firm's announcement-only signals	16.97%	18.10%	18.51%	18.61%	17.56%	
Day of opening buy trades relative to announcement day (t=0)	0	1	2	3	4	5
Profit for full sample	4.98%***	3.88%***	4.20%***	3.39%***	2.35%***	3.47%***
Profit with net insider buying signal	3.12%**	2.16%	2.31%	0.76%	0.83%	1.27%
Profit with net insider selling signal	5.85%***	4.63%***	4.83%***	4.16%***	4.08%***	4.43%***
Profit with neutral insider trading signal	5.94%	4.84%	5.76%	5.86%	0.46%	4.69%
Profit with net insider buying and firm's follow-through signals	4.07%**	1.76%	2.40%	1.11%	1.26%	0.98%
Profit with net insider selling and firm's follow-through signals	5.78%***	4.38%***	4.53%***	4.16%***	3.95%***	4.26%***
Profit with neutral insider trading and firm's follow-through signals	2.58%**	1.40%	1.91%	2.13%*	0.75%	0.38%
Profit with net insider buying and firm's announcement-only signals	1.20%	3.01%	2.13%	0.03%	-0.08%	1.87%
Profit with net insider selling and firm's announcement-only signals	6.04%***	5.36%***	5.75%***	4.14%**	4.45%***	4.95%***
Profit with neutral insider trading and firm's announcement-only signals	15.71%	14.70%	17.05%	16.72%	-0.41%	17.40%

Panel B: Profitability of institutional ISO sell trades closing on day +90 relative to the announcement day (t=0)

Number of firms	1878					
Number of announcements	3394					
Day of opening sell trades relative to announcement day (t=0)	-5	-4	-3	-2	-1	
Profit for full sample	-5.26%***	-5.68%***	-6.04%***	-6.09%***	-6.36%***	
Profit with net insider buying signal	-3.83%***	-4.46%***	-4.36%***	-4.41%***	-5.09%***	
Profit with net insider selling signal	-5.96%***	-6.33%***	-6.99%***	-6.81%***	-6.70%***	
Profit with neutral insider trading signal	-5.92%	-6.06%	-6.39%	-7.08%	-7.59%*	
Profit with net insider buying and firm's follow-through signals	-3.05%**	-4.43%**	-3.48%*	-4.78%**	-4.76%**	
Profit with net insider selling and firm's follow-through signals	-6.32%***	-6.48%***	-7.42%***	-6.88%***	-6.73%***	
Profit with neutral insider trading and firm's follow-through signals	-2.27%*	-1.74%	-2.27%	-3.18%**	-4.09%***	
Profit with net insider buying and firm's announcement-only signals	-5.49%*	-4.52%	-6.23%**	-3.63%	-5.80%*	
Profit with net insider selling and firm's announcement-only signals	-4.89%***	-5.90%***	-5.69%***	-6.63%***	-6.61%***	
Profit with neutral insider trading and firm's announcement-only signals	-16.73%	-18.21%	-17.92%	-18.25%	-17.69%	
Day of opening sell trades relative to announcement day (t=0)	0	1	2	3	4	5
Profit for full sample	-5.24%***	-4.46%***	-4.21%***	-3.93%***	-2.60%***	-3.23%***
Profit with net insider buying signal	-3.28%**	-3.24%**	-1.88%	-1.89%	-1.35%	-0.91%
Profit with net insider selling signal	-6.34%***	-4.96%***	-5.10%***	-4.41%***	-4.27%***	-4.25%***
Profit with neutral insider trading signal	-5.77%	-5.30%	-5.87%	-6.12%	-0.44%	-4.51%
Profit with net insider buying and firm's follow-through signals	-3.94%**	-2.83%*	-2.07%	-1.85%	-2.46%	-1.19%
Profit with net insider selling and firm's follow-through signals	-6.17%***	-4.50%***	-4.80%***	-4.26%***	-4.16%***	-4.00%***
Profit with neutral insider trading and firm's follow-through signals	-2.36%*	-2.00%*	-1.96%	-2.17%*	-0.90%	-0.09%
Profit with net insider buying and firm's announcement-only signals	-1.90%	-4.10%	-1.50%	-1.97%	0.98%	-0.32%
Profit with net insider selling and firm's announcement-only signals	-6.85%***	-6.32%***	-5.99%***	-4.85%***	-4.58%***	-4.99%***
Profit with neutral insider trading and firm's announcement-only signals	-15.63%	-14.78%	-17.42%	-17.60%	0.95%	-17.62%

**Table 6**  
**Cumulative Biweekly Short Interest and Profit**

The table shows the cumulative number of shares sold short and short interest profit for five different biweekly windows around the announcement. Profit is calculated as the difference between the proceeds from the sale and the cost to close the position using CRSP closing prices. \*\*\*, \*\*, \* stand for statistical significance at the 1%, 5%, and 10% level, respectively.

