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Institutional Investors, Insiders and the Firm

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INSITUTIONAL INVESTORS, INSIDERS AND THE FIRM

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by

Vinh Huy Nguyen

2016

To: Acting Dean Jose M. Aldrich
        College of Business Administration

This dissertation, written by Vinh Huy Nguyen, and entitled Institutional Investors, Insiders and the Firm, having been approved in respect to style and intellectual content, is referred to you for judgment.

We have read this dissertation and recommend that it be approved.

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Florida International University, 2016

DEDICATION

I dedicate this dissertation to Dr. Lawrence E. Feldman. Without his patience, understanding, and unconditional support, the completion of this work would not have been possible.

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ABSTRACT OF THE DISSERTATION

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This dissertation is comprised of three chapters that focus on three topics related to institutional investors' and registered insiders' trading activities around corporate announcements. This research provided insights into the trading behavior of institutions and insiders around corporate events when they are influenced by the anticipation and arrival of new information. Data samples were stratified, regression models were estimated, and control variables were added to ensure the results are significant and robust.

The first chapter discussed the information signaling hypothesis around share repurchase announcements. I examined if institutions can trade profitability around the announcement time using signals from insiders and the firm. I found that only transient institutional investors are able to adjust their portfolios to take advantage of the post-announcement price run-up. The second chapter explored the relationship between information asymmetry and the information acquisition process. It appeared that institutions prefer using lower cost, small, round lot, 100-share multiples when they can acquire information in advance of the event as in earnings announcements. The last chapter looked at if the information hierarchy hypothesis holds true at the very top of the corporate pyramid. I found that CEO trades are largely ignored and president net purchases have

positive effects on M&A post-announcement returns. In summary, institutions, insiders, and the firm play important roles in the information dissemination and acquisition process. Hence, their decisions have profound effects on their complicated, interconnected relationships.

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ABBREVIATIONS

CAR   Cumulative abnormal return

CEO   Chief executive officer

CRSP   Center for Research in Security Prices

EMM   Emerging market multinationals

EPS   Earnings per share

H1   Hypothesis 1

H2   Hypothesis 2

H3   Hypothesis 3

HML   High minus low

ISO   Intermarket sweep orders

M&A   Merger and acquisition

MOM   Momentum

NISO   Non-intermarket sweep order

SDC   Securities Data Company

SMB   Small minus big

TAQ   Trade and quote

CHAPTER 1: INSTITUTIONAL FORESIGHT—DO INSTITUTIONS PROFIT FROM
REPURCHASE ANNOUNCEMENTS

I.   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 to trade profitably. In my paper, I 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 sell 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 my 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[1] 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, I 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 share repurchases and the timing of such repurchases. In my sample, 35 percent of the firms do not follow through. Thus, repurchase announcements can create a period of heightened uncertainty. For this reason, I 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.

My paper differs from prior research in two regards: (1) I focus on the institutional investors' decisions around the announcement, and (2) I 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

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[1] I 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

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 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 my paper, I find evidence of institutional net buying and profit for transient investors, and net selling and significant losses for ISO traders and short sellers. To my 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 my 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. My 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.

I first start with the 13(f) data as they provide a broad understanding of institutional trading behavior for a wider range of time. I use this database to examine how institutional investors trade around repurchase announcements before assessing institutional profitability. I 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 to the pre-announcement trend.

Furthermore, I also examine institutional trading by investor type based on the Bushee (2001) classifications. I 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 my 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 to their normal buying trend in Q+4.

With a big-picture understanding, I continue the analysis with a closer examination at the daily frequency using ISO data. I 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). My 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, I 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, I expect them to exhibit a neutral response or significant decrease in short selling around repurchase announcements, which are associated with future price increases. Rather, I 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 reached 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, I 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. These findings are robust when compared to the findings of the control sample of non-announcing firms, the sample of announcing firms during the non-announcing time, and the sample of non-contemporaneous events. My 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 1-1 provides a visual summary of institutional trading and profit.

II. 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 influences 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 Wermer 2000, and Wermers 2000). In Bushee (2001), the author classifies institutional investors into 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 can 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

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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. I hypothesize that institutions can 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.

III. Hypotheses

Based on prior research, it is well-established that institutional investors are informed. In this study, I focus on three institutional types—ISO traders, transient institutions, and short sellers. Chakravarty, Jain, Upson, and Wood (2012) provide evidence that ISO trades are associated with larger information share than NISO trades mainly used by liquidity traders. Ke and Petroni (2004) find that transient institutions can predict a break in consecutive earnings increases a quarter before it happens. Finally, short sellers can generate positive and significant profit around earnings announcements (Christophe, Ferri, and Angel 2004). While it is clear that they are skilled traders, are these institutions able to replicate the same success around share repurchase announcements?

Therefore, I test the central or main null hypothesis that institutional investors can 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, I calculate institutional trading profits for ten different scenarios shown in Figure 1-2. 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. I reformulate my 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. I evaluate institutional performance by measuring the profitability of institutional buy and sell trades (Irvine, Lipson, and Puckett 2007). Following their methodology, I 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 $+90$. I 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 can 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, giving investors more opportunities to reallocate their resources and potentially make profitable trades (Manne 1966; Bernhardt, Hollifield and Hughson 1995). To test the hypothesis, I 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 credible to investors. Conversely, net insider selling will dampen the undervaluation signal (Bonaime and Ryngaert 2013). Given the three insider trade directions, I 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. I 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 similar to Bonaime (2012). Given all the scenarios, I 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 the absence of institutional foresight.

IV. Data

The data for share repurchases are from the Securities Data Company (SDC). My repurchases sample[2] 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.

My 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 I evaluate institutional profitability using all three datasets, I focus on ISO because the data provide the timestamp, exact price, quantity, and trade condition to calculate institutional profit. In the other two datasets, I 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

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[2] In another sample, I 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. My results are robust even when the contemporaneous events are excluded.

the volume and 38% of trades in my 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 trades profitably before price-sensitive information is released, for example, in repurchase announcements. Hence, I focus on ISO to determine if institutional investors can make a profit using a more aggressive trading mechanism.

I 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, I 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. My 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. I 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, I 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.

V. Findings

Before I can answer questions related to institutional profitability, I first need to determine if institutional investors are actively trading around the repurchase announcements. Using the 13(f) data, I 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, I 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 1-1, I show that the announcing firms during the 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 my control sample of non-announcing firms, I find that there is a positive trade imbalance for the quarters around the announcement with varying degrees of significance. The positive trade imbalances 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 net institutional 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 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, I 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 I suspected, transient investors seem to be influenced by the announcements. Figure 1-3 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 1-1. 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 a 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. I 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, I turn my attention to how institutions trade during the five days around the announcement. My 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 I am studying the perceptiveness of institutional investors before and on the announcement date, I 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 to the announcement, I 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, I found evidence of significant negative institutional trade imbalance [3] for all 11 days shown in Table 1-2. During the pre-announcement period, I expect institutional investors to take a neutral trading position because they may not be

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[3] 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.

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, I observe significant negative trade imbalances during both periods ranging from -0.5*** to -1.8*** shown in Table 1-2 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, I separate the full sample based on whether the corporate insiders are net buyers or net sellers in the period surrounding the repurchase announcement. My 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 exceed 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). I 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, I 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 1-2 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, I observe that institutional investors are strong net sellers during the days around repurchase announcements.

Using the ISO data, I can also examine how institutional investors trade throughout the announcement day. I divide the trading day into fifteen-minute intervals, and I also include trades before market opens and after market closes. In Figure 1-4, I show the trading volume of institutional investors during these time segments. There is a U-shaped pattern associated with institutional trading on the announcement day, which is congruent with investors' heterogeneous willingness to bear risk in an informationally asymmetric environment. Figure 1-4 also shows a spike in trading volume from 11:30 AM to 11:45 AM. This outlier is due to the American Express repurchase announcement of 150 million shares on March 25, 2013. During this short window, institutions used ISO to trade approximately 125 million shares. From this trading volume, 58% were buy shares and 42% were sell shares. The abnormal trading associated with the American Express

announcement is another piece of evidence that institutions do use ISO to sweep through the book.

When I calculate the intraday trade imbalance, I observe that there is an overall negative trade imbalance. I show in Table 1-3 that the negative trade imbalances are significant and strongest before the market opens and immediately before the market closes. The pre-market trade imbalance is -0.001**. The trade imbalances during the time segments of 03:00 PM - 03:15 PM, 03:15 PM - 03:30 PM, 03:30 PM - 03:45 PM, and 03:45 PM - 04:00 PM are -0.001**, -0.001*, -0.0008**, and -0.002***, respectively. These findings provide more evidence that institutional investors are net sellers around the announcements. Furthermore, when I divide the full sample based on the insider signals and the firm's follow through decision the net selling trend persists.

My 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, I 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 I 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, I find significant abnormal short selling in the immediate three biweekly periods after the repurchase announcement as shown in Table 1-4 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, I find evidence of abnormal selling around the announcement. With all three institutional datasets explaining similar trading behaviors, I now examine the profitability of these trades.

Using the exact pricing of the ISO trades, I can 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. I compute profitability using closing prices five and ninety days after the announcement to assess institutional short- and long-term performance. Table 1-5 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.

I 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 1-5 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 1-5 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, I find that traders profit when they buy before the announcement and sell after the announcement. This pattern holds true even when I 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, I observe that institutional trading profits and losses around the announcement are amplified with net insider buying.

Finally, I dissect the profitability patterns according to both insider transactions and the firm's follow-through or announcement-only decision shown in Table 1-5. I 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%.

I also extend my profit analysis to a longer time horizon to see if these trends persist when the opening trades are closed +90 days after the announcement. I 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 1-6. 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. I 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 my finding that institutional investors exhibit significant negative trade imbalance during the 11 days, I conclude that they are not able to trade profitably.

With evidence that short sellers are also active around the announcement, I examine their ability to trade profitably. I calculate profit as the difference between the proceeds from the sale and the cost to close the position using CRSP closing prices. Table 1-7 shows the number of shares sold short and covered as well as the profits for several cumulative biweekly periods. I 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 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 I expand the trading window. I 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 I 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, I conclude that short sellers are not able to trade profitably around repurchase announcements.

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 1-8 shows the regression results of

institutional sell profit on closing day +90. I see that transient institutional investors can trade profitably. In the full sample, for every transient investor 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 investor 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 can take advantage of the announcement event until the price appreciation disappears, at which point they revert to their normal trading behavior.

VI. Conclusion

Using three different data sources, I 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, I turn my attention to institutional trading at the daily frequency. I 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. My 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.

Figure 1-1
Timeline of Institutional Trading and Profitably

This figure shows the timeline of events around repurchase announcements (t=0). I examine insider transaction signals during the six months prior to the announcement and the firm's follow-through decision during the eight quarters after the announcement. The transient quarterly trade imbalance is calculated as the net shares traded normalized by the number of shares outstanding. 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. The 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, expressed in basis points. Short selling profit is calculated as the difference between the proceeds from the sale and the cost to close the position using CRSP closing prices. Institutional ISO profit is determined using ISO buy-and-sell prices and CRSP daily closing prices. ***, **, * stand for statistical significance at the 1%, 5%, and 10% level, respectively.

	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8
Information from the firm and its insiders							Insider transaction signal		Firm's follow through decision								
Dedicated investor quarterly trade imbalance	-0.06%	-0.15%***	-0.14%***	-0.13%***	-0.14%***	-0.13%***	-0.06%	-0.06%	-0.12%***	-0.19%***	-0.20%***	-0.18%***	-0.17%***	-0.07%*	-0.11%***	-0.16%***	-0.08%*
Transient investor quarterly trade imbalance	0.10%*	0.19%***	0.23%***	0.15%***	0.09%*	0.15%***	0.08%	0.00%	-0.25%***	-0.22%***	-0.11%***	-0.13%***	0.07%	0.03%	0.24%***	0.23%***	0.38%***
Cumulative average abnormal return									5.77%***								

	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8
Biweekly abnormal short selling	0.01%	0.02%	-0.01%	0.00%	0.02%	0.11%	0.22%*	0.27%**	0.22%*	0.21%*	0.20%	0.20%	0.16%	0.15%
Biweekly CFA abnormal short selling	1.35%	0.99%	0.41%	-0.95%	-0.57%	5.55%	7.31%*	8.15%**	7.87%*	6.86%	6.36%	5.89%	6.07%	5.45%

Profit -0.199%
Profit -0.194%
Profit -0.500%***
Profit -0.417%**
Profit -0.624%***

	-5	-4	-3	-2	-1	0	1	2	3	4	5
Daily ISO trade imbalance	-0.8***	-1.3***	-1.2***	-0.7***	-0.9***	-0.9**	-1.8***	-0.9**	-0.8***	-0.5***	-0.6***
ISO sell trade profit closing on day +5	-0.34%	-0.66%*	-0.93%**	-1.47%***	-1.13%***	-0.48%	0.42%	0.60%**	0.88%***	0.81%***	-0.10%***
ISO sell trade profit closing on day +90	-5.26%***	-5.68%***	-6.04%***	-6.09%***	-6.36%***	-5.24%***	-4.46%***	-4.21%***	-3.93%***	-2.60%***	-3.23%***

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Figure 1-2

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 can trade profitably using only the information from the announcement. H1 uses the full sample. The second hypothesis (H2) tests if institutional investors can 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 can trade profitably using information from the announcement, insiders and the firm's decision to follow through with the 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 eight quarters.

