Do Fund Managers Manipulate Share Prices? Evidence from Their Daily Trades[*]

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This Draft: February 2009

Abstract

Institutional investors display abnormally high buying relative to selling at quarter-end, and especially so at year-end. This imbalance is from depressed selling, not excessive buying. At year end, abnormal buying declines by one standard deviation, while abnormal selling declines by almost two standard deviations. There is no evidence of increased buying pressure in positions that are heavily represented in institutional portfolios. Our findings contradict the claim that institutions purposefully buy shares to inflate net asset values at quarter end.

[*] Hu acknowledges support from a Babson Faculty Research Fund award. McLean acknowledges support from the Southam/Edmonton Journal Fellowship Award. Any remaining errors are the authors.

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Carhart, Kaniel, Musto, and Reed (2002) (CKMR hereafter) and Bernhardt and Davies (2005) show that both fund net asset values (NAVs) and the share prices of stocks that are widely held by funds are inflated on quarter-end, and especially on year-end days. The cause of this inflation is widely believed to be price manipulation on the part of fund managers, via the excessive buying of securities, which they already own. For example, in their abstract CKMR interpret their evidence as showing "…mutual fund managers inflate quarter-end portfolio prices with last minute purchases of stocks already held." This practice is commonly referred to as "portfolio pumping" or "tape painting".[1] The incentives for tape painting are described in CKMR, Bernhardt and Davies (2005), Bhattacharyya and Nanda (2008), and Bernhardt, Davies, and Westbrook (2007). These studies build on an older literature, which shows a positive relation between fund performance and subsequent investment flows.[2]

The previous literature on portfolio pumping has relied on mutual fund return data, daily stock return data, and intraday stock return data. Although this data suggests that managers buy stocks to opportunistically inflate portfolio returns, institutional trading data is needed to directly link trading to share price manipulation. In this paper we study whether, and if so how, institutional trading causes quarter-end share price inflation. Our sample

[1] A related, but different practice is known as window dressing. Window dressing involves buying (selling) securities that have performed well (poorly) towards the end of the quarter or year. Window dressing is done to mislead investors, who judge managers based on their portfolios' quarter-end holdings. Papers that study window dressing and its effects on security prices include Haugen and Lakonishok (1988), Lakonishok, Shleifer, Vishny, and Thaler (1991), Chevalier and Ellison (1997), Musto (1997 and 1999), He, Ng, and Wang (2004), Ng and Wang (2004), Morey and O'Neal (2006), and Sias (2007).

[2] Papers by Spitz (1970), Smith (1980), Patel, Zeckhauser, and Hendricks (1991), Kane, Santini, and Aber (1991), and Lakonishok, Shleifer, and Vishny (1992) all find evidence of a positive relation between investment performance and subsequent investment flows, suggesting that managers have an incentive to exaggerate their performances. More recent studies have shown that this performance-flow relation is nonlinear, in that the best performing funds receive especially high flows, whereas poor performing funds do not receive low flows. These studies include Ippolito (1992), Gruber (1996), Chevalier and Ellison (1997), Goetzmann and Peles (1997), and Sirri and Tufano (1998).

spans from 1999 through 2005, and includes the trades of more than 300 institutions in each year. The trades in our sample account for 7% to 10% of the total dollar volume in CRSP in each of the years that we study. We uncover several interesting institutional trading patterns, which are novel to this study.

We show that abnormal levels of institutional trading cause temporary inflations in share prices. We test for these effects with both abnormal levels of buying and abnormal levels of selling. To the best of our knowledge, no other paper has suggested that institutions may be inflating quarter-end prices via depressed selling. We show that stocks with either abnormally high institutional buying, or with abnormally low institutional selling, have prices that are temporarily inflated.

If institutions are inflating prices on quarter-end days, then the amount of buying relative to selling should be especially high on these days. We show that there is an imbalance in the ratio of institutional buying to selling at quarter-end, and especially at year-end, in that the ratio of buys to sells increases sharply on these days. These findings are consistent with the findings in CKMR, who show that quarter-end, and especially year-end fund NAVs are inflated, and contend that these effects are the result of abnormal institutional trading.

We further study what causes these quarter-end trade imbalances: Is buying excessive or is selling depressed? We show that excessive buying is not the cause of this imbalance; abnormal institutional buying is not significantly higher at quarter-end, and declines by a full standard deviation at year-end. We do however find widespread evidence of depressed selling; the magnitude of abnormal selling declines by almost two standard deviations on the last day of the year. Hence our findings suggest that fund NAVs are inflated at quarter-end and year-end primarily due to a lack of selling, rather than a surge in buying. Given that all previous studies in this area have attributed such price inflation to excessive buying, our findings are surprising.

We try to ascertain whether the abnormal trading that we document is intentional price manipulation. Price manipulation on the part of institutional investors can be costly; CKMR note that it might draw attention from regulators, who regard the practice as illegal.[3] Hence we should only expect to observe price manipulation in stocks for which it is likely to yield large benefits. Price manipulation is easier in stocks that are less liquid, so if managers are intentionally manipulating prices, then we should observe greater quarter-end trade imbalances in smaller stocks. Yet we find that quarter-end trade imbalances arise in both large and small stocks, and more consistently in large stocks, as the effect is significant in all of our tests among large stocks, but only in some of our tests among small stocks.

Price manipulation should also be more profitable in stocks that institutions hold large positions in. Therefore, we test whether a stock's weight in an institution's portfolio affects the institution's abnormal trading in that stock at quarter-end. We do not find evidence of excessive buying in heavily-weighted stocks on either quarter-end days, or on year-end days. Year-end selling is depressed in both heavily-weighted and lightly-weighted stocks, but is more depressed in lightly-weighted stocks, so the findings do not suggest that depressed selling is manipulative in nature.

[3] In August of 2001 ABN Amro and Oechsle International Advisors were censured by the SEC for employing a portfolio manager who engaged in portfolio pumping. Each firm was fined $200,000 and the portfolio manager involved in the incident was fined $75,000 and suspended from practice for 12 months. The SEC stated that the portfolio manager had "willfully violated Section 10(b) of the Exchange Act and Rule 10b-5 thereunder, and willfully aided and abetted violations of Sections 206(1) and (2) of the Advisers Act." The SEC administrative proceeding for this matter can be found here: http://www.sec.gov/litigation/admin/34-44679.htm.

Taken in their entirety, our results are broadly consistent with the findings in CKMR; we show that abnormal institutional trading inflates prices, and that there is an increase in the ratio of buys to sells on quarter-end days, and especially on year-end days. However the abnormal trading that we document does not appear to be done in an effort to manipulate share prices, but rather is part of an overall decline in trading activity. This decline most likely reduces the liquidity of stocks held by institutions, which leads to a temporary inflation in prices on these days. Our findings do not rule out the possibility that some managers are intentionally inflating prices; however the average institution does not appear to be engaged in this activity.

The rest of this paper is organized as follows. Section 1 describes our sample and provides some summary statistics. Section 2 describes our main results. Section 3 concludes.

1. Data and Summary Statistics

Our sample consists of transaction-level institutional trading data from a leading execution quality measurement service provider for institutional investors. The data are similar in nature to those used by several other studies on institutional trading, such as Keim and Madhavan (1995), Conrad, Johnson, and Wahal (2001), Jones and Lipson (2001), Goldstein, Irvine, Kandel, and Wiener (2006), Irvine, Lipson, and Puckett (2006), and Lipson and Puckett (2006).

The data cover equity trading transactions made by a large sample of institutions from January 1999 through December 2005. For each transaction, the data include the date of the transaction, the stock traded (identified by both symbols and CUSIPs), the number of shares traded, the dollar principal traded, commissions paid by the institution, and whether the trade is a buy or a sell. The names of the institutions are removed from the data. However, identification codes are provided enabling us to identify each institution separately.

The sample institutions are either investment managers, or plan sponsors. Examples of investment managers are mutual fund families such as Fidelity Investments, Putnam Investments, and Lazard Asset Management. Examples of plan sponsors include the California Public Employees' Retirement System (CalPERS), the Commonwealth of Virginia, and United Airlines.[4] We merge the institutional trading data with the daily CRSP files from which we get information on share prices, number of shares outstanding, share volume, NYSE size breakpoints, and daily returns.

Table 1 provides some descriptive statistics of our sample. In each year we have between 300 and 342 institutions. Table 1 shows that throughout the seven years that our sample covers, the institutions in our sample account for between 7.19% and 10.49% of the total trading volume in CRSP. Table 1 also summarizes trading volume within NYSE size quintiles. We see that the institutions in our sample account for a significant amount of trading in both large and small firms. Throughout our sample period, the percentage of total trading volume done by the institutions in our sample ranges from 4.87% to 10.13% for the smallest size quintile, and 7.63% to 10.49% for the large size quintile. With the larger stocks the percentages have remained relatively flat over the sample period, but with the smaller stocks the percentages have increased from 4.87% in 1999 to 9.94% in 2005.

[4] We did many of the tests reported in this paper for investment managers and plan sponsors separately. The results were similar for the two groups, so we only report results for the full sample.

2. Results

2.1. Does Institutional Trading Inflate Quarter-End Share Prices?

CKMR show that both fund NAVs and the share prices of stocks, which are widely held by funds, are inflated on quarter-end and especially on year-end days. CKMR's evidence strongly suggests that institutional trading is causing the price inflation; however they do not have actual institutional trade data, so they could not show this directly.

In this Section we use our institutional trade data, and directly test whether abnormal institutional trading causes price inflation. We not only test for effects resulting from excessive institutional buying, but we also measure how depressed institutional selling affects prices. It is plausible that both activities have similar affects on share prices.

2.1.1. Measuring Price Inflation

We want to test for a relation between quarter-end institutional trading and share price inflation. To accomplish this we create a monthly abnormal buy (sell) measure for each stock on the last day of each month. Our abnormal buy (sell) measure is the dollar volume of institutional buying (selling) on the last day of each month, minus the average daily dollar volume of institutional buying (selling) over the last five days of the month, all divided by the average daily dollar volume of institutional buying (selling) over the last five days of the month:

$$\textit{Abnormal Buying}_{st} = (\textit{Buys}_{st} - \textit{Average }(\textit{Buys}_{st\ to\ st-4})) / \textit{Average }(\textit{Buys}_{st\ to\ st-4})$$

$$\textit{Abnormal Selling}_{st} = (\textit{Sells}_{st} - \textit{Average }(\textit{Sells}_{st\ to\ st-4})) / \textit{Average }(\textit{Sells}_{st\ to\ st-4})$$

We follow CKMR and define price inflation (*PI*) as the return on the last day of the month, minus the return on the first day of the subsequent month. To test for price inflation resulting from abnormal trading, we regress *PI* on the abnormal trading measures. We expect that abnormal buying will have a positive relation with *PI*, and that abnormal selling will have a negative relation with *PI*. Summary statistics for each of these measures are reported in Table 2.