Biweekly period	[+1,+4]	[+1,+5]	[+1,+6]	[+1,+7]	[+1,+8]
Shares sold short	1361439	1668720	2012901	2319531	2596198
Shares covered	1303344	1632608	1997630	2296255	2600383
Short - cover	58,095	36,112	15,271	23,276	(4,185)
Profit	-0.199%	-0.194%	-0.500%***	-0.417%**	-0.624%***

**Table 7**  
**Impact of Announcement Signals on Institutional Profitability**

This table reports the regression results of institutional sell profit for trades open on day -5 and close on day +90. The dependent variable is the profitability of institutional sells initiated on day -5 and closed on day +90. Transient institutional investors classified in Bushee (2001) have high portfolio turnover and highly diversified portfolio holdings. Transient investors are more focus on short-term gains. The number of transient investors is included as they are the most active institutional investor type. Ln(Number of Shares Authorized) and Ln(Market Capitalization) are both standardized by taking the log of the number of shares authorized for repurchases and the number of shares outstanding, respectively. EPS forecast surprise measures the difference between the actual and mean analyst forecast divided by the share price. Net insider trading direction is separated into three categories: net buying, net selling and neutral. Our method of classifying insider trade direction is similar to that of Bonaime and Ryngaert (2013). The announcement event is considered net selling if insider sales exceed insider purchases by at least 0.01% of the firm's market capitalization. The announcement event is considered net buying if purchases exceeds sales by the same requirement. Otherwise, the event is associated with neutral insider trading. These classifications are based on the transactions of insiders during the previous six months relative to the announcement because insiders are found to be most active during this period based on the findings of Chan, Ikenberry, Lee, and Wang (2012). We further divide the sample using the firm's decision to follow through during the eight quarters after the announcement similar to Bonaime (2012). \*\*\*, \*\*, \* stand for statistical significance at the 1%, 5%, and 10% level, respectively.

Number of firms	1878					
Number of announcements	3394					
Independent variables	Intercept	# of transient investors	ln(# of shares authorized)	ln(market capitalization)	EPS surprise	
Profit for full sample	0.6442*	0.0014***	-0.0814***	0.0221	0.4341***	
Profit with net insider buying signal	0.1402	0.0012***	-0.0507***	0.0260	-1.2658***	
Profit with net insider selling signal	0.1631	0.0011***	-0.0386***	0.0144	0.6314***	
Profit with net insider buying and firm's follow-through signals	0.1011	0.0009*	-0.0153	-0.0003	-1.2943***	
Profit with net insider selling and firm's follow-through signals	0.2571	0.0012***	-0.0327**	0.0041	0.6344***	
Profit with net insider buying and firm's announcement-only signals	0.4727	0.0016	-0.1015***	0.0479	-0.9550*	
Profit with net insider selling and firm's announcement-only signals	-0.0009	0.0011*	-0.0612**	0.0426	-1.2191	
Independent variables	Mkt-Rf	SMB	HML	UMD	R <sup>2</sup>	Adjusted R <sup>2</sup>
Profit for full sample	-0.0060	0.0251	0.0547*	0.0372**	3.4%	2.9%
Profit with net insider buying signal	-0.0019	0.0356*	0.0012	0.0049	8.7%	7.2%
Profit with net insider selling signal	-0.0085	0.0302	-0.0095	0.0082	12.4%	11.5%
Profit with net insider buying and firm's follow-through signals	0.0001	0.0081	0.0148	0.0219	4.8%	2.7%
Profit with net insider selling and firm's follow-through signals	-0.0051	0.0331	-0.0007	0.0128	13.2%	12.1%
Profit with net insider buying and firm's announcement-only signals	-0.0003	0.1016*	-0.0627	-0.0532	20.8%	14.9%
Profit with net insider selling and firm's announcement-only signals	-0.0274	0.0236	-0.0462	-0.0074	8.9%	4.8%