H1: FULL SAMPLE OF ALL SHARE REPURCHASE ANNOUNCEMENTS					
H2: NET INSIDER BUY		H2: NEUTRAL INSIDER TRADING		H2: NET INSIDER SELL	
H3: FOLLOW THROUGH & NET INSIDER BUY	H3: ANNOUNCEMENT ONLY & NET INSIDER BUY	H3: FOLLOW THROUGH & NEUTRAL INSIDER TRADING	H3: ANNOUNCEMENT ONLY & NEUTRAL INSIDER TRADING	H3: FOLLOW THROUGH & NET INSIDER SELL	H3: ANNOUNCEMENT ONLY & NET INSIDER SELL

Figure 1-3
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). The trade imbalance is calculated as the net shares traded, the number of shares bought minus the number of shares sold, in the quarter normalized by the number of shares outstanding. I 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. My control firm quarterly institutional trade imbalance is calculated using non-repurchase-announcing firms.

Figure 1-4
Intraday Intermarket Sweep Order Trading Volume

This graph shows the average trading volume of institutional investors during the pre-market time, post-market time, and fifteen-minute intervals during trading hours.
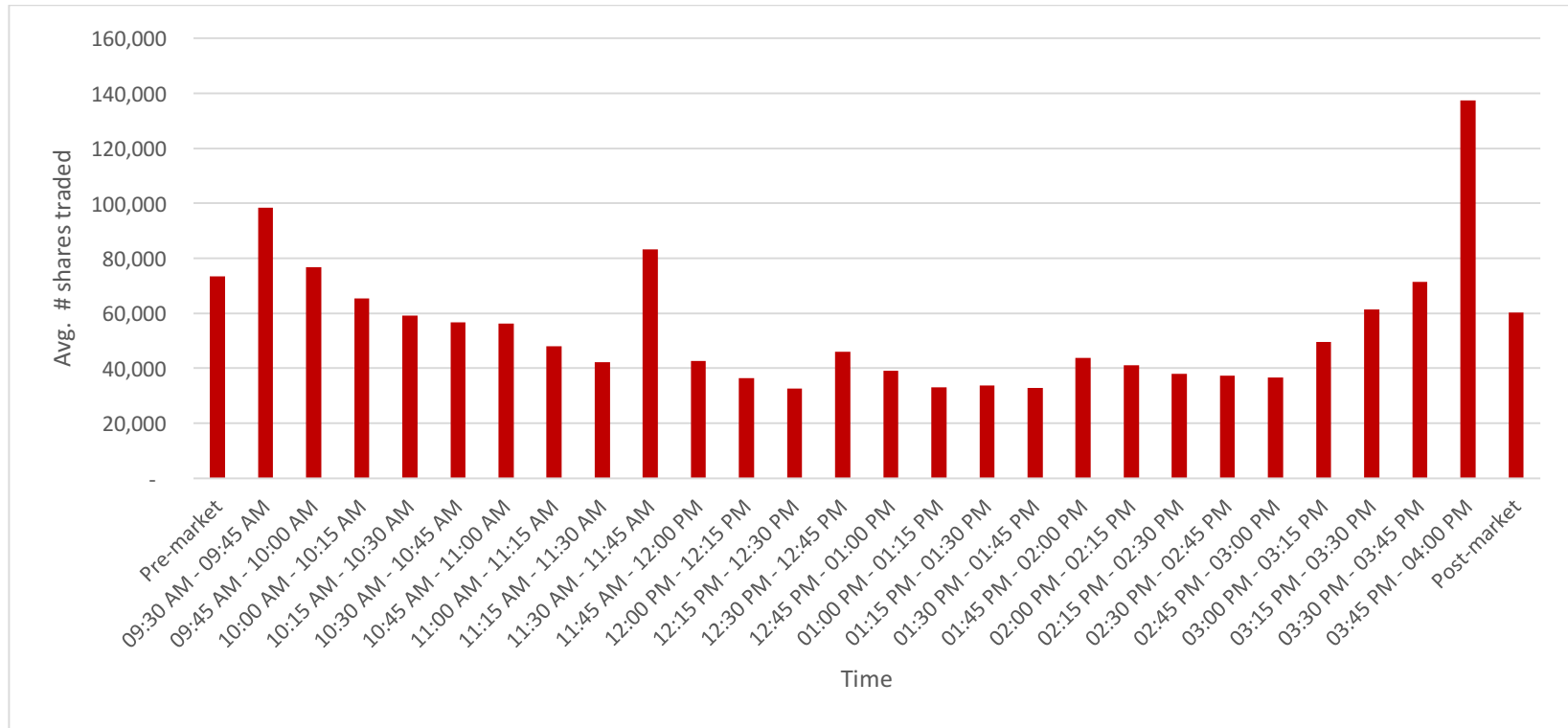
Table 1-1
Quarterly Institutional Trade Imbalance and Price

This table shows the quarterly institutional trade imbalance for the quarters around the announcement (t=0). The trade imbalance is calculated as the net shares traded, the number of shares bought minus the number of shares sold, in the quarter normalized by the number of shares outstanding. I 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. My 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 1-2
Daily Intermarket Sweep Order Institutional Trade Imbalance

This table reports the daily intermarket sweep order (ISO) institutional trade imbalance. The 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, expressed in basis points of the number of shares outstanding of a company 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. My 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 exceed 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). I 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***

Days around the announcement (t=0)	-5	-4	-3	-2	-1
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***

Days around the announcement (t=0)	0	1	2	3	4	5
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 1-3
Intraday Intermarket Sweep Order Institutional Trade Imbalance

This table reports the intraday intermarket sweep order (ISO) institutional trade imbalance. The intraday 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. The intraday trade imbalance is calculated for three time periods: pre-market time, post-market time, and fifteen minutes intervals during trading hours. ***, **, * stand for statistical significance at the 1%, 5%, and 10% level, respectively.

Time	N	Trade Imbalance
Pre-market	991	-0.0010**
09:30 AM - 09:45 AM	3320	0.0002
09:45 AM - 10:00 AM	3306	-0.0020
10:00 AM - 10:15 AM	3340	-0.0004
10:15 AM - 10:30 AM	3269	-0.0007
10:30 AM - 10:45 AM	3279	0.0003
10:45 AM - 11:00 AM	3297	-0.0009
11:00 AM - 11:15 AM	3275	-0.0005
11:15 AM - 11:30 AM	3293	0.0006*
11:30 AM - 11:45 AM	3251	0.0010
11:45 AM - 12:00 PM	3278	0.0000
12:00 PM - 12:15 PM	3227	-0.0007**
12:15 PM - 12:30 PM	3242	-0.0004
12:30 PM - 12:45 PM	3246	-0.0005
12:45 PM - 01:00 PM	3231	-0.0002
01:00 PM - 01:15 PM	3230	-0.0007*
01:15 PM - 01:30 PM	3260	0.0004
01:30 PM - 01:45 PM	3264	-0.0004
01:45 PM - 02:00 PM	3268	-0.0030
02:00 PM - 02:15 PM	3293	-0.0010
02:15 PM - 02:30 PM	3308	0.0000
02:30 PM - 02:45 PM	3306	-0.0001
02:45 PM - 03:00 PM	3323	-0.0040
03:00 PM - 03:15 PM	3361	-0.0010**
03:15 PM - 03:30 PM	3393	-0.0010*
03:30 PM - 03:45 PM	3441	-0.0008**
03:45 PM - 04:00 PM	3629	-0.0020***
Post-market	1330	-0.0020

Table 1-4
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 1-5
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 +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 1-6
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 1-7
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 1-8
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 (SHARES AUTHORIZED) and LN (SHROUT) 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. My 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 exceed 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). I 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.

	FULL	INSIDER BUY SIGNAL	INSIDER SELL SIGNAL	INSIDER BUY & FT SIGNALS	INSIDER SELL & FT SIGNALS	INSIDER BUY & NFT SIGNALS	INSIDER SELL & NFT SIGNALS
Independent Variables	1	2	3	4	5	6	7
TRANSIENT	0.0014***	0.0012***	0.0011***	0.0009*	0.0012***	0.0016	0.0011*
LN (SHARES AUTHORIZED)	-0.0814***	-0.0507***	-0.0386***	-0.0153	-0.0327**	-0.1015***	-0.0612**
LN (SHROUT)	0.0221	0.0260	0.0144	-0.0003	0.0041	0.0479	0.0426
EPS SURPRISE	0.4341***	-1.2658***	0.6314***	-1.2943***	0.6344***	-0.9550*	-1.2191
MKT-RF	-0.0060	-0.0019	-0.0085	0.0001	-0.0051	-0.0003	-0.0274
SMB	0.0251	0.0356*	0.0302	0.0081	0.0331	0.1016*	0.0236
HML	0.0547*	0.0012	-0.0095	0.0148	-0.0007	-0.0627	-0.0462
UMD	0.0372**	0.0049	0.0082	0.0219	0.0128	-0.0532	-0.0074
INTERCEPT	0.6442*	0.1402	0.1631	0.1011	0.2571	0.4727	-0.0009
R-SQUARED	3.4%	8.7%	12.4%	4.8%	13.2%	20.8%	8.9%
ADJUSTED R-SQUARED	2.9%	7.2%	11.5%	2.7%	12.1%	14.9%	4.8%

CHAPTER 2: INSTITUTIONAL TRADE SIZE PREFERENCE AROUND CORPORATE ANNOUNCEMENTS

I. Introduction

Armed with superior research skills, informed and sophisticated institutional investors are able to acquire private information and swiftly profit from such information. To do so, these traders must be strategic with their trades. In the context of my study, I am particularly interested in institutional size preference. Does one size fit all when it comes to informed trading? Barclay and Warner (1993) find that informed investors tend to use medium-sized trades, and these trades have the highest cumulative price changes. Chakravarty (2001) provides further evidence that these informed, medium-size trades from 500 to 9,999 shares have abnormal price impact. Consistent with the stealth trading hypothesis, these medium-size trades are not large enough to attract unwarranted attention and not small enough that that they are too expensive. Extending this line of research, Alexander and Peterson (2007) find evidence that these trades cluster on multiples of 500, 1,000, and 5,000 shares. Yet, there are times when trades are not clustered. When pressed for specific quantities at the end of the quarter, Moulton (2005) explains that investors shy away from trade size clustering. More recently, Garvey and Wu (2014) show that trade size clustering is less common towards the end of the trading day. They also explain that specific size trades are less informed and are more costly.

From the prior research, the answer to my initial question seems to be a resounding yes. It appears that informed traders prefer using medium-sized trades, or at least that was the preference. I argue that data selection has an important role in understanding size

preference. Barclay and Warner (1993) use data from 1981 to 1984. Chakravarty (2001) uses 63 days of trading data from November 1990 to January 1991. Both of these papers use data before decimalization, which is a major structural change and it can affect the size selection process. Alexander and Peterson (2007) use randomly chosen stock data in 1990, 1991, 1995, 1998, and 2002. Moulton (2005) uses foreign exchange data from 2001 to 2002. While their data include 2002 post-decimalization data, the samples are only for one year after the conversion, and it was more than a decade ago. I believe that the older data may accurately reflect strategies of the past, but traders evolve and their strategies do too. Finally, the latest paper, Garvey and Wu (2014) use more recent data from October 1999 to May 2006, but the data come from one broker/deal firm. For my research, I use TAQ data from September 2007 to December 2013. The data sample is naturally more recent and is more encompassing as it includes more market participants than the broker/dealer firm data. The TAQ data provide the exact timestamp, price, and round, mixed, and odd lot quantity of each trade. The data also provide a trader indicator to separate institutional from non-institutional transactions.

Beyond the difference in data selection, I explore how institutional size preference differs around corporate announcements and provide evidence that one size does not fit all. I examine two different corporate events—share repurchase and earnings announcements. The first happens infrequently, and investors are not able to predict in advance if or when the firm will make the announcement. The second occurs frequently and, in fact, institutions are very aware of the timing of earnings season, and they often perform their analysis in advance of the event. This paper empirically tests the theories laid out in Verrecchia (2001). The author explains that investors have more incentives to seek private

information when they anticipate a news release. Doing so inherently will create an environment with higher information asymmetry. Furthermore, as the frequency of the news release increases, the intensity of information acquisition will grow. Since round lots and trade size clustering are associated with informed trading, I hypothesize that there is a difference in how institutional investors trade on the earnings announcement day compared to the share repurchase announcement. The difference can highlight the point that institutions seek private information when they expect the arrival of new information as in earnings announcements.