2.1.2. Stock Price InflationResults

Table 3 reports our price inflation results. In Panel A, the only independent variable is abnormal buying. In the full sample regression, the abnormal buying coefficient is 0.188 (t-statistic = 19.79). Table 2 shows that the abnormal buying variable has a standard deviation of 1.502. Hence, a one standard deviation increase in abnormal buying leads to an increase of 0.282 in price inflation.

The abnormal buying coefficient is both positive and significant in each of the size quintiles, showing that abnormal buying can affect the prices of stocks of all sizes. The coefficient is 0.537 in the first size quintile, and declines monotonically to 0.187 in the last size quintile, showing that price inflation resulting from abnormal buying is less a factor in large stocks. Moreover, the standard deviation of the abnormal buying variable declines across the size quintiles as well (not reported in tables), from 1.768 in the smallest size quintile, to 1.052 in the largest quintile. Hence a one standard deviation increase in abnormal buying leads to an increase of 0.949 in price inflation in small stocks, and an increase of 0.197 in price inflation in large stocks. This shows that if institutions wish to manipulate prices via excessive buying, then they will have a much easier time doing so in smaller stocks.

In Panel B, the only independent variable is abnormal selling. Table 2 shows that this variable has a standard deviation of 1.485, and in the full sample regression the coefficient is -0.128 (t-statistic = -13.66). Hence a one standard deviation decline in abnormal selling leads to an increase of 0.190 in price inflation, similar in magnitude to what is observed with excessive buying.

With the exception of quintile 2, each of the abnormal selling coefficients is negative and significant, showing that depressed selling can also have a significant influence on the share prices of both small and large firms. Unlike abnormal buying, the abnormal selling coefficient is largest in the fourth and fifth size quintiles, suggesting that the affects of abnormal selling are greatest in larger stocks.

The regressions reported in Panel C use both abnormal buying and selling in the same regression. For both trading measures, the coefficients and *t*-statistics are similar to those reported in models 1 and 2. These results show that both abnormal buying and abnormal selling have independent effects on price inflation.

2.2. Is There an Imbalance in Institutional Trading at Quarter-End?

CKMR show that fund NAVS and the prices of some stocks held by funds are inflated on quarter-end days. These findings suggest that there is an imbalance in the amount of institutional buying relative to the amount of institutional selling on quarter-ending days. In this Section we test for an imbalance in quarter-end institutional trading directly using our sample of institutional trade data. Here we only test for an imbalance in the ratio of buys to total trades. In later tests we will determine whether depressed selling or excessive buying causes such imbalances.

2.2.1. Trade Imbalance Measurement: The Buy Ratio

To test for an imbalance in institutional trading we create a measure that we refer to as the "buy ratio". The buy ratio is the dollar volume of buy transactions on a particular day, divided by the dollar volume of trades (buys + sells) on the same day. We create a daily buy ratio for each institution, and then generate a daily average across the institutions in our sample. Summary statistics for this measure are provided in Table 2.

$$Buy\ Ratio_{it} = Buys_{it} / (Buys_{it} + Sells_{it})$$

We generate this daily average using both equal-weights (Panel A) and value-weights (Panel B). To create the value-weights, we scale each institution's dollar volume on the measurement day by the sample's aggregate dollar volume on the same day. Equal-weighting provides a better description of how the typical institution in our sample is trading, as it accounts for both large and small institutions equally, whereas value-weighting yields results that are more influenced by larger institutions.

If the quarter-end and year-end price inflation documented in CKMR is the result of institutional trading, then the buy ratios should be higher on quarter-end and year-end days as compared to other month-end days. Hence, we test for differences between the year-end and quarter-end buy ratios and buy ratios measured on other days. We conduct our analyses using the following regression equation:

$$(1.) \qquad BuyRatio_t = \alpha + \beta_1 QEND_t + \beta_2 YEND_t + \sum B_i X_{it} + \varepsilon_t$$

In Equation 1 dummy variables that signal the last day of the quarter (QEND) and the last day of the year (YEND) are used to test whether the buy ratio is abnormally high on these days. The control variables (X) include the CRSP value-weighted market return for each of the five previous days (R1, R2, R3, R4, and R5), the volatility of the CRSP value-weighted market return, which is measured as the return squared, for each of the five previous days (V1, V2, V3, V4, and V5), dummy variables indicating the day of the week (MON, TUE, THUR, FRI), the previous five days' buy ratios (L-RATIO1, L-RATIO2, L-

RATIO3, L-RATIO4, L-RATIO5), dummy variables for the first (FIRST), second (SECOND), last (LAST), and second to last (SLAST) days of the month, and a dummy variable for the first day of the year (NEWYEAR). As in Table 3, we estimate the above regression equation both in our full sample, and within each size quintile.

We report our buy ratio regression results in Table 4. The results in Panel A show that, within the full sample, the buy ratios are significantly higher at both quarter-end and year-end. The buy ratios are higher by 0.035 at quarter-end, and an additional 0.059 at year-end; both coefficients are significant at the 1% level. Table 2 shows that the mean buy ratio is 0.503. Hence the results show that the buy ratio increases by 7% at quarter-end and an additional 11.8% at year-end.

If institutions are purposefully manipulating prices, then we would expect this activity to be greater in smaller stocks, as the prices of these stocks are easier to inflate. Moreover, we might not expect to observe this activity in larger stocks, as the prices of these stocks are probably more difficult to manipulate. However we find that the buy ratios are abnormally high at year-end in all of the size quintiles; the YEND coefficient estimates are: 0.056, 0.074, 0.084, 0.061, and 0.040. This consistency across the quintiles suggests a systematic change in trading behaviours, rather than targeted price manipulation.

Panel B displays our value-weighted results. Like in Panel A, the results in Panel B show that buy ratios are abnormally high at year-end (but not at quarter-end). Like in Panel A, the results in Panel B do not suggest a concerted effort on the part of managers to manipulate share prices, by rather imply a systematic change in trading behaviours. The YEND coefficient is significant in the full sample, insignificant in the smallest size quintile, and significant in the four larger size quintiles. The YEND coefficient estimates are: 0.051, 0.062, 0.092, 0.088, and 0.058 from the second to fifth (largest) size quintiles.

Figure 1 displays the sample average buy ratios at each month-end. Here we compute the buy ratio with dollar value (as done in the tables), number of shares, and number of transactions. With all three measures our results from Table 4 are confirmed. The buy ratios are abnormally high at quarter-end, and especially at year-end. This effect can be seen in both small and large stocks, as the pattern is similar across all of the size quintiles.

Figure 2 displays monthly average buy ratios that are calculated *excluding* the last day of the month. Here we see no pattern; the lines are essentially flat, showing that the buy ratio does not spike in quarter-ending and year-ending months, except for the last day of these months. Taken together, Figures 1 and 2 and Table 4 clearly show that there is an imbalance in institutional trading on the last day of the quarter, and especially on the last day of the year. However these trade imbalances are not targeted, the happen in across all five size quintiles, and more persistently in the larger size quintiles. If firms were intentionally manipulating prices, then we would expect to see these results concentrated among smaller stocks.

2.3. Why Are Buy Ratios High at Quarter-End: Excessive Buying or Depressed Selling?

In the previous Tables we showed that the institutions in our sample have high buy ratios on quarter-end and especially on year-end days. Such trading imbalances could be caused by either excessive buying, or depressed selling, or both. In this Section we show which of these explanations is correct. We do so by studying the year-end and quarter-end levels of abnormal buying and abnormal selling separately.

2.3.1. Abnormal Buying and Selling Methodologies

Like in Table 2 we create measures of abnormal buying and selling. One difference here is that we make this measure for each institution, rather than for each stock. Hence for each institution *i* on day *t* abnormal trading is measured as the dollar volume of the institution's trading on the last day of each month, minus the average daily dollar volume of institution's trading over the last five days of the month, all divided by the average daily dollar volume of institution's trading over the last five days of the month.

$$Abnormal\ Buying_{it} = (Buys_{it} - Average\ (Buys_{it\ to\ it\text{-}4}))\ /\ Average\ (Buys_{it\ to\ it\text{-}4})$$

$$Abnormal\ Selling_{it} = (Sells_{it} - Average\ (Sells_{it\ to\ it\text{-}4}))\ /\ Average\ (Sells_{it\ to\ it\text{-}4})$$

As with the buy ratio, we make our abnormal trading measures for each institution, and then generate a daily average for our entire sample. We compute the abnormal trading ratios using both equal-weighted and value-weighted averages. Summary statistics for this measure are provided in Table 2.

In this Section we re-estimate Equation 1, but replace the buy ratio with the abnormal buying and abnormal selling measures, as well as the difference between these measures. If institutions engage in excessive buying at year-end and quarter-end, then the YEND and QEND coefficients should both be positive when abnormal buying is the dependent variable. If institutions engage in depressed selling at year-end and quarter-end, then the YEND and QEND coefficients should both be negative when abnormal selling is the dependent variable. We display our equal-weighted results in Panel A and the value-weighted results in Panel B. In Panel C we test whether the percentage of institutions engaged in either abnormal buying or abnormal selling is different on quarter-end and year-end days.

2.3.2. Abnormal Buying and Selling Results

We first describe the results in Panel A. In the abnormal buying regressions the QEND coefficient is positive, but not significant. The YEND coefficient is -0.188 and significant, while the standard deviation for abnormal buying is 0.161 (see Table 2), so this shows that abnormal buying declines by more than a full standard deviation on year-end days. These results are not consistent with price manipulation on the part of managers, which predicts excessive institutional buying on the last day of the year in an effort to inflate share prices. Certainly some managers may engage in portfolio pumping, but our findings here show that on average institutional investors do not do this.

With respect to abnormal selling, Panel A shows that abnormal selling declines at quarter-end, but the coefficient is not significant. However at year-end, the results show that there is a large decline in depressed selling, and this effect is very significant; the YEND coefficient is -0.269 (p-value = 0.001). Table 2 shows that the mean value for abnormal selling is 0.017, while the standard deviation is 0.173. Hence at YEND there is almost a two standard deviation decline in abnormal selling.