Consistent with the theory set by Verrecchia (2001), I observe a difference in informed trading in the two event types. Using TAQ intermarket sweep order data, which has the exact price, quantity, timestamp, and trader indicator, I find that institutional investors use more round lots around earnings announcements than in share repurchase announcements. While it is expected that informed institutions would use round lots, they appear to use significantly more round lots during earnings announcements than in share repurchase announcements. To the best of my knowledge, this is the only study comparing the variability in institutional and non-institutional round lot trading around events with different frequencies and announcement time predictabilities. Additionally, I observe a change in common trade sizes. While Alexander and Peterson (2007) observe clustering on multiples of 500, 1,000, and 5,000 shares, I find that institutions prefer a smaller 100-share multiple, and the most commonly traded size is 100 shares, which is significantly smaller than the medium-size of 500 to 9,999 shares. Finally, the change in common trade size multiples to 100 shares has an economic impact. I find that trades in 100-share multiples rather than 500x, 1000x, or 5000x are associated with lower bid-ask spreads. I

believe the reduction in trading cost could be a compensation for the information acquisition process.

II. Literature Review

Trade size has important implications because it has been linked to private information. Barclay and Warner (1993) find that medium-sized trades between 500 and 9,900 shares are linked to informed trading and have the highest cumulative effects on prices. Their stealth trading hypothesis explains that these profit-maximizing traders camouflage their true quantity demand by spreading their trades over time. Chakravarty (2001) extends the literature on stealth trading by providing evidence that medium-sized trades have the largest price impact and that informed institutions have a preference for breaking up large orders especially when trading stocks of large firms. Alexander and Peterson (2007) provide additional details on how these stealth traders break up larger trades. They slice the total quantity into round, medium-sized orders clustering around multiples of 500, 1,000, and 5,000 shares. These round lots appear to have more price impact and suggest that stealth traders may want to consider using less costly methods. Consistent with previous research, I also find size clustering and institutional preference for round lots. However, my findings show that clustering is on a much smaller size in multiples of 100 shares. In fact, trade size of 100 shares makes up at least 60 percent of all institutional trades. Additionally, I also find evidence of intraday differences in clustering. Similar to Garvey and Wu (2014), I observe less clustering towards the end of the trading day.

My research extends the current literature further by examining the how clustering is affected by the frequency and predictability of corporate news releases. I believe that clustering is affected by how asymmetrically informed investors trade around material events. There are two schools of thoughts on news releases and information asymmetry. Kim and Verrecchia (1991) explain that the more information is released to the public the more opportunities investors have to readjust their positions. Uninformed investors will have the opportunity to attain a more optimal portfolio. As the frequency of news releases increases, information asymmetry decreases. Fu, Kraft, and Zhang (2012) show that increasing the frequency of financial disclosure from semiannually to quarterly can reduce information asymmetry and cost of equity. Conversely, in Verrecchia (2001), by assuming that the information acquisition process is endogenously endowed, the frequency of disclosure is positively associated with information asymmetry. Because institutions have the resources and skills to acquire information, higher frequency of disclosures provides more opportunities for these traders to benefit from the announcements. The incentive to acquire private information, in turn, creates higher information asymmetry.

In my research, I use share repurchase and earnings announcements as the two event types that might affect clustering. The first happens infrequently, and investors are not able to predict the timing of the announcements with certainty. The latter occurs quarterly, and investors know ahead of time when the announcement is coming. By examining trade size clustering around these announcement types, I find that the informed traders use more round lots when they expect the news is coming and have time to prepare for the announcement. The biggest difference in round lots between the two event types occurs during post market hours when most corporate announcements are made.

III. Hypotheses

My main research question centers around the impact of news disclosure frequency on institutional investor's trade size and clustering preference. Verrecchia (2001) explains that the information acquisition process is endogenous and the higher the frequency of information disclosure the more investors are incentivized to obtain private information. Based on this theory, I believe that the quarterly frequency and predictable timing of earnings announcements encourage institutions to acquire information so they can optimally rebalance their portfolio every quarter. Conversely, if the institutional investors do not know when or if the firm will announce as in share repurchase announcements, there is less incentive to acquire private information. Considering that round lots are associated with informed trading (Alexander and Peterson 2007), I hypothesize that institutional investors will use more round lot trades around earnings announcements because they are able to obtain information ahead of the event (H1).

Additionally, I believe that these round lot trades will cluster around much smaller multiples than the previously found 500, 1,000, and 5,000 share-multiples (H2). The trend of using smaller sizes has been gaining popularity due to the need to disguise trading signals. Since 1995, the average trade size for the NYSE has shrunk from 1,600 to 200 shares, and due to competition from high-frequency traders, the need to disguise one's trades is becoming more important (Spritzer 2010). Hence, institutional investors may break up larger quantities into trades of 100 share-multiples with most trades under 500 shares to remain undetected.

Finally, Chakravarty (2001) explains that medium-size trades from 500 to 9,999 shares initiated by institutional investors have the highest price impact. Next are the large

trades at 10,000 shares or more. These trades also move prices although not nearly in the same magnitude as medium-size trades. Lastly, small trades from institutions appear to have no price impact. Given that there is evidence medium and large trades tend to move prices the most, using smaller sizes may be a more cost-effective strategy. Therefore, I believe that the smaller size multiples are less costly than the larger size multiples (H3). Additionally, it is possible that the market has figured out the camouflage strategy of the medium-sized trades. Stealth trading may not be so hidden anymore particularly around corporate announcements.

IV. Data

To test my hypotheses, I gather data from several sources. My repurchase announcement data are from SDC, and my earnings announcement data are from Compustat. My main source of institutional data are from TAQ intermarket sweep order (ISO) trades. Fully integrated in September 2007, ISOs are limit orders that can sweep multiple markets of their liquidity. These orders automatically execute in designated markets while simultaneously submitting orders in the market quoting the best prices to fulfill Regulation NMS Order Protect Rule. By prioritizing execution speed and order fulfillment over price, ISO traders have more opportunities to trades profitably before stock prices adjust to new information. ISOs are also associated with more information and are mainly used by institutional traders (Chakravarty, Jain, Upson, and Wood 2012). Moreover, I utilize ISOs because it provides the exact timestamp, price and round, mixed, or odd lot quantity of each institutional trade to determine if institutional investors have a size preference. My sample consists of repurchase and earnings announcements of 2,437

firms from September 2007 when ISOs were fully instated to December 2013. The trades are matched based on the firm, year, quarter, and time traded. In total, I examine approximately 17.9 million trades for each announcement type.

V. Findings

In my exploration of trade size clustering around corporate announcements, I focus on the preference of informed traders by examining the trades of ISO institutional investors. I look at approximately 17.9 million trades executed by these institutions in both earnings and share repurchase announcements. I observe that ISO traders on average use smaller trade sizes. The average trade size around earnings announcements is 835 shares, and the average for share repurchase announcements is 1,027 shares shown in Table 2-1. When I examine the buy and sell trade sizes, I see a similar trend—smaller sizes for earnings announcements and larger sizes for share repurchase announcements. It also appears that institutional investors prefer using more round lots around earnings announcements than around share repurchase announcements. 94.67% of the 17.9 million trades executed on the earnings announcement day are round lots. Compared to share repurchase announcements, this is approximately 1.87% more round lot or 335,174 more round lot trades. Moreover, these round lots appear to be in multiples of 100 shares. I also see that the spread is higher around earnings announcement hinting at the possibility that traders could be more asymmetrically informed around this type of events. Even before examining the matched samples, I observe key differences between earnings and share repurchase events. I believe that these differences can be attributed to the frequency and predictability of the announcement time. The use of round lots is associated with informed

trading (Alexander and Peterson 2007) and I believe that institutions use more round lots around earnings announcements because they can obtain private information ahead of the scheduled events.

In Table 2-2, I present the differences in round lots for ISO trades between earnings and share repurchase announcements. The trades are matched by the firm, year, quarter, and time traded. I divide the sample into several time segments—pre-market time, fifteen-minute intervals, and post-market time—to show the intraday round lot pattern and to highlight the significant difference during the non-market hours when most earnings and share repurchase announcement are made. When I rank the differences in round lots between earnings and share repurchase announcements from largest to smallest, I see that the post-market and pre-market time segments have the larger differences. The differences between earnings and repurchase announcements are 4.60%*** in pre-market and 14.32%*** in the post-market time segments. These differences not only are statistically significant, but they are also economically significant. These numbers suggest that institutional investors are more informed around earnings announcements than they are around share repurchase announcements. Their ability to trade so confidently may come from the fact that they are able to utilize their superior research skills ahead of the planned announcements. Conversely, when the institutional investors do not know if and when an announcement will be made, they are unable to utilize their skills to obtain private information.

When I turn my attention to the liquidity traders, I see that they use fewer round lots around earnings announcements. In Table 2-3, I present the differences in round lots for NISO traders between earnings and share repurchase announcements. Similar to the

ISO trades, the NISO trades are matched by firm, year, quarter, and time traded. Unlike the differences observed in the ISO trades, I do not see economically significant differences in round lot trading from the liquidity traders. All of the differences are less than a half percent. Even more evident is the differences in the pre- and post-market times. They are -0.15%*** and -0.03%. The first is statistically significant but is not significant economically. The second, during the post-market time, is insignificant. These findings suggest that liquidity traders are missing the opportunity to obtain better information even when the timing of the announcements are predictable like in earnings announcements.

Hence, I focus on the trade sizes of the ISO traders. Table 2-4 and Table 2-5 present the top ten ISO trade sizes around earnings and share repurchase announcements, respectively. Accounting for approximately 63.7% of the sample, the most common trade size around earnings announcements is 100 shares. This finding is quite different from previous research. Garvey and Wu (2014) find that the top five order sizes are 1,000, 500, 2000, 5,000, and 200. Chakravarty (2001) find that institutions prefer trades of medium sizes from 500 to 9,999 shares. The evidence of a smaller trade size point to the need to camouflage information around informed events. Stealth trading using medium-sized trade may be the best strategy on a day-to-day basis, but around corporate announcements traders appear to prefer a trade size of 100 shares. The preference for this particular share size also differs between announcement types. Institutional investors use 11.5% fewer 100-share trades around share repurchase announcements. This decrease from earnings to share repurchase announcements is congruent with how institutions use fewer round lots around

share repurchase announcements. So far, I am finding evidence that institutional investors prefer using small, round lots[4] mostly 100 shares to trade on their private information.

Using Alexander and Peterson (2007), I provide evidence that clustering around informed events is different from the prior research. Table 2-6 reports the regressions of the frequency of trade size i on the different size clusters for ISO trades around earnings announcements. In the full sample before dividing by the different time segments, I find that trades cluster on all four multiples. However, the magnitudes of the clustering vary. In the regression with only D100, I find that clustering around 100-share multiples accounts for 40.69% of the variations in trade sizes. Compared to 500-share, 1,000-share, and 5,000-share multiples, which account for only 7.56%, 5.06%, and 2.31% of the variations in size, 100-share multiples appear to have the most explanatory power. The 100-share multiples seem to have economic significance as well as explanatory power. If the trade size is in multiples of 100 shares, then the frequency of that size is increased by 1,004.67%***.

In the multivariate regressions, again, I observe trade size clustering for all multiples. Although its economic significance is decreased, 100-share multiples are still very relevant. If the trade size is in multiples of 100 shares, then the frequency of that size is increased by 619.36%***. For the others multiples, their economic significance is even less. For instance, if the trade size is in multiples of 500, 1,000, 5,000 shares, then the frequency of that size is increased by only 7.61%***, 42.55%***, and 195.47%***. These

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[4] In my examination of odd lot trades, I find that institutions prefer using smaller, odd lot sizes around earnings announcements than around share repurchase announcements. It appears that institutions prefer smaller sizes even with odd lots. The average odd lot size is 39.33 shares.

numbers are strong evidence that the clustering trend is different around earnings announcement than around the environment of Chakravarty (2001).

When I divide the full sample into the different time segments, I see that 100-share multiples are statistically and economically significant in all of the time periods. There is also evidence that institutions are less likely to use larger sizes shown by the negative and significant *LnSize* coefficient. If the trade size is increased by 1%, then the frequency of that size being traded is decreased by 245.74%***. In summary, there is strong evidence of clustering around 100-share multiples.

Finally, I examine how size clustering affects the cost of trading. Table 2-7 presents the results of the regression models for the full sample and the different time segments. Overall, I see that clustering does affect trading costs. First, 100-share multiples appear to reduce the bid-ask spread by approximately $0.0478***, 500-share multiples increase the spread by $0.0138***, 1,000-share multiples decrease the spread by $0.0314***, and the 5,000-share multiples increase the spread by $0.1885***. Although in the full sample the 1,000-share multiples appear to reduce the spread, I see mixed results in the time-segmented regressions. Most importantly, I see that during the post-market hours, when firms announce earnings, all multiples except D100 increase the cost of trading. Overall, it appears that clustering around 100-share multiples is a good strategy to lower trading costs.

VI. Conclusion

Assuming that the process of information acquisition is endogenously endowed, I explore how the frequency of corporate announcements affect institutional trading. By comparing earnings announcements, which occur every quarter, with share repurchase

announcements, which happen non-routinely and are unpredictable, I find that institutional investors are more motivated to obtain private information around earnings announcements. Institutions use more round lot trades, which are associated with informed trading, around earnings announcements than around repurchase announcements. In contrasts, the liquidity traders do not display any economic differences between the two announcement types. It appears that the information acquisition process for these NISO traders is the same for both earnings and share repurchase announcements. I believe the difference between ISO and NISO traders is due to the institution's ability to acquire private information, especially around an event that they know is coming.

Furthermore, I observe a change in trade size preference around corporate announcements. The most common trade size is 100 shares, which is much smaller than the previously known medium-size preference. The shift in smaller size preference is also associated with lower trading cost for institutional investors. These findings imply that traders have many tools in the shed. They pick and choose which tool is most appropriate for the job. In some cases, a small chisel is better than a hammer.

Table 2-1
Descriptive Statistics for Earnings & Share Repurchase Announcements

This table presents the descriptive statistics for trade size clustering and prices around earnings and share repurchase announcements. The events are matched by firm, year, quarter, and time traded. N is the number of trades matched for the two events.

	Earnings Announcements		Share Repurchase Announcements	
	Mean	N	Mean	N
Size	835	17,923,752	1,027	17,923,752
Shares Bought	812	8,623,958	975	8,591,729
Shares Sold	850	8,636,564	1,082	8,650,151
Round Lot	94.67%	17,923,752	92.80%	17,923,752
Mix Lot	5.30%	17,923,752	7.01%	17,923,752
Odd Lot	0.03%	17,923,752	0.19%	17,923,752
D100	94.67%	17,923,752	92.80%	17,923,752
D500	4.91%	17,923,752	7.70%	17,923,752
D1000	2.22%	17,923,752	3.44%	17,923,752
D5000	0.46%	17,923,752	0.75%	17,923,752
Ask	$ 47.17	17,923,752	$ 47.06	17,923,752
Bid	$ 47.06	17,923,752	$ 46.97	17,923,752
Buy Price	$ 47.35	8,623,958	$ 47.30	8,591,729
Sell Price	$ 47.93	8,636,564	$ 48.05	8,650,151
Spread	$ 0.11	17,923,752	$ 0.09	17,923,752

Table 2-2
Differences in ISO Round Lots between Earnings & Share Repurchase Announcements

This table presents the differences in round lots for ISO trades between earnings and share repurchase announcements. The events are matched by firm, year, quarter, and time traded. N is the number of trades matched for the two events. ***, **, * stand for statistical significance at the 1%, 5%, and 10% level, respectively.

	N	Earnings Announcement Round Lot	Share Repurchase Announcement Round Lot	Difference	p-value
Pre-market	164,638	88.36%	83.76%	4.60%***	<.0001
09:30 AM - 09:45 AM	1,514,406	92.27%	89.48%	2.79%***	<.0001
09:45 AM - 10:00 AM	1,235,931	95.42%	93.51%	1.91%***	<.0001
10:00 AM - 10:15 AM	1,062,593	94.19%	92.28%	1.91%***	<.0001
10:15 AM - 10:30 AM	861,738	94.87%	94.47%	0.39%***	<.0001
10:30 AM - 10:45 AM	803,933	95.96%	94.50%	1.46%***	<.0001
10:45 AM - 11:00 AM	680,415	95.02%	93.99%	1.03%***	<.0001
11:00 AM - 11:15 AM	652,070	95.36%	93.42%	1.94%***	<.0001
11:15 AM - 11:30 AM	600,149	96.19%	92.93%	3.26%***	<.0001
11:30 AM - 11:45 AM	572,869	94.09%	92.44%	1.65%***	<.0001
11:45 AM - 12:00 PM	510,499	95.38%	94.67%	0.72%***	<.0001
12:00 PM - 12:15 PM	470,795	95.69%	94.96%	0.73%***	<.0001
12:15 PM - 12:30 PM	428,688	94.85%	94.22%	0.64%***	<.0001
12:30 PM - 12:45 PM	411,143	95.43%	94.54%	0.89%***	<.0001
12:45 PM - 01:00 PM	381,465	95.25%	94.56%	0.69%***	<.0001
01:00 PM - 01:15 PM	409,821	95.32%	95.13%	0.19%***	<.0001
01:15 PM - 01:30 PM	397,734	95.71%	94.87%	0.84%***	<.0001
01:30 PM - 01:45 PM	424,863	95.61%	94.10%	1.51%***	<.0001
01:45 PM - 02:00 PM	440,502	95.08%	94.87%	0.21%***	<.0001
02:00 PM - 02:15 PM	486,232	94.12%	94.29%	-0.17%***	0.0002
02:15 PM - 02:30 PM	518,823	96.10%	95.69%	0.41%***	<.0001
02:30 PM - 02:45 PM	508,459	95.97%	93.91%	2.06%***	<.0001
02:45 PM - 03:00 PM	539,907	96.84%	94.58%	2.26%***	<.0001
03:00 PM - 03:15 PM	649,652	96.17%	94.07%	2.10%***	<.0001
03:15 PM - 03:30 PM	676,752	95.00%	94.73%	0.27%***	<.0001
03:30 PM - 03:45 PM	839,375	94.64%	93.27%	1.37%***	<.0001
03:45 PM - 04:00 PM	1,284,644	92.51%	89.17%	3.35%***	<.0001
Post-market	395,656	90.47%	76.16%	14.32%***	<.0001

Table 2-3
Differences in NISO Round Lots between Earnings & Share Repurchase Announcements

This table presents the differences in round lots for NISO trades between earnings and share repurchase announcements. The events are matched by firm, year, quarter, and time traded. N is the number of trades matched for the two events. ***, **, * stand for statistical significance at the 1%, 5%, and 10% level, respectively.

	N	Earnings Announcement Round Lot	Share Repurchase Announcement Round Lot	Difference	p-value
Pre-market	27,269	92.91%	93.06%	-0.15%***	<.0001
09:30 AM - 09:45 AM	379,841	96.14%	96.30%	-0.17%***	<.0001
09:45 AM - 10:00 AM	301,163	96.95%	97.18%	-0.23%***	<.0001
10:00 AM - 10:15 AM	252,994	96.60%	97.02%	-0.42%***	<.0001
10:15 AM - 10:30 AM	216,792	97.15%	97.19%	-0.04%***	0.0002
10:30 AM - 10:45 AM	193,846	97.11%	97.09%	0.02%*	0.0634
10:45 AM - 11:00 AM	163,445	96.73%	96.92%	-0.19%***	<.0001
11:00 AM - 11:15 AM	156,821	96.82%	97.04%	-0.21%***	<.0001
11:15 AM - 11:30 AM	144,885	97.15%	97.09%	0.06%***	0.0008
11:30 AM - 11:45 AM	133,743	96.85%	97.05%	-0.19%***	<.0001
11:45 AM - 12:00 PM	123,908	96.59%	97.02%	-0.43%***	<.0001
12:00 PM - 12:15 PM	115,366	96.80%	97.08%	-0.28%***	<.0001
12:15 PM - 12:30 PM	110,148	96.85%	96.88%	-0.03%	0.1515
12:30 PM - 12:45 PM	104,994	96.61%	97.00%	-0.39%***	<.0001
12:45 PM - 01:00 PM	97,085	96.55%	96.78%	-0.23%***	<.0001
01:00 PM - 01:15 PM	101,390	96.66%	96.89%	-0.24%***	<.0001
01:15 PM - 01:30 PM	99,135	96.90%	96.98%	-0.09%***	<.0001
01:30 PM - 01:45 PM	109,759	96.46%	96.88%	-0.42%***	<.0001
01:45 PM - 02:00 PM	114,003	96.87%	96.99%	-0.12%***	<.0001
02:00 PM - 02:15 PM	120,283	96.60%	96.78%	-0.18%***	<.0001
02:15 PM - 02:30 PM	128,882	96.68%	96.87%	-0.18%***	<.0001
02:30 PM - 02:45 PM	132,965	97.03%	97.17%	-0.14%***	<.0001
02:45 PM - 03:00 PM	134,782	96.72%	97.06%	-0.35%***	<.0001
03:00 PM - 03:15 PM	163,103	96.69%	97.04%	-0.35%***	<.0001
03:15 PM - 03:30 PM	182,090	96.83%	96.93%	-0.10%***	<.0001
03:30 PM - 03:45 PM	238,033	96.87%	96.90%	-0.03%**	0.0458
03:45 PM - 04:00 PM	396,873	95.57%	95.80%	-0.23%***	<.0001
Post-market	85,646	89.16%	89.20%	-0.03%	0.2317

Table 2-4
Earnings Announcements Top 10 ISO Sizes

This table reports the top ten ISO trade sizes around earnings announcements.

SIZE	COUNT	PERCENT
100	11,421,801	63.7
200	1,836,801	10.2
300	728,602	4.1
400	456,567	2.5
500	329,063	1.8
600	188,222	1.1
1,000	171,010	1.0
700	142,692	0.8
800	138,508	0.8
900	131,645	0.7
Other	2,378,841	13.3
Total	17,923,752	100.0
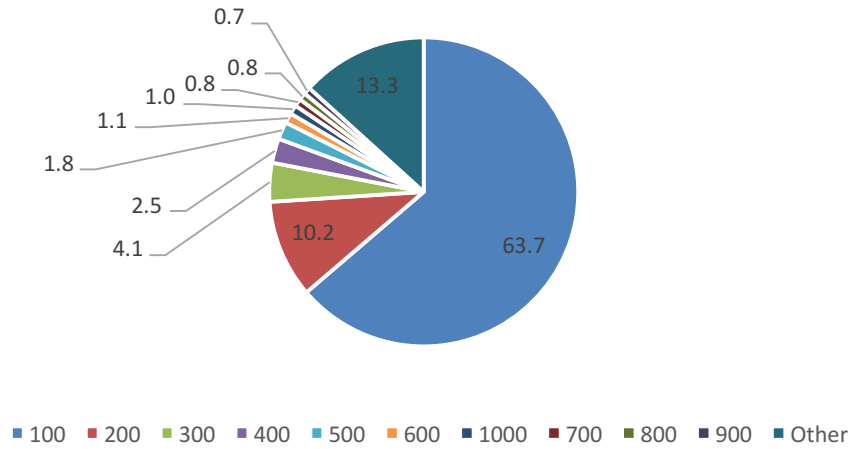
Table 2-5
Share Repurchase Announcements Top 10 ISO Sizes

This table reports the top ten ISO trade sizes around share repurchase announcements.

SIZE	COUNT	PERCENT
100	9,355,977	52.2
200	1,723,275	9.6
300	812,550	4.5
400	589,811	3.3
500	495,298	2.8
600	344,777	1.9
1,000	289,912	1.6
700	285,170	1.6
800	258,573	1.4
900	208,233	1.2
Other	3,560,176	19.9
Total	17,923,752	100.0
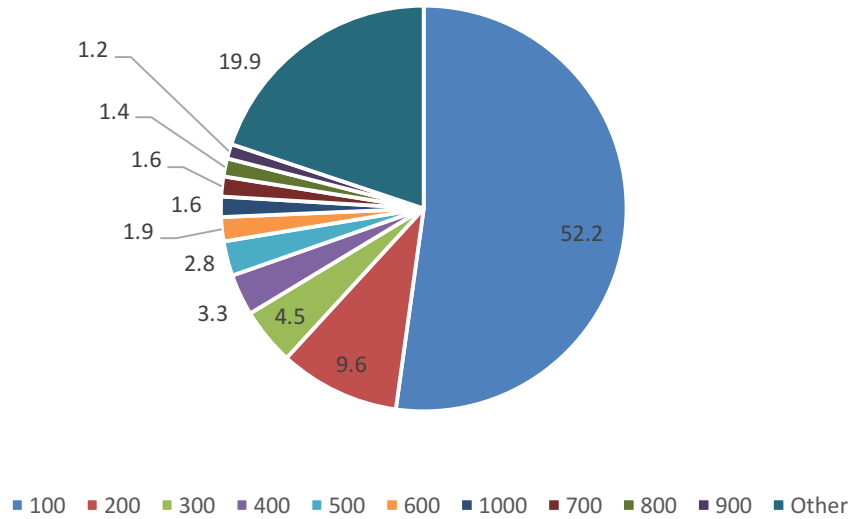
Table 2-6
Intraday Intermarket Sweep Order Trade Size Clustering for Earnings Announcements

This table reports the regression of *LnFreq* on the different size clusters for ISO trades around earnings announcements.

$$LnFreq_i = \alpha + \beta_{100}D100 + \beta_{500}D500 + \beta_{1,000}D1000 + \beta_{5,000}D5000 + LnSize_i + \varepsilon_i$$

I estimate a regression following Alexander and Peterson (2007). *LnFreq* is the natural log of the percentage of trades that are of size *i*. *D100, D500, D1000,* and *D5000* are dummy variables set to one if size *i* is a multiple of 100, 500, 1,000, or 5,000 shares, zero otherwise. *LnSize* is the natural log of the trade size *i* in shares. ***, **, * stand for statistical significance at the 1%, 5%, and 10% level, respectively.