The dependent variable in the final regression of Panel A is the difference between abnormal buying and abnormal selling. The QEND and YEND coefficients are both positive and significant in this regression. This shows that firms engage in more abnormal buying relative to abnormal selling on both quarter-end and year-end days. The results in the first two regressions of Panel A show that this difference is driven by depressed selling, rather than excessive buying; the QEND coefficient is 0.033 in the abnormal buying regression, and -0.047 in the abnormal selling regression, while the YEND coefficient is negative and significant in both the abnormal buying regression (-0.188), and in the abnormal selling regression (-0.296).

Panel B reports our value-weighted results. The QEND coefficient is positive and significant in the abnormal buy regressions, showing that abnormal buying is higher at quarter-end. The QEND coefficient is also positive in the abnormal selling regression, although it is not significant. The YEND coefficient is negative and significant in both regressions, again showing that there is a decline in both excessive buying and selling at year-end. Hence, here again we show that the abnormally high buy ratios at year-end are caused by depressed selling, rather than excessive buying.

The results reported in Panel C show whether the percentage of institutions, which engage in abnormal buying (selling) is different at quarter-end and year-end. The results show that the percentage of institutions engaged in abnormal buying is not significantly different on quarter-ending days, and is significantly lower on year-ending days. The YEND coefficient is -0.075 on year-ending days, showing that the 7.5% fewer institutions engage in excessive buying on year-end days.

The percentage of institutions engaged in abnormal selling is significantly lower on both quarter-ending and year-ending days. The QEND coefficient is -0.029, while the YEND coefficient is -0.100, showing that 2.9% of the institutions in our sample have declines in abnormal selling on the last day of the quarter, and an additional 10% have declines on the last day of the year.

Taken in their entirety, the results in Table 5 show that abnormal buying does not increase at quarter-end, and decreases at year-end. Abnormal selling declines by large amounts at both quarter-end and year-end. These results can also be seen in Figure 3, which plots month-end abnormal buying and abnormal selling levels.

The findings in this Section suggest that the trade imbalances documented in Table 4 are the results of depressed selling, rather than excessive buying. Our results further suggest that depressed selling probably plays a larger role in NAV inflation than does excessive buying, which on average is not observable in our sample. This result has not been suggested in the literature before, as previous studies have concluded that both quarter-end and year-end NAV inflations are caused entirely by excessive buying.

2.4. Robustness Check: Abnormal Trading and Portfolio Weightings

In the last Section we showed that at quarter-end institutions do not engage in excessive buying, but do engage in depressed selling. This however does not mean that some institutions do not excessively buy some stocks at quarter-end in an effort to inflate their funds' NAVs. Excessive buying is costly; it generates extra transaction costs, and might create problems with regulators. Therefore excessive buying should only occur when there are clear benefits from the activity. Hence, if institutions are purposefully trying to manipulate prices, then we expect that all abnormal trading activities, and especially excessive buying, to be greater in stocks that make up a relatively large part of a fund's portfolio, as these stocks have more of an impact on the portfolio's returns.

In this Section we test whether the weight of a stock in an institution's portfolio influences the institution's quarter-end trading activity in the stock. Specifically, we test whether, conditional on buying on the last of a quarter or year, is an institution *more likely to buy* a stock, which has a large weight in the institution's portfolio. We also test whether, conditional on selling on the last of a quarter or year, is an institution *less likely to sell* a stock, which has a large weight in the institution's portfolio.

2.4.1. Portfolio Weighting Measurement and Methodology

In order to estimate the weight that a stock has in an institution's portfolio, we accumulate the institution's trades in the stock over our sample period, and use this value as an estimate of the institution's net position in the stock. If the accumulated net position is negative, then we assign it a value of 0. For each institution, we sum up the individual stock positions to create an estimate of the institution's total portfolio. We then divide each individual stock's position by the total value of the portfolio; this is an estimate of the stock's weight for a particular institution, W_i.

We define a second measure M_i; it is the market value of stock *i* divided by the sum of the market values of all of the stocks in the institution's portfolio. *Over-weight (OW)* is the difference between W_i and M_i: $OW_i = W_i - M_i$. Intuitively, a positive (negative) *OW* measure means the institution is over-weighting (under-weighting) the particular stock relative to what a value-weighted portfolio would call for.

Within each institution's portfolio, we sort the stocks on *Over-weight*, and place each stock into a tercile based on its *Over-weight* rank. The highest tercile stocks are defined as over-weighted, the middle tercile stocks are defined as fairly-weighted, and the lower tercile stocks are defined as under-weighted. For each institution, and on each day, we calculated the ratio of over-weighted buys (sells) to over-weighted stocks in the institutional portfolio, and then average this ratio across institutions to come up with a single daily measure. We then repeat the exercise with under-weighted buys (sells).

If managers are purposefully manipulating prices, then there should be more abnormal buying and less abnormal selling in over-weighted stocks on quarter-ending and year-ending days. Moreover, we should not expect high levels of abnormal trading in underweighted stocks, as there is little gain from manipulating the prices if these stocks. We test these hypotheses using the same regression equation as in the previous tables, only the dependent variables are the over-weighted/under-weighted buy and sell ratios described above.

2.4.2. Portfolio Weighting Results

Panel A describes the results for abnormal buying. Panel A shows that quarter-end buying is higher in over-weighted stocks, which is consistent with manipulative trading. However quarter-end buying is also higher in under-weighted stocks, which is not consistent with manipulative trading. The year-end results are also not consistent with manager manipulation. The YEND coefficient is negative and insignificant for the over-weight buys. Hence, conditional on buying a stock on the last day of the year, institutions are not more likely to buy an over-weighted stock. Hence the findings do not show that at quarter-end and year-end managers excessively buy shares in stocks which, they already have large positions in.

Panel B reports the results for the sells. The QEND coefficient is positive in the over-weight buy regression, showing that managers do not tend to reduce selling in over-weighted securities. The year-end results show that selling is depressed on year-end days, however it is not targeted; selling falls in both over-weighted and under-weighted stocks, and more so in under-weighted stocks. The YEND coefficient is -0.005 (p-value = 0.003) in the over-weight sell regression, and -0.008 (p-value < 0.0001) in the under-weight sell regression. Hence the YEND coefficient is greater by is 0.003 in the over-weight regression, showing that selling is more depressed among under-weighted as compared to over-weighted stocks, which is the opposite result that tape painting would predict.

3. Conclusion

In this paper we study quarter-end institutional trading activity and its affect on share prices. Our study is in large part motivated by the findings in CKMR, who find that mutual fund NAVs are abnormally high at quarter-end, and suggest that this is due to manipulative trading on the part of institutions.

We show that abnormal institutional trading inflates share prices, and that the ratio of buys to total trades is high on quarter-end days, and especially so on year-end days. Hence our findings are consistent with the findings in CKMR, who conclude that institutional trading causes quarter-end share price inflation.

However, in contrast to what is suggested in CKMR and related studies, we show that the imbalance between buys and sells on quarter-end days is the result of depressed selling, not excessive buying. Moreover, our findings suggest that quarter-end abnormal trading is not manipulative in nature. We show that abnormal trading is not targeted; it happens similarly in both small and large stocks. We also observe high levels of abnormal trading in stocks that make up only a relatively small part of the institution’s portfolio, and therefore are only marginally helpful at inflating fund NAVs. Some managers may intentionally be inflating quarter-end prices, but our findings show that the average institution does not appear to be engaged in this practice.

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Table 1: Summary Statistics of the Institutional Trading Data

The table reports summary statistics regarding the institutions in our sample and the magnitude of their trading activities. The second column reports the number of institutions (N) in each year of the sample. Columns 3 through 8 report the aggregate dollar value of trading institutional trading as a percentage of the dollar trading volume in CRSP. The third column shows the trading percentage for all stocks, while columns 4 through 8 report statistics for stocks in each of the five NYSE-size quintiles.

		Percent of Total Market Trading Volume					
Year	**N**	**All Stocks**	**Small Stocks**	**Q2**	**Q3**	**Q4**	**Large Stocks**
1999	329	7.52	4.87	6.93	8.27	8.92	7.63
2000	321	7.19	3.83	6.10	7.90	8.05	7.35
2001	324	9.30	7.74	12.24	11.59	10.89	9.23
2002	342	10.49	10.13	12.51	12.18	11.65	10.49
2003	327	9.42	10.01	12.11	10.71	10.40	9.44
2004	300	8.81	8.59	10.85	9.35	9.68	8.91
2005	301	8.71	9.94	11.10	10.77	10.36	8.40

Table 2: Summary Statistics for the Different Measures

This table reports the means and standard deviations for the trading measures used in this study. Panel A reports statistics for variables that are measured at the stock-level. For each stock, price inflation (PI) is defined as the difference between the return on the end of the each month and the return on the first day of the subsequent month. Abnormal Buying (Selling) is defined for each stock as the dollar value of buys (sells) on day *t* minus the average dollar value of buys (sells) over days *t* to *t-4*, all scaled by the average dollar value of buys (sells) over days *t* to *t-4*. Panels B and C report statistics for variables that are measured at the institution level. The buy ratio is measured each day; it is the total value of each institution's buys scaled by the total value of the institution's trades. Abnormal Buying (Selling) is defined for each institution as the dollar value of buys (sells) on day *t* minus the average dollar value of buys (sells) over days *t* to *t-4*, all scaled by the average dollar value of buys (sells) over days *t* to *t-4*. We use equal-weighted averages in Panel B and value-weighted averages in Panel C. To create the value-weights, we scale each institution's dollar volume on the measurement day by the sample's aggregate dollar volume on the same day.

Panel A: Stock-Level Measures (Measured on month-end days only)		
Measure	**Mean**	**Standard Deviation**
Abnormal Buying	0.253	1.502
Abnormal Selling	0.108	1.485
Price Inflation	0.281	7.126
Panel B: Institutional-Level Equal-Weighted Measures		
Measure	**Mean**	**Standard Deviation**
Buy Ratio	0.503	0.036
Abnormal Buying	0.015	0.161
Abnormal Selling	0.017	0.173
Panel C: Institutional-Level Value-Weighted Measures		
Measure	**Mean**	**Standard Deviation**
Buy Ratio	0.501	0.041
Abnormal Buying	-0.035	0.167
Abnormal Selling	-0.038	0.171

Table 3: Institutional Trading Activity and Price Inflation

The table reports regression results of price inflation and institutional trading activities on the last day of the month: $PI_{i,t} = a + b_{buy}ABUY_{ti,t} + b_{sell}ASELL_{i,t}$. For each stock, price inflation (PI) is defined as the difference between the return on the end of the each month and the return on the first day of the subsequent month. Abnormal Buying (Selling) is defined for each stock as the dollar value of buys (sells) on day *t* minus the average dollar value of buys (sells) over days *t* to *t-4*, all scaled by the average dollar value of buys (sells) over days *t* to *t-4*. The sample spans from 1999 through 2005, and includes the trades of more than 300 separate institutions in each of the seven years that we study. T-statistics are reported in italics.