	N	D100	D500	D1000	D5000	LnSize	Intercept	Adjusted R-Square
All time segments	17,923,752	10.0467***					-7.2231***	0.4069
All time segments	17,923,752		-4.5002***				2.5093***	0.0756
All time segments	17,923,752			-5.3996***			2.4080***	0.0506
All time segments	17,923,752				-7.9222***		2.3248***	0.0231
All time segments	17,923,752					-2.7599***	16.8229***	0.8354
All time segments	17,923,752	6.1936***	0.0761***	0.4255***	1.9547***	-2.4574***	9.3444***	0.9837

	N	D100	D500	D1000	D5000	LnSize	Intercept	Adjusted R-Square
Pre-market	164,638	5.1460***	0.7793***	0.9855***	1.2446***	-1.9953***	7.9767***	0.9808
09:30 AM - 09:45 AM	1,514,406	6.0617***	-0.2067***	0.5587***	1.9117***	-2.2874***	8.6381***	0.9843
09:45 AM - 10:00 AM	1,235,931	6.2222***	-0.0571***	0.5006***	2.3598***	-2.4051***	9.0687***	0.9828
10:00 AM - 10:15 AM	1,062,593	6.5572***	0.0839***	0.5401***	2.3115***	-2.5073***	9.2428***	0.9922
10:15 AM - 10:30 AM	861,738	6.3795***	0.0289***	0.5325***	1.8370***	-2.4901***	9.3303***	0.9857
10:30 AM - 10:45 AM	803,933	6.2751***	0.1768***	0.4188***	4.3071***	-2.5483***	9.7143***	0.9879
10:45 AM - 11:00 AM	680,415	6.3907***	0.0284***	0.4497***	1.4765***	-2.4974***	9.3582***	0.9873
11:00 AM - 11:15 AM	652,070	6.2689***	0.0672***	0.5887***	1.3366***	-2.5276***	9.6217***	0.9864
11:15 AM - 11:30 AM	600,149	6.5422***	0.1361***	0.4806***	1.9157***	-2.5524***	9.4808***	0.9889
11:30 AM - 11:45 AM	572,869	5.9013***	-0.0720***	0.5261***	1.2385***	-2.4168***	9.4353***	0.9837
11:45 AM - 12:00 PM	510,499	6.2197***	-0.0015***	0.4437***	1.4261***	-2.5237***	9.6504***	0.9842
12:00 PM - 12:15 PM	470,795	6.1919***	0.0142***	0.4802***	1.3537***	-2.4924***	9.5204***	0.9824
12:15 PM - 12:30 PM	428,688	6.7422***	0.120***	0.3955***	3.0634***	-2.5302***	9.1646***	0.9890
12:30 PM - 12:45 PM	411,143	6.5211***	0.0760***	0.5256***	3.2996***	-2.6041***	9.7487***	0.9881
12:45 PM - 01:00 PM	381,465	6.4906***	-0.0997***	0.6715***	1.7979***	-2.5201***	9.3686***	0.9856

	N	D100	D500	D1000	D5000	LnSize	Intercept	Adjusted R-Square
01:00 PM - 01:15 PM	409,821	6.4951***	0.1300***	0.3427***	1.4175***	-2.5780***	9.6465***	0.9909
01:15 PM - 01:30 PM	397,734	6.2281***	-0.0208***	0.4434***	1.1954***	-2.4686***	9.3609***	0.9762
01:30 PM - 01:45 PM	424,863	6.3700***	0.0330***	0.5138***	1.3657***	-2.5155***	9.4482***	0.9809
01:45 PM - 02:00 PM	440,502	6.5646***	0.1267***	0.5592***	2.0496***	-2.5784***	9.5787***	0.9916
02:00 PM - 02:15 PM	486,232	6.3057***	0.0639***	0.5036***	3.1296***	-2.5403***	9.6448***	0.9898
02:15 PM - 02:30 PM	518,823	6.5762***	0.1288***	0.5330***	2.2802***	-2.6122***	9.7335***	0.9916
02:30 PM - 02:45 PM	508,459	6.5223***	0.1095***	0.5052***	2.0753***	-2.5811***	9.6339***	0.9904
02:45 PM - 03:00 PM	539,907	6.9944***	-0.0692***	0.5363***	1.9325***	-2.5298***	8.9196***	0.9907
03:00 PM - 03:15 PM	649,652	6.4581***	0.1127***	0.4917***	1.2533***	-2.5967***	9.7701***	0.9908
03:15 PM - 03:30 PM	676,752	6.1955***	0.0312***	0.4275***	1.8672***	-2.5342***	9.7224***	0.9877
03:30 PM - 03:45 PM	839,375	6.2227***	0.0027***	0.3236***	1.9692***	-2.4940***	9.5015***	0.9903
03:45 PM - 04:00 PM	1,284,644	6.0488***	-0.0122***	0.4109***	0.9435***	-2.3875***	9.1221***	0.9886
Post-market	395,656	5.2677***	0.4071***	0.8693***	0.4774***	-2.1309***	8.5840***	0.9691

Table 2-7
Intraday Intermarket Sweep Order Trade Size Clustering and the Bid-Ask Spread for Earnings Announcements

This table reports the regression of the bid-ask spread on the different trade size clusters for ISO trades.

$$Spread_i = \alpha + \beta_{100}D100 + \beta_{500}D500 + \beta_{1,000}D1000 + \beta_{5,000}D5000 + LnSize_i + \varepsilon_i$$

I estimate a regression following Alexander and Peterson (2007). The *Spread* is calculated as the difference between the bid and ask prices. *D100, D500, D1000,* and *D5000* are dummy variables set to one if size *i* is a multiple of 100, 500, 1,000, or 5,000 shares, zero otherwise. *LnSize* is the natural log of the trade size *i* in shares. ***, **, * stand for statistical significance at the 1%, 5%, and 10% level, respectively.

	N	D100	D500	D1000	D5000	LnSize	Intercept	Adjusted R-Square
All time segments	17,923,752	-0.0478***	0.0138***	-0.0314***	0.1885***	-0.0022***	0.1642***	0.0041
	N	D100	D500	D1000	D5000	LnSize	Intercept	Adjusted R-Square
Pre-market	164,638	-0.1709***	0.0650***	-0.1235***	-0.0920***	0.0015***	0.3710***	0.0396
09:30 AM - 09:45 AM	1,514,406	-0.2667***	0.0179***	-0.0506***	-0.1436***	0.0128***	0.3673***	0.0538
09:45 AM - 10:00 AM	1,235,931	-0.0049***	-0.1033***	-0.0168***	-0.0604***	0.0263***	0.0053***	0.0121
10:00 AM - 10:15 AM	1,062,593	-0.0142***	-0.0030*	0.0311***	-0.0394***	-0.0147***	0.2014***	0.0041
10:15 AM - 10:30 AM	861,738	0.0041***	-0.0175***	-0.0222***	-0.0097**	-0.0095***	0.1523***	0.0045
10:30 AM - 10:45 AM	803,933	0.0188***	-0.0007	0.0044*	0.1395***	-0.0039***	0.1039***	0.0013
10:45 AM - 11:00 AM	680,415	-0.0023*	0.0371***	-0.0690***	0.0129***	-0.0113***	0.1593***	0.0045
11:00 AM - 11:15 AM	652,070	-0.0027**	-0.0068***	-0.0157***	0.0028	-0.0123***	0.1591***	0.0055
11:15 AM - 11:30 AM	600,149	-0.0266***	0.0534***	-0.0722***	-0.0321***	-0.0071***	0.1638***	0.0029
11:30 AM - 11:45 AM	572,869	-0.0082***	0.0124***	-0.0239***	0.0014	-0.0163***	0.1864***	0.0097
11:45 AM - 12:00 PM	510,499	0.0007	0.0310***	0.0098***	-0.0542***	-0.0171***	0.1798***	0.0075
12:00 PM - 12:15 PM	470,795	-0.0136***	-0.0099***	0.0151***	0.0217***	-0.0167***	0.1891***	0.0079
12:15 PM - 12:30 PM	428,688	-0.0848***	0.0170***	0.0455***	0.2732***	-0.0132***	0.2426***	0.0354
12:30 PM - 12:45 PM	411,143	0.0100***	-0.0098***	-0.0066**	0.1471***	-0.0143***	0.1521***	0.0075

	N	D100	D500	D1000	D5000	LnSize	Intercept	Adjusted R-Square
12:45 PM - 01:00 PM	381,465	-0.0167***	0.0856***	-0.1252***	0.0040	0.0036***	0.0907***	0.0078
01:00 PM - 01:15 PM	409,821	0.0484***	-0.0330***	-0.0830***	-0.0233**	0.0194***	-0.0507***	0.0087
01:15 PM - 01:30 PM	397,734	0.0850***	-0.0702***	-0.0482***	-0.0877***	0.0293***	-0.1302***	0.0176
01:30 PM - 01:45 PM	424,863	0.0138***	-0.0195***	-0.0022	-0.0134*	-0.0049***	0.0985***	0.0019
01:45 PM - 02:00 PM	440,502	0.0092***	0.0436***	0.1448***	1.7496***	-0.0103***	0.1307***	0.5452
02:00 PM - 02:15 PM	486,232	-0.1719***	-0.0172***	-0.0171***	-0.0280***	-0.0026***	0.2735***	0.0334
02:15 PM - 02:30 PM	518,823	0.0073***	-0.0179***	-0.0126***	-0.0013	-0.0072***	0.1221***	0.0037
02:30 PM - 02:45 PM	508,459	-0.0035**	0.0288***	-0.0417***	-0.0010	-0.0141***	0.1599***	0.0072
02:45 PM - 03:00 PM	539,907	0.0072***	0.1586***	-0.1420***	-0.0580***	-0.0070***	0.1215***	0.0156
03:00 PM - 03:15 PM	649,652	-0.0007	-0.0190***	0.0343***	0.8515***	-0.0096***	0.1371***	0.0940
03:15 PM - 03:30 PM	676,752	-0.0011	-0.0119***	0.0099***	0.0062**	-0.0098***	0.1345***	0.0038
03:30 PM - 03:45 PM	839,375	-0.0013	0.0389***	-0.0357***	-0.0097	-0.0125***	0.1409***	0.0063
03:45 PM - 04:00 PM	1,284,644	-0.0004	0.0248***	-0.0374***	-0.0057	-0.0080***	0.1234***	0.0031
Post-market	395,656	-0.0405***	0.0612***	0.0115***	-0.0023	-0.0244***	0.3626***	0.0050

CHAPTER 3: CEO VS. PRESIDENT—MARKET PERCEPTION OF CROSS-BORDER M&A ANNOUNCEMENT BASED ON INSIDER TRADING

I. Introduction

The information hierarchy hypothesis explains that the quality of information possess by the insiders depends on their role within the firm (Nunn, Madden, and Gombola, 1983; Seyhun 1986). At the bottom of the corporate pyramid, large shareholders' trades are the least informative. Above the larger shareholders are the directors and officers, who are largely more informed and on average earn higher returns than the large shareholders. At the apex, the top executives, who account for approximately a quarter of insider trades, earn the highest return of all insiders. These top insiders earn five percent return over a twelve-month period, and their profitability is seven times that of the large shareholders (Seyhun 2000).

Considering that the top executives are more informed than the others, their trades may have stronger signaling power to outsiders. In my study, I look at how insider transactions, specifically the trading activities of the CEO and president, prior to merger and acquisition (M&A) announcement can impact the post-announcement return. This research is an empirical test of the information hierarchy hypothesis examining the insiders at the very top of the corporate pyramid. Is there a difference in signaling power between the two titans—the CEO and the president? M&A announcements provide a good environment to study top insider trading signals because of the chatter and rumors surrounding the event. It has been documented that talks of M&A start six months prior to the announcement (Agrawal and Nasser 2012). During this period, interested parties will

seek information, and they may look to the CEO and president for signals because insider purchases usually result in positive abnormal returns (Lin and Howe 1990; Chang and Suk 1998).

My study is different from the existing literature in two main aspects. First, my research looks at the insiders of the *acquirers* while prior research largely focuses on the insiders of the *target* firms. Agrawal and Jaffe (1995) examine the effectiveness of the SEC Rule 16-b short-swing rule, which states that all profits must be returned to the firm if the trades were executed six months before the announcement of a material event. They find that the *target* insiders' purchases dropped significantly six months before the merger announcement. Jabbour, Jalilvand, and Switzer (2000) find that *target* firm's abnormal return before merger announcements is due to insider trading. In Agrawal and Nasser (2012), they find that *target* insiders use a passive, net purchasing strategy before takeover announcements, and the directors' and officers' level of passive net purchases increase by 50% during the six-month, pre-announcement period.

I focus on the acquirers rather than the targets to provide insights into the trading behavior of the executives, who are responsible for the M&A from inception to completion. The acquirer executives are the people who establish the motives for the transaction, select the target, estimate target value, choose the method of payment, and ensure the success of the company after the merger or acquisition. Therefore, their pre-announcement trades would have more information relative to those of the target executives considering that the acquirer executives do most of the pre-announcement planning. I also focus on the acquirers because most target executives leave the organization within one year of the completion of the M&A (Hartzell, Ofek, and Yermack 2004). They also find that the half

of the target CEOs do not become officers of the acquiring firm and very few become top executives. Only 15 target CEOs out of 311 become the presidents in the acquiring firm. By examining the acquirer executives, I am avoiding potential biases from the target executives' exit strategy.

Secondly, my study differs from the prior research because I examine trades by both the CEO and the president. This delineation is important because these top insiders play different roles within the corporation. In most cases, the CEO is the highest ranking officer in the company and the president is second in command. The CEO is responsible for the strategies and visions of the firm. The president manages the day-to-day operations—setting goals, developing policies, and monitoring performance. In a merger, both of the acquirer CEO and president are needed to ensure the transaction will be successful. Nevertheless, the spotlight is mostly on the CEO as shown by the prior literature. Researchers have looked at personal characteristics of CEOs related to M&A. Rovenpor (1993) explains that CEOs who believe that bigger is better, who need power, and are self-confident, are more likely to engage in M&A activities. Malmendier and Tate (2008) find that overconfident CEOs overpay for target firms, and Lehn and Zhao (2006) find that CEOs who make bad acquisitions are more likely to be replaced within five years. Researchers also look at the positive effects of mergers on CEO compensation (Bliss and Rosen 2001), the positive relationship between CEO age and the likelihood of making diversifying acquisitions (Serfling 2014), and the positive impact of CEO network on M&A (El-Khatib, Fogel, and Jandik 2015). Considering that the president is as involved in M&A activities, he deserves some of the spotlights as well, and it would be interesting to find that investors value the president net purchases over those of the CEO. The results

could provide evidence for or against the information hierarchy hypothesis at the top of the corporate pyramid. To my knowledge, this comparison between the CEO and president has not been analyzed.

In the study, I find that CEO net purchases before the announcement are mostly ignored, and net purchases made by the president during the six months before the announcement have more impact on post-announcement returns. These results suggest that the market values the trading signals of the president more than the CEO's, perhaps, because of his hands-on experience and knowledge of the specific division within the corporation involved in the merger. My study also provides additional insight on CEO-president duality. The trades of a president who is also the CEO of the firm have either negative effects or no significant impact on the post-announcement returns. However, the net purchases of a president who does not concurrently hold the CEO title have the strongest positive impact. My findings are consistent with the existing literature that executive duality have negative effects on the firm. Harris and Helfat (1998) relate that a CEO, who is also the Chair of the Board and president tend to have poor succession planning and does not have the ability to guide the firm successfully after the incumbent chief executive leaves. Worrell, Nemec, and Davidson (1997) find that when a firm has a CEO with all three titles the firm stock performance suffers.

II. Literature Review

The existing literature on M&A examines stock returns around the announcement time and concludes that overall acquiring firms do not benefit from their acquisitions. King, Dalton, Daily, and Covin (2004) and Moeller, Schlingemann, and Stulz (2005) find

negative cumulative abnormal returns (CARs) for acquirers and positive CARs for targets. Similarly, Hackbarth and Mrellec (2008) find that the 3-day CARs using a 90-day estimation window around the announcement date for acquirers and targets are -0.52% and 18.21%, respectively. Both CARs are significant at the 1% level.

However, in cross-border mergers, there is mix evidence of abnormal returns. Bris and Cabolis (2008) find significant buy-and-hold abnormal returns in cross-border M&A. However, the results are not as robust showing a positive buy-and-hold median abnormal return and a negative buy-and-hold mean abnormal return. Additionally, Aybar and Ficici (2009) examine 433 cross-border merger announcements from 58 emerging-market multinationals (EMM) in Asia, Latin America, and Europe. Using different event windows, the authors find that the mean CAR for the acquirer ±1 day from the announcement is -0.09% and significant at the 5% level. They find that this value destruction comes from acquiring targets in the same industry. These firms did not reap the benefits of diversification. Conversely, Gubbi, Aulakh, Ray, Sarkar, and Chittoor (2010) find that all cross-border M&A have an average CAR of 2.58% using an 11-day window. They argue that emerging firms benefit from cross-border M&A especially with targets in developed economies because of better capabilities and higher quality of resources. These tangible and intangible advantages take time to develop, so emerging firms are better off acquiring these resources.

Since there is such ambiguity in returns for cross-border mergers, investors may turn to registered insiders for trading signals. Prior research shows that insider transactions around mergers provide valuable information to investors. Keown and Pinkerton (1981) explore the information leakage of impending M&A. They explain that twelve days before

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the first announcement insider trading behavior exhibits nonrandom patterns at the 2% significance level. Using a testing window of (-18, 10), they find a CAR of 27.042% with 93% of the return cumulated up to the day of the announcement. Overall, they find a significant CAR for target firms around announcement time. They argue that the significant and abnormal CAR is the result of the poorly kept M&A secrets. Then, in Agrawal and Jaffe (1995), they examine the effects of Section 16b of the Securities Exchange Act, which discourage managers from trading on private information before M&A, on the target firm's insider trading pattern. They find that insider purchases decrease significantly before the announcement although pre-announcement sales do not decrease. Meanwhile, the firm experience 11.75% abnormal return over months (-3, 0). Comparing the results of Keown and Pinkerton (1981) with that of Argawal and Jaffe (1995), it is clear that the insider's restraint is due largely to the effective enforcement of insider trading regulations. In a following paper, Agrawal and Nasser (2012) explain that insiders of 3700 targets reduce their purchases below normal levels and decrease their sales even more. This passive trading strategy leads to a 50% increase in dollar value of net purchases for targets' officers and directors in the 6-month pre-announcement period. Again, the passive trading strategy is evidence of effective enforcement of insider trading regulations.

Jabbour, Jalilvand, and Switzer (2000) describe the relationship between pre-bid price run-ups in target share prices and insider trading. They explain that the run-ups before the announcement are largely due to insider trading. However, the immediate run-ups are associated with the market excitement associated with takeover threats. With an estimation window of (-255, -80) and event window of (-60, 25) the authors find a CAAR of 14.05%. Similar to previous studies, they find insider net selling around the time of the

announcement. Luo (2005) find that insiders gauge the market reaction to complete M&A. The deals are more sensitive to the market's opinion when the company announces before signing a definitive contract, the companies are not in the high-tech industries, and the companies are small or mid-cap. Fidrmuc, Goergen, and Renneboog (2006) study the U.K. market reaction to insider transactions around announcements, including M&A. Insider buys and sales trigger a 3.12% and -0.37% 2-day returns. The higher the number of insiders participating in trading before the announcement the stronger the impact. They find no information hierarchy, which means the CEO does not have superior information relative to a blockholder. Acharya and Johnson (2010) construct models to measure the likelihood of insider activity before private-equity buyout bid announcement. Under lax regulations, the higher the number of insiders the higher the level of insider trading.

III. Hypotheses

The information hierarchy hypothesis explains that top executive trades have more information than those of all others (Seyhun 1986, 2000). If the hypothesis proves true, then CEO net purchases should have the most impact on the post-announcement return (H1). The CEO is the highest ranking officer and can make strategic changes. Therefore, it would not be surprising if the CEO trading activities are closely monitored and followed by investors, especially around corporate announcements that can change the future of the company.

Similarly, the president of the firm has broad control over the daily operations and is in-tune with the business. Hence, the president net purchases should also have a significant impact on post-announcement stock return albeit not as strong as the CEO's

(H2). If investors pay more attention to the president than the CEO, it would imply that they value insights from the executive with more hands-on experience working with suppliers and customers. It would also suggest that the information hierarchy hypothesis does not hold at the very top of the corporate ladder.

Finally, in some firms, the roles between the CEO and president are merged where one person assumes both titles. In this CEO-president duality scenario, the net purchases by the CEO-president should have a profound impact on the post-announcement return (H3). After all, this person makes the strategic decision to merge and ensures that the target is folded into the firm without impacting the current businesses.

IV. Data

To test my hypotheses, I use several data sources. The merger data come from the Securities Data Company. Insider trading from Thomson Reuters and pricing data from CRSP. The sample contains more than 10,300 cross-border mergers of 2,051 acquirers from 1986 to 2014. Approximately, 91.97 percent of the mergers are friendly. Less than one percent is unsolicited or of a hostile nature. On average, these acquirers seek 87 percent of the target and acquire 82.5 percent. The top ten target countries are United Kingdom, Canada, Germany, France, Australia, India, Italy, Brazil, China, and Mexico. In total, they make up 64 percent of the sample M&A announcements as shown in Figure 3-1.

V. Findings

Since 1986, U.S. firms are increasingly looking outside the border for valuable targets. The percentage of cross-border mergers has climbed steadily from four percent of mergers to as high as 24 percent in 2013 shown in Figure 3-2. In contrast, domestic mergers

have gone down from 96 percent to as low as 76 percent. This difference highlights the importance of the changing M&A environment. As cross-border mergers grow in importance so do their impact on the stock market. Besides its increasing popularity, I also chose to study insider trading around cross-border mergers because of the added risk factors, ranging from political to cultural issues. Despite the challenges faced by the acquirer, it appears that cross-border mergers do not always result in negative returns. Table 3-1 shows the cumulative average abnormal returns of cross-border and domestic mergers. As reported in the table, domestic mergers tend to result in significant losses for the acquirer. Conversely, in cross-border mergers, the CAARs are not so clear. There are both positive and negative returns with varying levels of significance. Additionally, around cross-border mergers CEO and president trading patterns seem to differ. The CEOs are net sellers while the presidents are net buyers during the twelve months around the announcement. Hence, cross-border mergers provide an interesting testing environment for the impact of insider trading on post-announcement returns.

In my assessment of insider trading impact on post-announcement returns, I estimated several models. The first set of models evaluation the trades of the president and CEO. The control variables for all models are the net purchases of all insiders, the Fama-French three factors plus momentum, year dummies, and industry dummies. Table 3-2 reports the regression results for all seventeen models. Model 1 – 4 look at the president net purchases during the months prior to the announcements. The results show that the president net purchases during months [-3, 0] and [-6, -3] have significant and positive impact on the post-announcement return. Economically, for every one percent increase in

net purchases by the president during months [-3, 0] and [-6, -3], the three-month, post-announcement return increases by 3.44%** and 4.96%***, respectively.

When I look at the CEO trades impact in Model 5 – 8, I see that CEO trades during months [-3, 0] relative to the announcement have a negative but insignificant impact on the post-announcement return. During months [-6, -3], president net purchases actually increase return. A one percent increase in CEO net purchases can increase return by 3.71%***. CEO trades during months [-9, -6] have negative, but insignificant impact similar to the three months prior to the announcement. Months [-12, -9] positively influence return but the impact in insignificant. Overall, CEO impact on return is rather inconsistent and not as strong as the president's. In Model 9-16, the president and CEO trades are controlled by the trades of all insiders during the twelve months prior to the announcement. Even with these added variables, the president net purchases are still significant. A one percent increase in the president net purchases during months [-3, 0], [-6, -3], and [-12, -9] can increase the post-announcement return by 4.47%**, 8.40%***, and 3.38%*, respectively. In contrast, when the net purchases of all insiders are added to the models, the impact of CEO net purchases during months [-6, -3] appears to reduce in magnitude from the initial 3.71%*** to 2.87%*. Not only is there a reduction of almost one percent but also a reduction in significance level. Again, similar to the findings in Model 1 – 4, president trades are largely still significant. Finally, in Model 17, I evaluate the net trading of all players. It appears that the president net purchases during the six months prior to the announcement can increase the post-announcement return by 5.18%** in months [-3, 0] and 8.50%*** in months [-6, -3]. A one percent increase in the CEO net purchases during the three-months prior to the announcement can reduce return by 3.50%*. Overall, there is

evidence that the market response positively to the net purchases by the president, especially when these trades are executed during a time that these top executive are subjected to the SEC six-month, short-swing profit rule.