Panel A: Abnormal Buying and Price Inflation

	All	Small	2	3	4	Large
Intercept	0.082	0.202	0.248	0.150	0.119	0.029
	5.86	*5.29*	*8.25*	*5.11*	*4.34*	*1.18*
ABUY	0.188	0.537	0.444	0.282	0.233	0.187
	19.79	*12.02*	*11.92*	*7.47*	*6.41*	*5.29*
R^2	0.028	0.040	0.032	0.020	0.026	0.021

Panel B: Abnormal Selling and Price Inflation

	All	Small	2	3	4	Large
Intercept	0.179	0.183	0.250	0.101	0.041	-0.014
	13.09	*4.77*	*8.16*	*3.37*	*1.47*	*-0.56*
ASELL	-0.128	-0.188	-0.040	-0.275	-0.486	-0.430
	-13.66	*-4.30*	*-1.12*	*-7.63*	*-13.85*	*-12.49*
R^2	0.028	0.040	0.032	0.020	0.026	0.021

Panel C: Abnormal Buying, Abnormal Selling, and Price Inflation

	All	Small	2	3	4	Large
Intercept	0.109	0.188	0.243	0.101	0.045	-0.015
	7.69	*4.88*	*7.95*	*3.39*	*1.61*	*-0.63*
ABUY	0.195	0.524	0.443	0.289	0.269	0.243
	20.48	*11.67*	*11.89*	*7.68*	*7.41*	*6.86*
ASELL	-0.137	-0.141	-0.028	-0.283	-0.504	-0.459
	-14.65	*-3.22*	*-0.79*	*-7.83*	*-14.34*	*-13.24*
R^2	0.030	0.040	0.032	0.021	0.032	0.026

Table 4: Time Series Regression: Daily Buy Ratios

The table reports the results from time series regression. The dependent variable is the buy ratio; it is the total value of institutional buys scaled by the total value of the institutional trades. The institutional buy ratios are then averaged using equal-weights (Panel A) and value-weights (Panel B) to come up with a single buy ratio for each day. To create the value-weights, we scale each institution's dollar volume on the measurement day by the sample's aggregate dollar volume on the same day. Dummy variables that signal the last day of the quarter (QEND) and the last day of the year (YEND) are used to test whether the buy ratio is abnormally high on these days. The control variables include the CRSP value-weighted market return for each of the five previous days (R1, R2, R3, R4, and R5), the volatility of this return, which is measured as the return squared, for each of the five previous days (V1, V2, V3, V4, and V5), dummy variables indicating the day of the week (MON, TUE, THUR, FRI), the previous five days' buy ratios (L-RATIO1, L-RATIO2, L-RATIO3, L-RATIO4, L-RATIO5), dummy variables for the first (FIRST), second (SECOND), last (LAST), and second to last (SLAST) days of the month, and a dummy variable for the first day of the year (NEWYEAR). The sample is from 1999 through 2005, and includes the trades of more than 300 separate institutions in each of the seven years that we study.

Table 4 – Continued

Panel A: Equal-Weighted Regressions												
	Full Sample		**Small**		**2**		**3**		**4**		**5**	
Variable	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value
Intercept	0.347	<.0001	0.104	<.0001	0.214	<.0001	0.264	<.0001	0.206	<.0001	0.332	<.0001
R1	0.172	0.035	-0.134	0.193	-0.202	0.061	-0.002	0.985	0.233	0.018	0.407	<.0001
R2	0.054	0.510	0.241	0.020	0.239	0.028	0.250	0.015	0.188	0.060	-0.094	0.294
R3	0.017	0.835	0.221	0.037	0.054	0.626	0.128	0.217	0.004	0.966	-0.055	0.544
R4	-0.070	0.399	0.090	0.395	0.018	0.873	-0.161	0.120	0.006	0.953	-0.063	0.483
R5	0.014	0.861	0.082	0.432	0.008	0.938	0.165	0.106	-0.039	0.693	0.012	0.896
V1	2.105	0.506	-4.915	0.271	1.895	0.663	7.159	0.083	-0.058	0.989	0.239	0.949
V2	-2.059	0.515	-13.285	0.003	-4.895	0.259	-2.726	0.509	-4.307	0.290	-0.927	0.804
V3	-3.336	0.292	-10.474	0.019	-12.457	0.004	-2.561	0.535	-1.369	0.736	-0.140	0.970
V4	-3.047	0.329	-11.398	0.010	-8.793	0.040	-1.408	0.729	-2.467	0.539	-1.494	0.685
V5	1.825	0.559	-0.884	0.841	-0.243	0.955	2.790	0.493	1.433	0.721	4.664	0.205
MON	-0.006	0.015	-0.005	0.189	-0.002	0.556	-0.007	0.030	-0.014	<.0001	-0.005	0.128
TUE	0.000	0.921	-0.003	0.423	-0.001	0.794	-0.001	0.869	-0.005	0.145	0.002	0.537
THUR	0.001	0.776	-0.001	0.866	0.000	0.929	-0.002	0.611	-0.002	0.614	0.002	0.599
FRI	0.003	0.278	0.003	0.420	0.001	0.787	0.001	0.688	-0.001	0.674	0.004	0.219
L-RATIO1	0.170	<.0001	0.458	<.0001	0.296	<.0001	0.296	<.0001	0.339	<.0001	0.219	<.0001
L-RATIO2	0.107	0.000	0.152	<.0001	0.113	<.0001	0.131	<.0001	0.146	<.0001	0.080	0.003
L-RATIO3	0.043	0.119	0.085	0.002	0.113	<.0001	0.032	0.246	0.087	0.002	0.012	0.643
L-RATIO4	-0.022	0.434	0.049	0.072	0.007	0.794	-0.017	0.534	0.011	0.684	0.003	0.895
L-RATIO5	0.014	0.610	0.071	0.004	0.078	0.003	0.047	0.072	0.007	0.801	0.017	0.498
FIRST	-0.021	<.0001	-0.031	<.0001	-0.022	0.000	-0.018	0.001	-0.031	<.0001	-0.016	0.001
SECOND	-0.012	0.003	-0.014	0.013	-0.007	0.209	-0.013	0.010	-0.006	0.214	-0.009	0.054
SLAST	0.013	0.001	0.010	0.057	0.008	0.111	0.013	0.009	0.017	0.001	0.016	0.000
LAST	0.006	0.218	-0.012	0.078	0.008	0.229	0.002	0.799	0.010	0.085	0.006	0.313
QEND	**0.035**	**<.0001**	**0.012**	**0.314**	**0.019**	**0.107**	**0.033**	**0.005**	**0.029**	**0.010**	**0.034**	**0.001**
NEWYEAR	-0.002	0.912	-0.032	0.112	-0.005	0.798	-0.002	0.911	-0.012	0.536	-0.001	0.976
YEND	**0.059**	**<.0001**	**0.056**	**0.008**	**0.074**	**0.000**	**0.084**	**<.0001**	**0.061**	**0.001**	**0.040**	**0.024**

Table 4 - Continued

Panel B: Value-Weighted Regressions												
	Full Sample		**Small**		**2**		**3**		**4**		**5**	
Variable	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value
Intercept	0.362	<.0001	0.161	<.0001	0.209	<.0001	0.245	<.0001	0.234	<.0001	0.322	<.0001
R1	0.947	<.0001	0.133	0.378	0.531	<.0001	0.654	<.0001	0.887	<.0001	1.061	<.0001
R2	-0.001	0.988	0.172	0.258	0.205	0.123	0.380	0.002	0.102	0.348	-0.129	0.153
R3	-0.087	0.301	0.034	0.824	0.111	0.412	0.266	0.032	0.116	0.294	-0.229	0.013
R4	-0.162	0.056	0.247	0.110	0.310	0.022	0.132	0.288	0.034	0.761	-0.244	0.008
R5	0.028	0.740	0.191	0.217	0.025	0.852	0.053	0.668	0.204	0.064	-0.033	0.721
V1	-0.025	0.994	-7.167	0.285	2.419	0.669	8.146	0.115	-1.196	0.794	-1.186	0.762
V2	-0.902	0.800	-10.397	0.120	-1.168	0.836	-3.316	0.521	-5.167	0.258	-0.611	0.876
V3	4.931	0.166	-18.447	0.006	-4.888	0.385	-4.837	0.349	2.150	0.638	7.365	0.059
V4	2.668	0.447	-9.923	0.134	-12.837	0.021	-13.683	0.007	-1.664	0.711	6.752	0.080
V5	-3.771	0.283	-15.158	0.022	-13.282	0.017	0.991	0.846	2.289	0.612	-3.670	0.343
MON	-0.006	0.032	0.003	0.506	0.003	0.480	-0.003	0.428	-0.008	0.044	-0.006	0.108
TUE	-0.002	0.528	-0.005	0.337	0.000	0.972	-0.001	0.718	-0.005	0.150	-0.002	0.516
THUR	0.001	0.775	0.000	0.970	0.008	0.080	0.002	0.673	-0.003	0.433	0.001	0.825
FRI	0.000	0.925	0.009	0.096	0.005	0.289	0.006	0.136	-0.001	0.694	0.001	0.850
L-RATIO1	0.145	<.0001	0.361	<.0001	0.325	<.0001	0.232	<.0001	0.236	<.0001	0.142	<.0001
L-RATIO2	0.076	0.002	0.121	<.0001	0.115	<.0001	0.134	<.0001	0.098	0.000	0.109	<.0001
L-RATIO3	0.051	0.040	0.055	0.034	0.059	0.025	0.067	0.011	0.057	0.028	0.054	0.029
L-RATIO4	0.008	0.752	0.066	0.011	0.063	0.018	0.056	0.033	0.046	0.074	0.036	0.139
L-RATIO5	-0.003	0.912	0.107	<.0001	0.046	0.066	0.044	0.084	0.111	<.0001	0.004	0.850
FIRST	0.000	0.952	-0.025	0.004	-0.005	0.523	0.001	0.869	-0.005	0.389	0.000	0.950
SECOND	-0.002	0.673	0.009	0.294	0.005	0.489	-0.001	0.913	-0.001	0.840	-0.001	0.833
SLAST	0.013	0.003	0.008	0.356	0.012	0.093	0.010	0.118	0.008	0.178	0.019	<.0001
LAST	0.018	0.001	-0.007	0.486	0.002	0.806	0.015	0.050	-0.005	0.429	0.016	0.005
QEND	**-0.004**	**0.721**	**-0.014**	**0.457**	**0.025**	**0.106**	**-0.004**	**0.795**	**0.018**	**0.148**	**-0.001**	**0.950**
NEWYEAR	-0.002	0.925	0.027	0.375	-0.011	0.687	-0.005	0.820	-0.011	0.599	-0.004	0.812
YEND	**0.080**	**<.0001**	**0.051**	**0.106**	**0.062**	**0.022**	**0.092**	**0.000**	**0.088**	**<.0001**	**0.058**	**0.002**

Table 5: Time Series Regression: Abnormal Buying and Selling

The table reports the results form time series regressions. Abnormal Buying (Selling) is defined for each institution on each day as the dollar value of buys (sells) on day *t* minus the average dollar value of buys (sells) over days *t* to *t-4*, all scaled by the average dollar value of buys (sells) over days *t* to *t-4*. We then take an average of this measure across the institutions in our sample to estimate a daily measure. We use equal-weighted averages in Panel A and value-weighted averages in Panel B. To create the value-weights, we scale each institution's dollar volume on the measurement day by the sample's aggregate dollar volume on the same day. In Panel C, we estimate the average percentage of institutions that exhibit abnormal buy (abnormal buy greater than zero) and abnormal sell (abnormal sell ratio than 0) activities on each day. Dummy variables that signal the last day of the quarter (QEND) and the last day of the year (YEND) are used to test whether abnormal trading is especially high on these days. The control variables include the CRSP value-weighted market return for each of the five previous days (R1, R2, R3, R4, and R5), the volatility of this return, which is measured as the return squared, for each of the five previous days (V1, V2, V3, V4, and V5), dummy variables indicating the day of the week (MON, TUE, THUR, FRI), the previous five days' buy ratios (L-RATIO1, L-RATIO2, L-RATIO3, L-RATIO4, L-RATIO5), dummy variables for the first (FIRST), second (SECOND), last (LAST), and second to last (SLAST) days of the month, and a dummy variable for the first day of the year (NEWYEAR). The sample spans from 1999 through 2005, and includes the trades of more than 300 separate institutions in each of the seven years that we study.

Table 5 – Continued

Panel A: Equal-Weighted Regressions						
	Abnormal Buy Ratio		**Abnormal Sell Ratio**		**Buy Minus Sell**	
Variable	Estimate	p-value	Estimate	p-value	Estimate	p-value
Intercept	0.066	<.0001	0.065	<.0001	0.002	0.727
R1	0.849	0.002	-1.372	<.0001	0.946	0.000
R2	-0.556	0.045	-0.533	0.081	0.220	0.384
R3	-0.235	0.405	-0.309	0.317	0.038	0.880
R4	0.358	0.206	-0.104	0.736	0.012	0.961
R5	-0.243	0.390	-0.241	0.428	0.238	0.349
V1	15.662	0.212	12.966	0.326	2.079	0.837
V2	-12.572	0.312	-6.581	0.616	-8.858	0.376
V3	-9.110	0.459	-11.311	0.387	-2.315	0.817
V4	-6.830	0.579	6.644	0.608	-10.018	0.311
V5	-11.872	0.336	-9.911	0.446	-2.400	0.809
MON	-0.143	<.0001	-0.121	<.0001	-0.024	0.009
TUE	0.008	0.497	0.004	0.712	-0.002	0.790
THUR	-0.020	0.086	-0.024	0.040	0.001	0.936
FRI	-0.109	<.0001	-0.119	<.0001	0.005	0.552
L-RATIO1	0.295	<.0001	0.323	<.0001	-0.005	0.848
L-RATIO2	-0.053	0.033	-0.048	0.060	-0.060	0.021
L-RATIO3	-0.070	0.005	-0.081	0.001	-0.138	<.0001
L-RATIO4	-0.132	<.0001	-0.135	<.0001	-0.273	<.0001
L-RATIO5	0.046	0.050	0.001	0.970	-0.045	0.085
FIRST	-0.011	0.499	0.068	<.0001	-0.054	<.0001
SECOND	0.045	0.004	0.067	<.0001	-0.037	0.006
SLAST	-0.013	0.410	-0.045	0.007	0.032	0.012
LAST	0.004	0.837	-0.018	0.370	0.034	0.028
QEND	**0.033**	**0.329**	**-0.047**	**0.193**	**0.069**	**0.013**
NEWYEAR	0.415	<.0001	0.537	<.0001	-0.081	0.077
YEND	**-0.188**	**0.001**	**-0.296**	**<.0001**	**0.140**	**0.003**

Table 5 – Continued

Panel B: Value-Weighted Regressions						
	Abnormal Buy Ratio		**Abnormal Sell Ratio**		**Buy Minus Sell**	
Variable	Estimate	p-value	Estimate	p-value	Estimate	p-value
Intercept	-0.001	0.896	-0.007	0.419	0.006	0.409
R1	1.497	<.0001	-2.614	<.0001	3.533	<.0001
R2	-1.112	0.000	0.188	0.553	-0.229	0.398
R3	-0.536	0.088	-0.222	0.491	-0.429	0.118
R4	0.115	0.715	0.389	0.227	-0.459	0.094
R5	0.242	0.440	-0.133	0.678	0.225	0.411
V1	22.768	0.100	19.031	0.171	-1.357	0.905
V2	-4.173	0.761	-2.327	0.866	-5.139	0.648
V3	-4.108	0.763	-10.174	0.459	5.048	0.654
V4	4.163	0.759	5.189	0.703	3.278	0.768
V5	-24.743	0.069	-4.745	0.728	-18.767	0.092
MON	-0.091	<.0001	-0.061	<.0001	-0.020	0.050
TUE	0.019	0.107	0.018	0.157	0.001	0.922
THUR	-0.015	0.197	-0.013	0.291	0.004	0.710
FRI	-0.084	<.0001	-0.086	<.0001	0.004	0.731
L-RATIO1	0.253	<.0001	0.338	<.0001	0.048	0.053
L-RATIO2	-0.061	0.014	-0.120	<.0001	-0.078	0.001
L-RATIO3	-0.057	0.020	-0.030	0.232	-0.081	0.001
L-RATIO4	-0.126	<.0001	-0.132	<.0001	-0.197	<.0001
L-RATIO5	0.032	0.174	0.041	0.086	-0.068	0.004
FIRST	-0.065	0.000	-0.045	0.013	-0.015	0.304
SECOND	0.012	0.509	0.029	0.098	-0.015	0.296
SLAST	0.014	0.410	-0.017	0.317	0.034	0.018
LAST	0.034	0.104	0.023	0.263	0.022	0.201
QEND	**0.101**	**0.008**	**0.040**	**0.295**	**0.039**	**0.217**
NEWYEAR	0.366	<.0001	0.491	<.0001	-0.079	0.133
YEND	**-0.202**	**0.002**	**-0.266**	**<.0001**	**0.105**	**0.052**

Table 5 – Continued

Panel C: Percentage of Institutions Experiencing Abnormal Buying and Selling						
	Abnormal Buy Ratio		**Abnormal Sell Ratio**		**Buy Minus Sell**	
Variable	Estimate	p-value	Estimate	p-value	Estimate	p-value
Intercept	0.285	<.0001	0.301	<.0001	0.010	0.002
R1	0.572	<.0001	-0.802	<.0001	0.664	<.0001
R2	-0.322	0.016	-0.291	0.047	0.159	0.237
R3	-0.131	0.336	-0.262	0.077	-0.016	0.907
R4	0.082	0.549	0.022	0.881	-0.117	0.391
R5	-0.120	0.377	-0.172	0.234	0.066	0.627
V1	3.684	0.541	4.831	0.436	-0.561	0.915
V2	-8.716	0.147	-6.211	0.316	-6.412	0.220
V3	-10.311	0.084	-6.731	0.276	-5.824	0.265
V4	-3.233	0.586	3.680	0.548	-6.307	0.222
V5	-6.205	0.295	1.196	0.845	-5.952	0.249
MON	-0.069	<.0001	-0.058	<.0001	-0.014	0.002
TUE	0.010	0.068	0.006	0.294	0.000	0.970
THUR	-0.006	0.260	-0.009	0.099	-0.002	0.722
FRI	-0.052	<.0001	-0.058	<.0001	0.001	0.869
L-RATIO1	0.338	<.0001	0.361	<.0001	0.028	0.306
L-RATIO2	-0.031	0.212	-0.010	0.711	0.003	0.906
L-RATIO3	-0.024	0.330	-0.053	0.044	-0.119	<.0001
L-RATIO4	-0.121	<.0001	-0.140	<.0001	-0.223	<.0001
L-RATIO5	0.106	<.0001	0.049	0.041	0.007	0.793
FIRST	-0.026	0.001	0.020	0.011	-0.033	<.0001
SECOND	0.016	0.034	0.031	<.0001	-0.023	0.001
SLAST	-0.005	0.536	-0.023	0.003	0.019	0.004
LAST	0.001	0.917	-0.009	0.309	0.018	0.028
QEND	**0.007**	**0.670**	**-0.029**	**0.091**	**0.033**	**0.023**
NEWYEAR	0.159	<.0001	0.167	<.0001	-0.003	0.899
YEND	**-0.075**	**0.009**	**-0.100**	**0.001**	**0.038**	**0.123**

Table 6: Abnormal Trading and Portfolio Weights

The table reports the results from time series regressions. For each institution, and for each stock, we accumulate the institution's trades in the stock over our sample period, and use this as an estimate of the institution's position in the stock. If the accumulated position is negative, then we assign it a value of 0. Once we have the positions we estimate the weight of each stock in the institution's portfolio. We call this W_i. For the same stocks in the portfolio, we construct a value-weight based on the market value of the stock; this weight is called M_i. M_i is the market value of stock i divided by the sum of the market values of all of the stocks in the institution's portfolio. Over-weight is the difference between W_i and M_i. Then, within each institution, we sort the stocks on over-weight, and place each stock into a tercile based on its over-weight rank. The highest tercile stocks are defined as over-weighted, the middle tercile stocks are defined as fairly-weighted, and the lower tercile stocks are defined as under-weighted. Next, for each institution, we calculate the ratio of over-weighted buys (sells) to over-weighted stocks in the portfolio, and the average this measure across institutions to come up with a single daily measure. Dummy variables that signal the last day of the quarter (QEND) and the last day of the year (YEND) are used to test whether abnormal trading is especially high on these days. The control variables include the CRSP value-weighted market return for each of the five previous days (R1, R2, R3, R4, and R5), the volatility of this return, which is measured as the return squared, for each of the five previous days (V1, V2, V3, V4, and V5), dummy variables indicating the day of the week (MON, TUE, THUR, FRI), the previous five days' buy ratios (L-RATIO1, L-RATIO2, L-RATIO3, L-RATIO4, L-RATIO5), dummy variables for the first (FIRST), second (SECOND), last (LAST), and second to last (SLAST) days of the month, and a dummy variable for the first day of the year (NEWYEAR). The sample spans from 1999 through 2005, and includes the trades of more than 300 separate institutions in each of the seven years that we study.