Table 3-3 reports the impact of insider trading on the six-month, post-announcement returns. Using the same models, I find that the president net purchases have significant and positive impact on returns. A one percent increase in net purchases by the president can increase return by 6.13%** during months [-3, 0] and 11.13%*** during months [-6, -3]. It appears that the president trades during months [-9, -6] have a negative impact on return. I argue that these trades fall outside of the SEC short-swing, six-month period, and, hence, the market does not trust signals from these transactions. On the other hand, the CEO trades appear to have a negative no impact on return.

In summary, Table 3-2 and 3-3 show that the president net purchases can significantly impact post-announcement returns, and the CEO trades are mostly ignored by the market. These findings support the idea that investors value the signals from the insiders with the most hands-on experience in running the company. Investors will believe in the merger if the president is confident enough to invest his personal assets in the firm.

To answer the question of CEO-president duality, I use a subsample of announcements from firms with CEO-president executives. Table 3-4 present the impact of trades by these top insiders holding two titles. It appears that their trades do not impact the post-announcement return. This finding implies that the market does not believe a CEO-president can successfully merge two companies. Even when these dual insiders buy

more shares of the firm before the announcement, the market does not take the signals as credible.

Table 3-5 reports the impact of the trades of CEOs (presidents) who are not presidents (CEOs)—no duality effects. In this subsample, the executive roles are clearly separated. In this case, I find that the president net purchases can increase the three-month and six-month post-announcement returns. A one percent increase in the president net purchases during months [-3, 0] can increase the three- and six-month return by 5.57%** and 6.71%*, respectively. A one percent increase in the president net purchases during months [-6, -3] can increase the three- and six-month return by 8.12%*** and 13.00%***, respectively. Conversely, the CEO net purchases during the three months prior to the announcement can reduce the three- and six-month return by 3.59%* and 5.10%*.

To check the robustness of my conclusion that the president net purchases have a significant and positive impact on post-announcement return, I divide the full sample of announcements based on post-merger performance to make sure that there are no endogeneity issues between successful mergers and president net purchases. A merger is considered successful if it results in a positive one-year cumulative abnormal return using the Fama-French plus momentum risk model. Similarly, if the merger results in a negative one-year cumulative abnormal return, then it is categorized as an unsuccessful merger.

Table 3-6 shows the effects of the president net purchase on a successful merger. It appears that the president net trades during months [-6, -3] have a significant and positive impact on the post-announcement return. A one percent increase in net purchases can increase post-announcement return by 15.97%**, which is economically significant as

well. Contrastingly, the CEO net purchases do not impact return. In Table 3-7, I provide evidence that even around a bad merger the president net purchases have a positive and significant impact on return. In an unsuccessful merger, a one percent increase in the president net purchases can increase post-announcement return by 20.99%*** during months [-12, -9] and by 9.05%* during the three months prior to the announcement. It appears that the market perceives the president net purchases as positive signals regardless if the merger actually results in a good or bad transaction.

VI. Conclusion

Around cross-border mergers, it appears that the top executive with the most influence on the post-announcement return is the president of the company, not the CEO. This finding supports the semi-strong form of the insider information hierarchy hypothesis. My research also explains that CEO-president duality may not be beneficial to the firm going through a merger. Investors prefer executives with clearly delineated sets of responsibilities, and they are more confident in the merger if the president is willing to invest his personal assets in the firm's stocks.

Figure 3-1
Top Ten Cross-Border Target Counties

The graph shows the percentages of cross-border and domestic M&A in my sample from 1986 to 2014. Our
M&A data come from the Securities Data Company.

Target Nations	Frequency	Percent	Cumulative Frequency	Cumulative Percent
United Kingdom	1,961	17	1,961	17
Canada	1,422	12	3,383	29
Germany	882	8	4,265	37
France	661	6	4,926	43
Australia	536	5	5,462	47
India	405	4	5,867	51
Italy	397	3	6,264	54
Brazil	391	3	6,655	58
China	355	3	7,010	61
Mexico	335	3	7,345	64
Other Countries	4,190	36	11,535	100

TARGET NATIONS

United Kingdom 17%
Canada 12%
Germany 8%
France 6%
Australia 5%
India 4%
Italy 3%
Brazil 3%
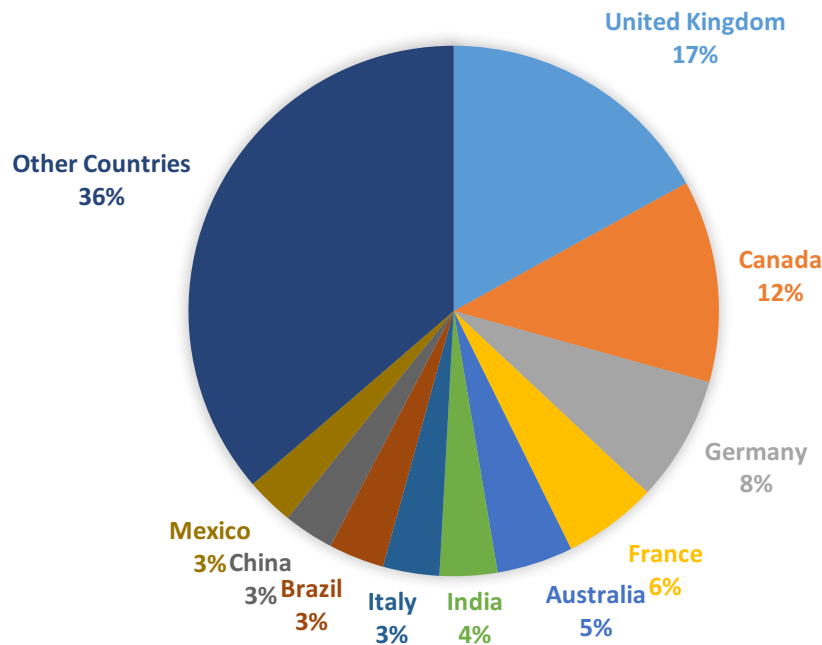China 3%
Mexico 3%
Other Countries 36%

Figure 3-2
Cross-border and Domestic M&A from 1986-2014

The graph shows the percentages of cross-border and domestic M&A in my sample from 1986 to 2014. Our M&A data come from the Securities Data Company.
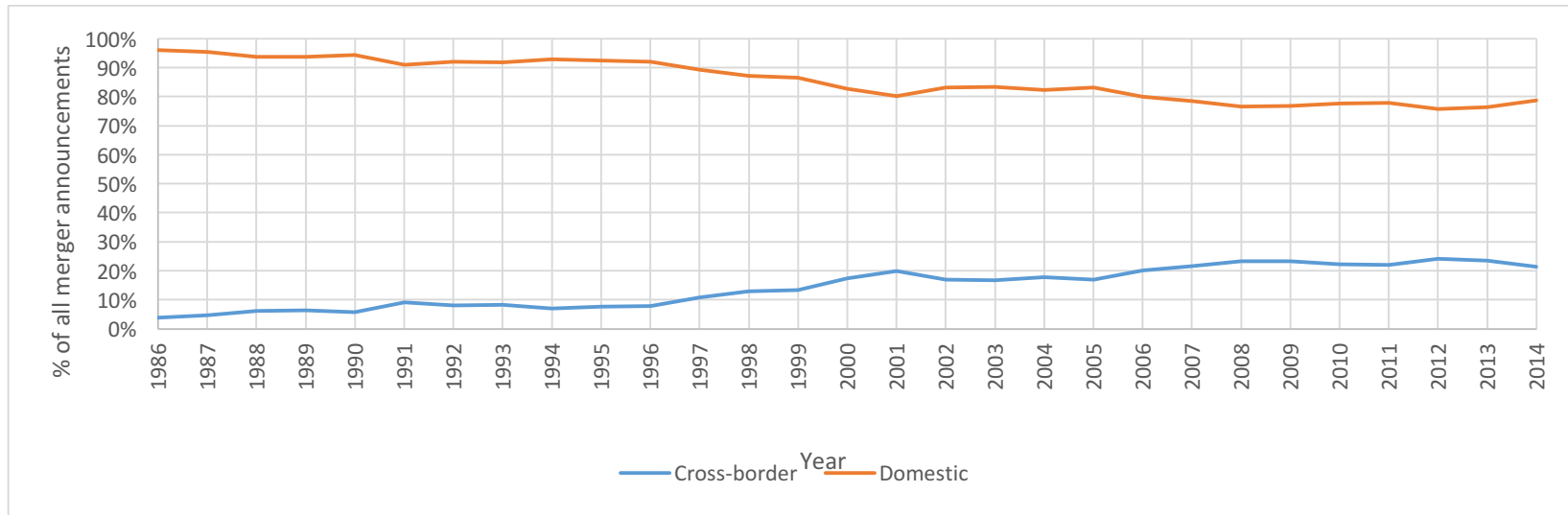
Table 3-1

Cumulative Average Abnormal Returns

The table shows the cumulative average abnormal return for domestic and cross-border M&A. I examine both monthly and daily CAARs. In the monthly CAARs, the estimation period ends seven months before the announcement date with a minimum estimation length of three months and a maximum of 12 months. In the daily CAARS, the estimation period ends 181 days before the announcement date with a minimum estimation length of three days and a maximum of 360 days. For the testing periods, I use several windows based on the short seller and insider trading patterns on a monthly basis. I also include testing periods from existing research on M&A and insider trading. The testing period of the 6-month pre-announcement period is similar to that of Agrawal and Nasser (2012). The event window of (-60, 25) comes from Jabbour, Jalilvand, and Switzer (2000). Keown and Pinkerton (1981) use the testing windows of (-18, 10) and (-10, 0) to measure the effects of information leakage around the announcement. Hackbarth and Mrellec (2008) and Aybar and Ficici (2009) both use a 3-day testing period to study the impacts of the announcement. ***, **, * stand for statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Monthly CAARs for domestic and cross-border M&A

Testing Windows	Domestic M&A	Cross-border M&A	All M&A
[-6, -3]	-2.09%***	-0.78%	-1.80%***
[-3, 0]	-1.96%***	0.40%	-1.45%***
[0, +3]	-3.37%***	-1.85%**	-3.04%***
[+3, +6]	-1.45%**	1.55%*	-0.79%*
[+6, +9]	2.09%***	0.24%	1.68%***
[+9, +12]	0.64%	-0.73%	0.34%

Panel B: Daily CAARs for domestic and cross-border M&A

Testing Windows	Domestic M&A	Cross-border M&A	All M&A
[-180,0]	-3.62%***	1.30%	-2.57%***
[-60,+25]	-1.63%**	1.05%	-1.06%*
[-18,+10]	-0.77%*	0.49%	-0.50%
[-12,0]	0.10%	-0.02%	0.08%
[-1,+1]	0.83%***	-0.08%	0.63%***
[-40,+5]	-0.39%	0.77%	-0.15%

Table 3-2
President and CEO Trading Impact on Three-Month, Post-Announcement Return for Cross-Border Mergers

This table reports the impact of the president and CEO trading on the three-month post-announcement stock return. *President [-3, 0]* is the net shares traded by the president of the firm during the three months before the announcement. *President [-6, -3]* is the net shares traded by the president of the firm during the month -6 to -3 relative to the announcement. *President [-9, -6]* is the net shares traded by the president of the firm during the month -9 to -6 relative to the announcement. *President [-12, -9]* is the net shares traded by the president of the firm during the month -12 to -9 relative to the announcement. *CEO [-3, 0], CEO [-6, -3], CEO [-9, -6],* and *CEO [-12, -9]* are the CEO net trading during the months around the announcement. *All Insiders [-3, 0], All Insiders [-6, -3], All Insiders [-9, -6],* and *All Insiders [-12, -9]* are the net insider trading by all insiders during the months around the announcements. ***, **, * stand for statistical significance at the 1%, 5%, and 10% level, respectively.