Table 6 - Continued

Variable	Over-weight Buy		Under-weight Buy		Over Minus Under	
	Estimate	p-value	Estimate	p-value	Estimate	p-value
Intercept	0.005	<.0001	0.008	<.0001	0.003	<.0001
R1	0.012	0.330	0.007	0.338	0.001	0.880
R2	-0.014	0.242	-0.023	0.003	0.009	0.368
R3	0.007	0.589	-0.020	0.011	0.028	0.004
R4	0.006	0.640	-0.001	0.882	0.005	0.628
R5	-0.015	0.230	-0.007	0.332	-0.007	0.456
V1	0.534	0.327	1.075	0.002	-0.089	0.836
V2	-0.361	0.505	0.190	0.581	-0.028	0.947
V3	-0.092	0.865	0.091	0.791	0.088	0.837
V4	-0.701	0.188	0.167	0.621	-0.422	0.315
V5	-0.601	0.261	0.194	0.567	-0.477	0.260
MON	-0.003	<.0001	-0.001	0.012	-0.003	<.0001
TUE	0.000	0.741	0.000	0.768	0.000	0.506
THUR	-0.001	0.001	-0.001	0.000	0.000	0.562
FRI	-0.003	<.0001	-0.001	0.033	-0.002	<.0001
L-RATIO1	0.375	<.0001	0.250	<.0001	0.413	<.0001
L-RATIO2	0.272	<.0001	0.177	<.0001	0.265	<.0001
L-RATIO3	0.129	<.0001	0.047	0.036	0.159	<.0001
L-RATIO4	0.124	<.0001	0.041	0.062	0.133	<.0001
L-RATIO5	0.030	0.120	0.076	0.000	-0.022	0.272
FIRST	-0.001	0.167	0.001	0.070	-0.001	0.193
SECOND	-0.002	0.001	-0.001	0.234	0.000	0.366
SLAST	0.001	0.044	0.002	<.0001	0.000	0.975
LAST	0.001	0.108	0.004	<.0001	-0.003	<.0001
QEND	**0.010**	**<.0001**	**0.006**	**<.0001**	**0.005**	**<.0001**
NEWYEAR	0.006	0.012	0.005	0.001	0.002	0.416
YEND	**-0.004**	**0.157**	**-0.005**	**0.001**	**0.001**	**0.661**

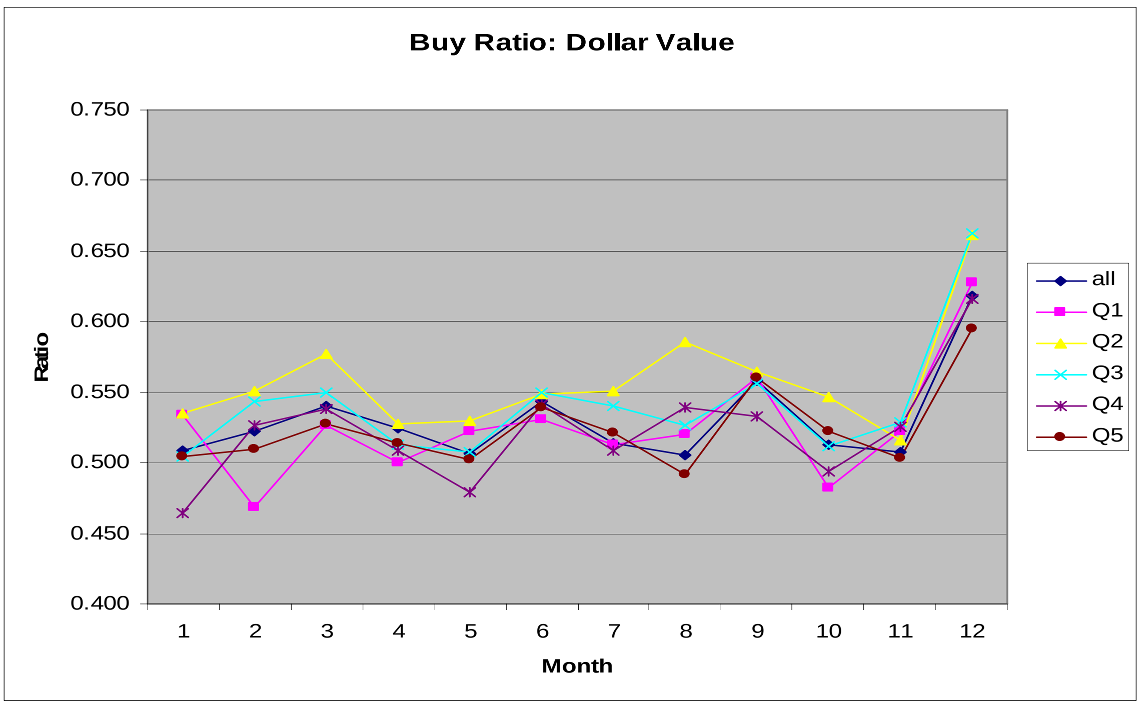
Table 6 - Continued

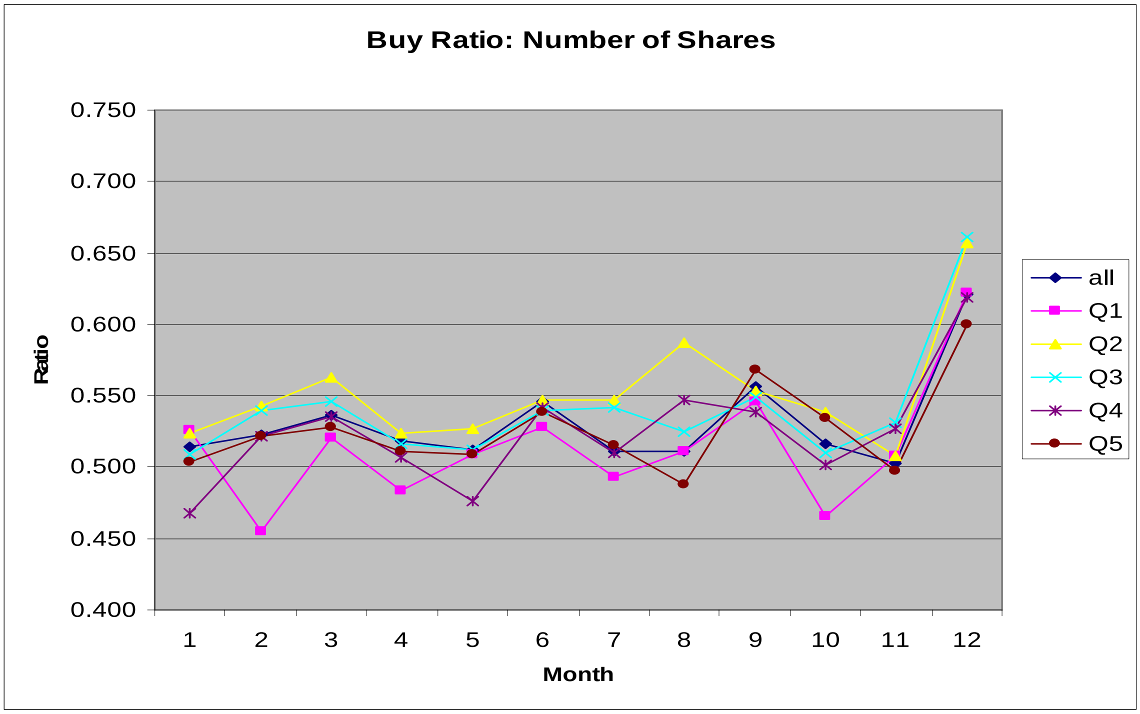
Variable	Over-weight Sell Estimate	Over-weight Sell p-value	Under-weight Sell Estimate	Under-weight Sell p-value	Over Minus Under Estimate	Over Minus Under p-value
Intercept	0.002	<.0001	0.003	<.0001	0.000	0.374
R1	-0.018	0.017	-0.026	0.006	0.009	0.220
R2	-0.026	0.001	-0.023	0.016	-0.002	0.800
R3	-0.024	0.002	-0.020	0.040	-0.006	0.434
R4	0.009	0.251	0.009	0.385	0.000	0.999
R5	-0.002	0.811	0.000	0.983	0.003	0.697
V1	-0.150	0.659	0.322	0.462	-0.385	0.275
V2	-0.197	0.558	-0.070	0.871	-0.035	0.919
V3	-0.316	0.348	-0.180	0.676	-0.077	0.826
V4	-0.009	0.979	0.070	0.869	0.044	0.898
V5	-0.356	0.287	-0.300	0.486	0.092	0.791
MON	0.001	0.088	-0.001	0.008	0.001	<.0001
TUE	0.001	<.0001	0.001	0.015	0.000	0.198
THUR	0.000	0.925	-0.001	0.124	0.000	0.137
FRI	-0.001	0.004	-0.001	0.001	0.000	0.454
L-RATIO1	0.353	<.0001	0.349	<.0001	0.448	<.0001
L-RATIO2	0.246	<.0001	0.236	<.0001	0.239	<.0001
L-RATIO3	0.122	<.0001	0.166	<.0001	0.170	<.0001
L-RATIO4	0.127	<.0001	0.121	<.0001	0.097	0.000
L-RATIO5	0.093	<.0001	0.061	0.003	0.013	0.503
FIRST	-0.005	<.0001	-0.002	0.000	-0.003	<.0001
SECOND	-0.004	<.0001	-0.001	0.036	-0.002	<.0001
SLAST	-0.003	<.0001	-0.003	<.0001	0.000	0.914
LAST	0.000	0.794	0.000	0.561	0.000	0.616
QEND	**0.001**	**0.335**	**0.006**	**<.0001**	**-0.005**	**<.0001**
NEWYEAR	0.006	<.0001	0.012	<.0001	-0.008	<.0001
YEND	**-0.005**	**0.003**	**-0.008**	**<.0001**	**0.003**	**0.058**

Figure 1: Buy Ratio on Last Day of Month

The figure depicts the average 'buy ratio' on the last day of each month. To measure the buy ratio we aggregate the value of buy (sell) transactions based on dollar value, shares traded, and number of transactions on the last day of each month. We then compute the buy ratio using the value of buys relative to the sum of buys and sells. For each institution, we calculate for each month three ratios based on dollar value of trading, shares trades and number of transactions. We then compute equal-weighted and value-weighted buy ratios across all institutions for each month. The value-weightings are based on the aggregate dollar value of trading for each institution, scaled by the total trading in the sample, all on the day of measurement. We calculate the buy ratios for all stocks in the sample (ALL) and also separately for stocks in the five size quintiles (Q1 – Q5). Panel A reports the equal-weighted buy ratios and Panel B reports the value-weighted buy ratio. The sample spans from 1999 through 2005, and includes the trades of more than 300 separate institutions in each of the seven years that we study.

Panel A: Equal Weighted Buy Ratio




Buy Ratio: Number of Shares
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0.700
0.650
0.600
0.550
0.500
0.450
0.400
Ratio
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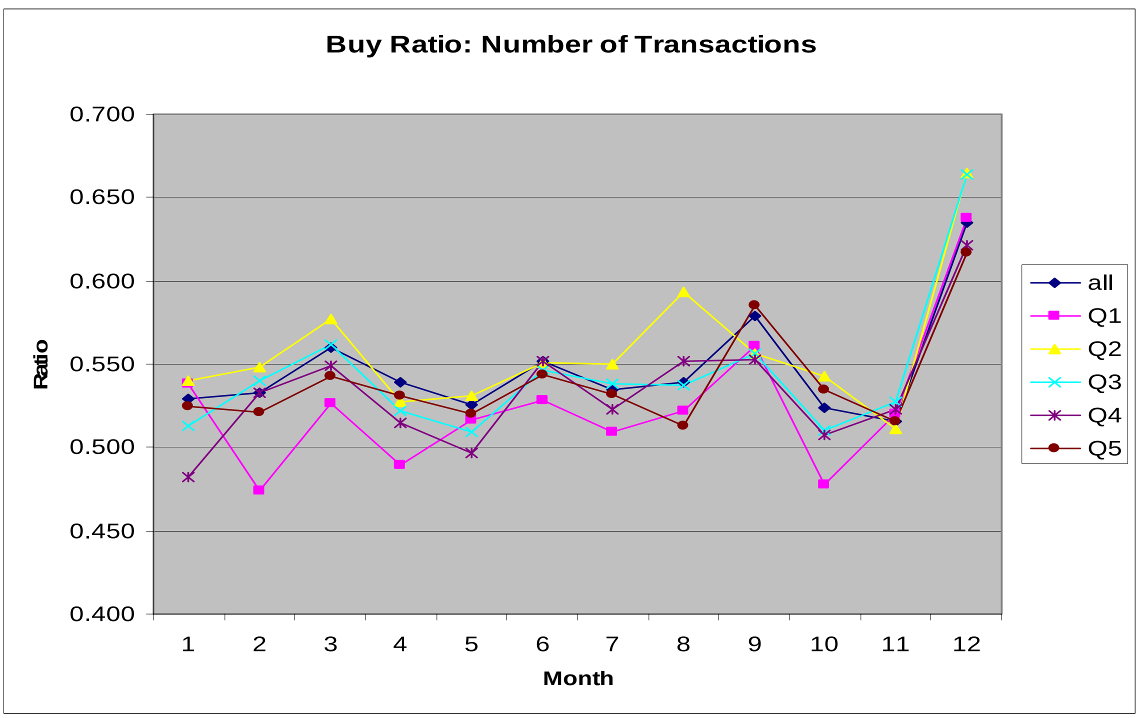
Month
all
Q1
Q2
Q3
Q4
Q5


Buy Ratio: Number of Transactions
0.700
0.650
0.600
0.550
0.500
0.450
0.400
Ratio
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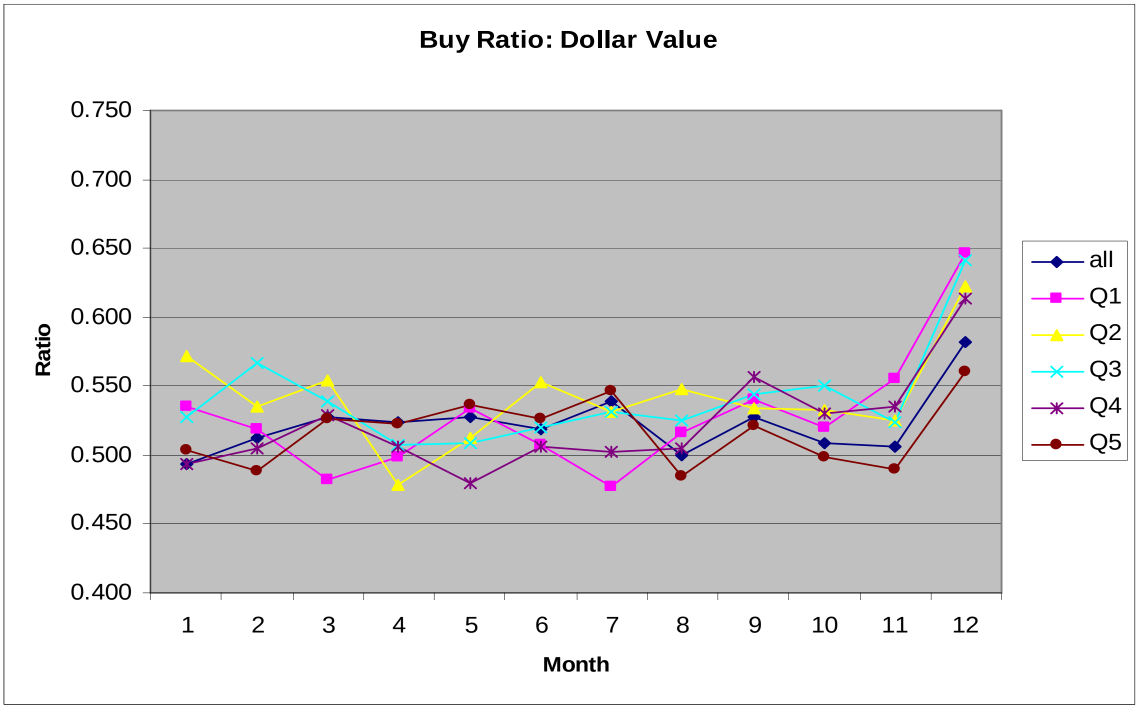
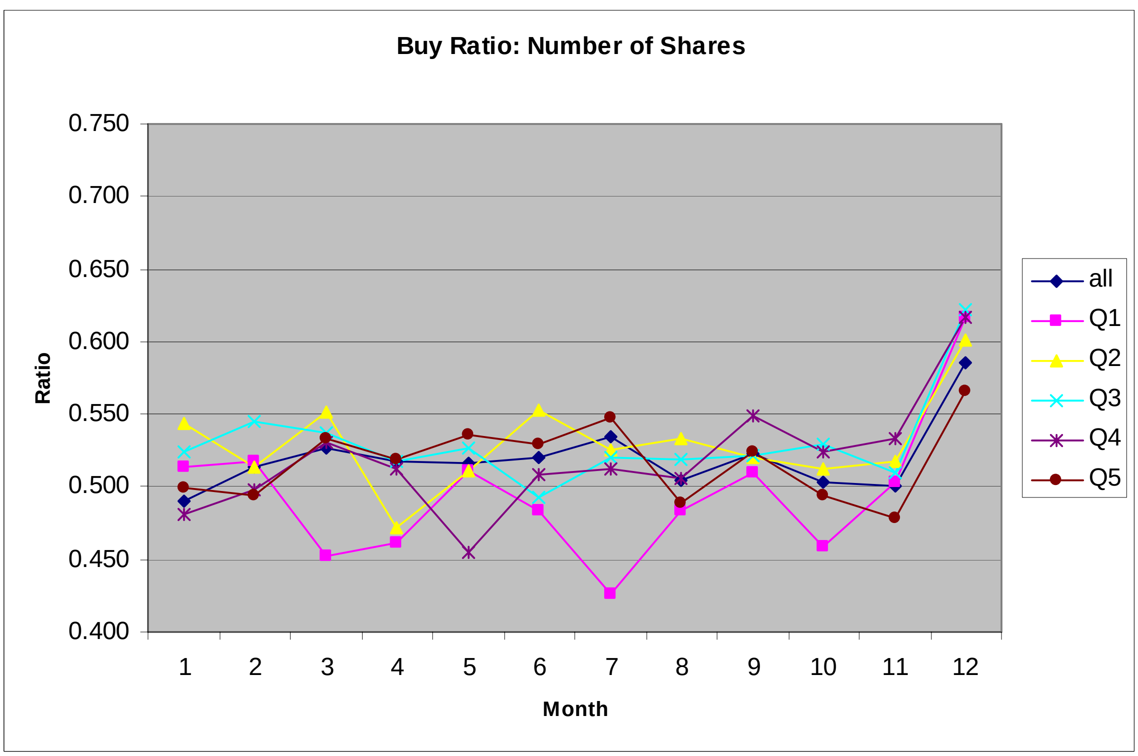
Month
all
Q1
Q2
Q3
Q4
Q5