N=6,261	Model 1	Model 2	Model 3	Model 4
President [-3,0]	0.0344**			
President [-6,-3]		0.0496***		
President [-9,-6]			-0.0065	
President [-12,-9]				0.0179
MKTRF	0.8184***	0.8555***	0.8497***	0.8619***
SMB	0.4430***	0.4399***	0.3709***	0.4175***
HML	0.1904*	0.2927***	0.2595**	0.2829***
UMD	0.0700	0.0849	0.0882	0.1140*
Year Dummies	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes
Intercept	0.1906	0.2933*	0.3009*	0.3271*
Adjusted R-Square	0.1349	0.1447	0.1311	0.1346

N=6,202	Model 5	Model 6	Model 7	Model 8
CEO [-3,0]	-0.0094			
CEO [-6,-3]		0.0371**		
CEO [-9,-6]			-0.0199	
CEO [-12,-9]				0.0014
MKTRF	0.8204***	0.8534***	0.8490***	0.8633***
SMB	0.4402***	0.4368***	0.3727***	0.4152***
HML	0.1898*	0.2890***	0.2582**	0.2820***
UMD	0.0675	0.0828	0.0877	0.1149*
Year Dummies	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes
Intercept	0.1908	0.2939*	0.3014*	0.3278*
Adjusted R-Square	0.1342	0.1442	0.1313	0.1344

N=4,988	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14	Model 15	Model 16	Model 17
President [-3,0]	0.0447**								0.0518**
President [-6,-3]		0.0840***							0.0850***
President [-9,-6]			-0.0155						-0.0359
President [-12,-9]				0.0338*					0.0358*
CEO [-3,0]					-0.0117				-0.0350*
CEO [-6,-3]						0.0287*			-0.0031
CEO [-9,-6]							-0.0144		0.0011
CEO [-12,-9]								0.0033	-0.0136
All Insiders [-3,0]	0.0049	0.0096*	0.0090*	0.0092*	0.0105*	0.0089*	0.0091*	0.0091*	0.0091*
All Insiders [-6,-3]	0.0067	-0.0014	0.0067	0.0067	0.0066	0.0037	0.0067	0.0067	-0.0013
All Insiders [-9,-6]	-0.0026	-0.0033	-0.0016	-0.0029	-0.0029	-0.0030	-0.0013	-0.0029	0.0001
All Insiders [-12,-9]	-0.0075	-0.0069	-0.0074	-0.0105	-0.0072	-0.0077	-0.0074	-0.0078	-0.0084
MKTRF	0.8620***	0.8718***	0.8649***	0.8624***	0.8646***	0.8642***	0.8633***	0.8642***	0.8703***
SMB	0.4665***	0.4618***	0.4592***	0.4635***	0.4635***	0.4603***	0.4628***	0.4631***	0.4590***
HML	0.2712**	0.2809**	0.2726**	0.2733**	0.2760**	0.2726**	0.2734**	0.2736**	0.2823**
UMD	0.0709	0.0768	0.0743	0.0711	0.0721	0.0716	0.0728	0.0720	0.0804
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Intercept	0.2322	0.2165	0.2322	0.2375*	0.2326	0.2280	0.2316	0.2337	0.2145
Adjusted R-Square	0.1448	0.1474	0.1440	0.1444	0.1439	0.1443	0.1440	0.1438	0.1484

Table 3-3
President and CEO Trading Impact on Six-Month,
Post-Announcement Stock Return for Cross-Border Mergers

This table reports the impact of the president and CEO trading on the six-month post-announcement stock return. *President [-3, 0]* is the net shares traded by the president of the firm during the three months before the announcement. *President [-6, -3]* is the net shares traded by the president of the firm during the month -6 to -3 relative to the announcement. *President [-9, -6]* is the net shares traded by the president of the firm during the month -9 to -6 relative to the announcement. *President [-12, -9]* is the net shares traded by the president of the firm during the month -12 to -9 relative to the announcement. *CEO [-3, 0]*, *CEO [-6, -3]*, *CEO [-9, -6]*, and *CEO [-12, -9]* are the CEO net trading during the months around the announcement. *All Insiders [-3, 0]*, *All Insiders [-6, -3]*, *All Insiders [-9, -6]*, and *All Insiders [-12, -9]* are the net insider trading by all insiders during the months around the announcements. ***, **, * stand for statistical significance at the 1%, 5%, and 10% level, respectively.

N=4,988	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
President [-3,0]	0.0442								0.0613**
President [-6,-3]		0.0986***							0.1113***
President [-9,-6]			-0.0486						-0.0700**
President [-12,-9]				0.0091					0.0235
CEO [-3,0]					-0.0280				-0.0516*
CEO [-6,-3]						0.0258			-0.0098
CEO [-9,-6]							-0.0330		0.0024
CEO [-12,-9]								-0.0241	-0.0323
All Insiders [-3,0]	0.0005	0.0052	0.0044	0.0046	0.0080	0.0044	0.0047	0.0045	0.0058
All Insiders [-6,-3]	0.0133*	0.0039	0.0133*	0.0134*	0.0132	0.0106	0.0134	0.0135*	0.0036
All Insiders [-9,-6]	-0.0055	-0.0063	-0.0016	-0.0057	-0.0056	-0.0058	-0.0022	-0.0056	0.0001
All Insiders [-12,-9]	0.0002	0.0009	0.0002	-0.0006	0.0007	0.0000	0.0002	0.0030	0.0028
MKTRF	0.4562***	0.4673***	0.4603***	0.4579***	0.4592***	0.4583***	0.4562***	0.4590***	0.4694***
SMB	-0.0835	-0.0885	-0.0989	-0.0869	-0.0859	-0.0894	-0.0874	-0.0873	-0.0980
HML	-0.7694***	-0.7585***	-0.7704***	-0.7669***	-0.7616***	-0.7679***	-0.7676***	-0.7651***	-0.7542***
UMD	-0.3498***	-0.3431***	-0.3415***	-0.3490***	-0.3486***	-0.3491***	-0.3469***	-0.3485***	-0.3334***
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Intercept	0.4722	0.4536	0.4703	0.4743	0.4718	0.4684	0.4697	0.4684	0.4425
Adjusted R-Square	0.1668	0.1687	0.1669	0.1663	0.1666	0.1665	0.1666	0.1665	0.1698

Table 3-4
CEO-President Duality Trading Impact on Post-Announcement Stock Return

This table reports the impact of trades by CEOs that are also presidents of the company on the three- and six-month, post-announcement stock return. *CEO/president [-3, 0], CEO/president [-6, -3], CEO/president [-9, -6],* and *CEO/president [-12, -9]* are the *CEO/president* net trading during the months around the announcement. *All Insiders [-3, 0], All Insiders [-6, -3], All Insiders [-9, -6],* and *All Insiders [-12, -9]* are the net insider trading by all insiders during the months around the announcements. N is the number of announcements. ***, **, * stand for statistical significance at the 1%, 5%, and 10% level, respectively.

	N= 841	N= 841
	Three-Month Return	Six-Month Return
CEO/president [-3,0]	0.0277	-0.0067
CEO/president [-6,-3]	0.0521	-0.0092
CEO/president [-9,-6]	-0.0083	-0.0122
CEO/president [-12,-9]	0.0266	-0.0397
All Insiders [-3,0]	0.0125	0.0297
All Insiders [-6,-3]	0.0112	0.0363*
All Insiders [-9,-6]	-0.0180	-0.0026
All Insiders [-12,-9]	-0.0095	-0.0157
MKTRF	0.7539***	0.4571
SMB	0.4599*	-0.1064
HML	0.9440***	0.0714
UMD	0.4931***	-0.0799
Year Dummies	Yes	Yes
Industry Dummies	Yes	Yes
Intercept	0.1472	0.2839
Adjusted R-Square	0.1279	0.1579

Table 3-5
CEO-President Non-Duality Trading Impact on Post-Announcement Stock Return

This table reports the impact of trades of CEOs (presidents) that are not presidents (CEOs) of the firm on the three- and six-month, post-announcement stock return. *President [-3, 0]* is the net shares traded by the president of the firm during the three months before the announcement. *President [-6, -3]* is the net shares traded by the president of the firm during the month -6 to -3 relative to the announcement. *President [-9, -6]* is the net shares traded by the president of the firm during the month -9 to -6 relative to the announcement. *President [-12, -9]* is the net shares traded by the president of the firm during the month -12 to -9 relative to the announcement. *CEO [-3, 0], CEO [-6, -3], CEO [-9, -6],* and *CEO [-12, -9]* are the CEO net trading during the months around the announcement. *All Insiders [-3, 0], All Insiders [-6, -3], All Insiders [-9, -6],* and *All Insiders [-12, -9]* are the net insider trading by all insiders during the months around the announcements. N is the number of announcements. ***, **, * stand for statistical significance at the 1%, 5%, and 10% level, respectively.

	N=4,136	N=4,136
	Three-Month Return	Six-Month Return
President [-3,0]	0.0557**	0.0671*
President [-6,-3]	0.0812***	0.1300***
President [-9,-6]	-0.0315	-0.0780**
President [-12,-9]	0.0341	0.0317
CEO [-3,0]	-0.0359*	-0.0510*
CEO [-6,-3]	0.0111	0.0185
CEO [-9,-6]	-0.0047	-0.0081
CEO [-12,-9]	-0.0099	-0.0221
All Insiders [-3,0]	0.0070	0.0014
All Insiders [-6,-3]	-0.0037	-0.0033
All Insiders [-9,-6]	0.0034	0.0019
All Insiders [-12,-9]	-0.0081	0.0055
MKTRF	0.8740***	0.4557***
SMB	0.4508***	-0.1059
HML	0.1309	-0.9069***
UMD	-0.0460	-0.3937***
Year Dummies	Yes	Yes
Industry Dummies	Yes	Yes
Intercept	0.1607	0.2372
Adjusted R-Square	0.1635	0.1842

Table 3-6
President and CEO Impact on Successful Mergers

This table reports the impact of the CEO and president net purchases on the three-month, post-announcement stock return. *President [-3, 0]* is the net shares traded by the president of the firm during the three months before the announcement. *President [-6, -3]* is the net shares traded by the president of the firm during the month -6 to -3 relative to the announcement. *President [-9, -6]* is the net shares traded by the president of the firm during the month -9 to -6 relative to the announcement. *President [-12, -9]* is the net shares traded by the president of the firm during the month -12 to -9 relative to the announcement. *CEO [-3, 0], CEO [-6, -3], CEO [-9, -6],* and *CEO [-12, -9]* are the CEO net trading during the months around the announcement. *All Insiders [-3, 0], All Insiders [-6, -3], All Insiders [-9, -6],* and *All Insiders [-12, -9]* are the net insider trading by all insiders during the months around the announcements. N is the number of announcements. ***, **, * stand for statistical significance at the 1%, 5%, and 10% level, respectively.

N=345	Model 1	Model 2	Model 3	Model 4
President [-3,0]	-0.0019			
President [-6,-3]		0.1495*		
President [-9,-6]			0.0195	
President [-12,-9]				-0.0200
All Insiders [-12,0]	Yes	Yes	Yes	Yes
MKTRF, SMB, HML, UMD	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes
Intercept	0.0907	0.0909	0.0908	0.0896
Adjusted R-Square	0.2154	0.2251	0.2157	0.2156

N=345	Model 5	Model 6	Model 7	Model 8	Model 9
President [-3,0]					0.0227
President [-6,-3]					0.1597**
President [-9,-6]					0.0291
President [-12,-9]					-0.0296
CEO [-3,0]	-0.0919				-0.1105
CEO [-6,-3]		-0.0661			-0.0743
CEO [-9,-6]			-0.0307		-0.0351
CEO [-12,-9]				-0.0171	0.0037
All Insiders [-12,0]	Yes	Yes	Yes	Yes	Yes
MKTRF, SMB, HML, UMD	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes
Intercept	0.0801	0.0874	0.0885	0.0901	0.0718
Adjusted R-Square	0.2214	0.2172	0.2161	0.2156	0.2182

Table 3-7
President and CEO Impact on Unsuccessful Mergers

This table reports the impact of the CEO and president net purchases on the three-month, post-announcement stock return. *President [-3, 0]* is the net shares traded by the president of the firm during the three months before the announcement. *President [-6, -3]* is the net shares traded by the president of the firm during the month -6 to -3 relative to the announcement. *President [-9, -6]* is the net shares traded by the president of the firm during the month -9 to -6 relative to the announcement. *President [-12, -9]* is the net shares traded by the president of the firm during the month -12 to -9 relative to the announcement. *CEO [-3, 0], CEO [-6, -3], CEO [-9, -6],* and *CEO [-12, -9]* are the CEO net trading during the months around the announcement. *All Insiders [-3, 0], All Insiders [-6, -3], All Insiders [-9, -6],* and *All Insiders [-12, -9]* are the net insider trading by all insiders during the months around the announcements. N is the number of announcements. ***, **, * stand for statistical significance at the 1%, 5%, and 10% level, respectively.

N=382	Model 1	Model 2	Model 3	Model 4
President [-3,0]	0.0913*			
President [-6,-3]		0.0430		
President [-9,-6]			-0.0248	
President [-12,-9]				0.1670***
All Insiders [-12,0]	Yes	Yes	Yes	Yes
MKTRF, SMB, HML, UMD	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes
Intercept	0.0652*	0.0674*	0.0643*	0.0784**
Adjusted R-Square	0.3041	0.0200	0.2979	0.3149

N=382	Model 5	Model 6	Model 7	Model 8	Model 9
President [-3,0]					0.0905*
President [-6,-3]					0.0671
President [-9,-6]					-0.0572
President [-12,-9]					0.2099***
CEO [-3,0]	0.0650				0.0431
CEO [-6,-3]		-0.0072			0.0018
CEO [-9,-6]			-0.0776*		-0.0478
CEO [-12,-9]				-0.0170	-0.0904
All Insiders [-12,0]	Yes	Yes	Yes	Yes	Yes
MKTRF, SMB, HML, UMD	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes
Intercept	0.0745*	0.0656*	0.0648*	0.0665*	0.0808**
Adjusted R-Square	0.3003	0.2973	0.3032	0.2974	0.3226

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