Panel B: Value Weighted Buy Ratio





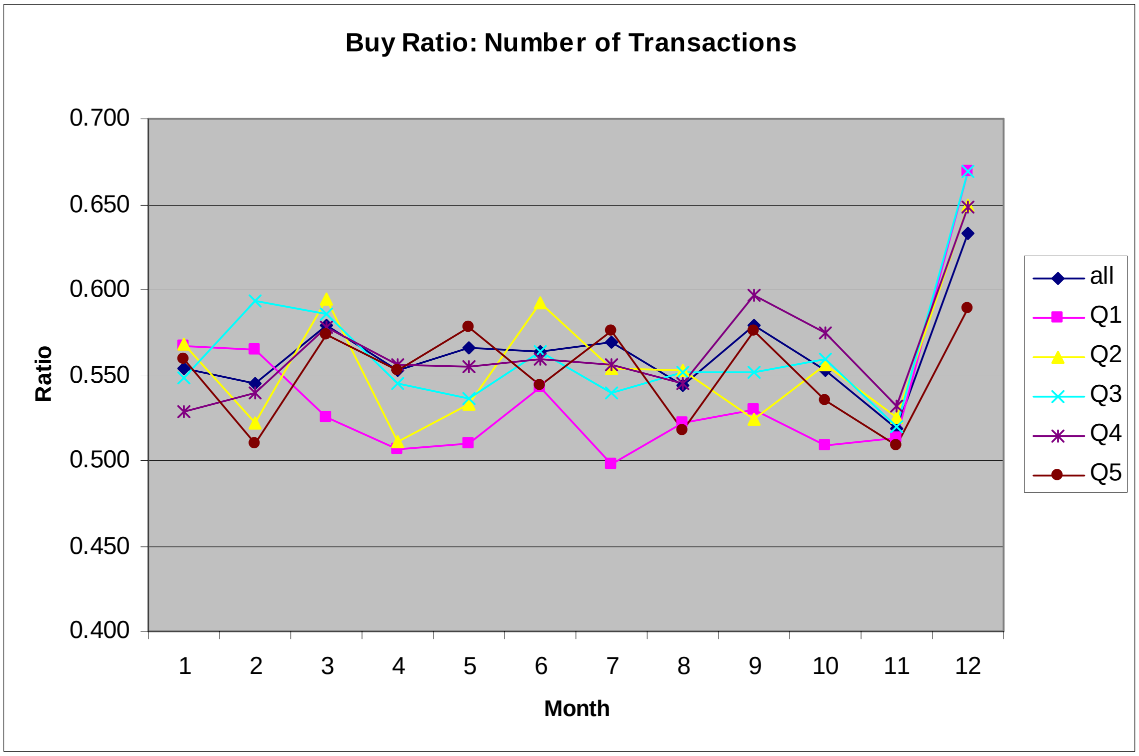
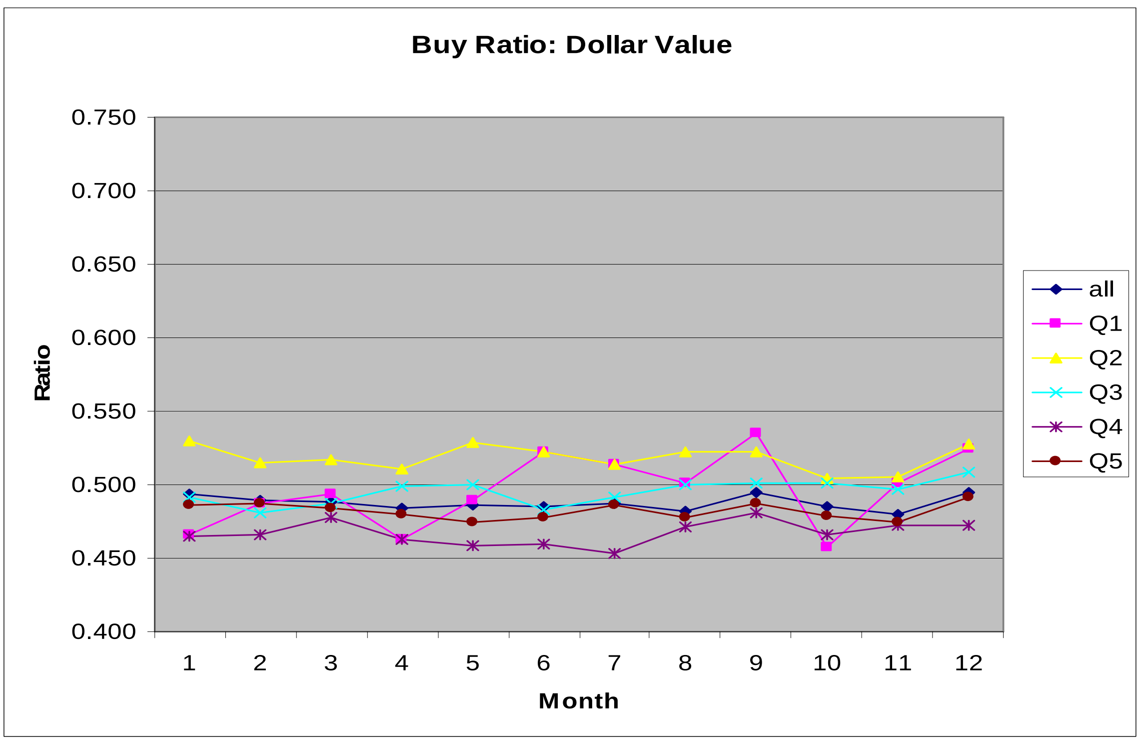
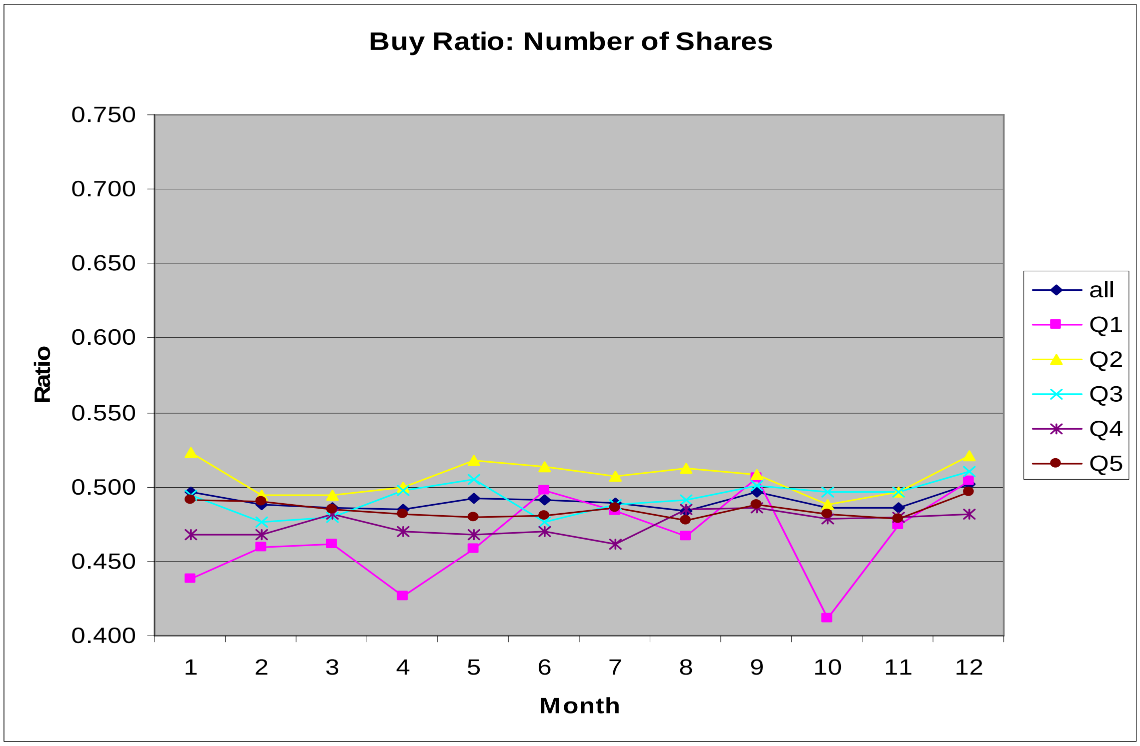
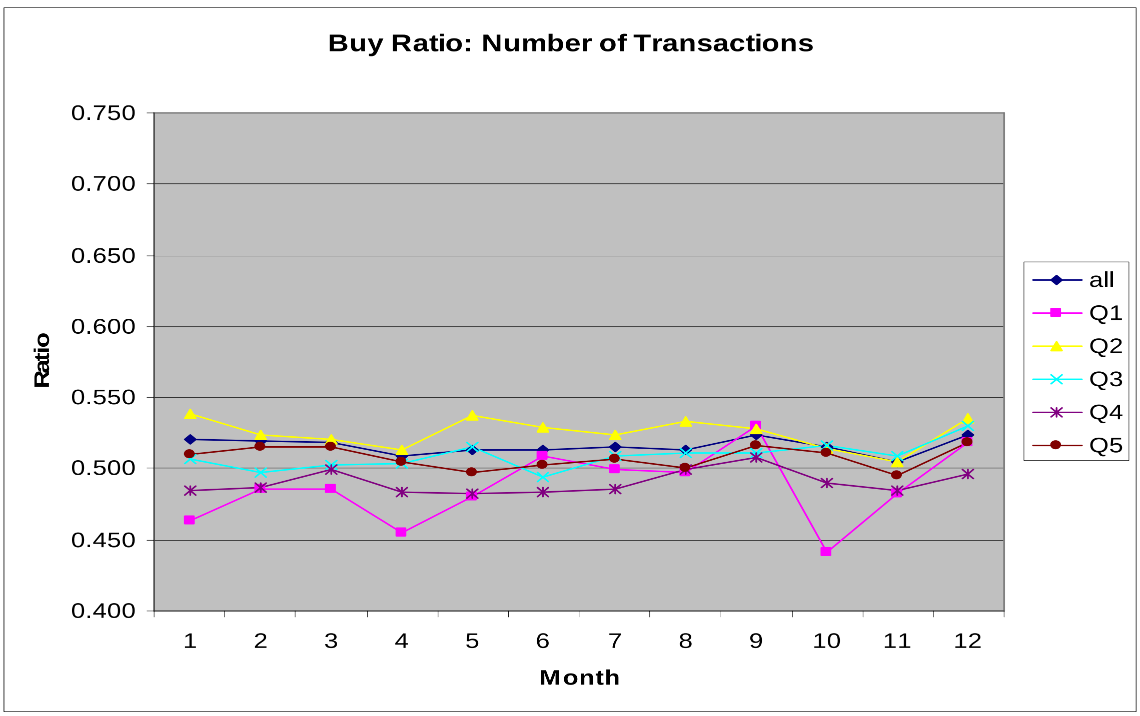

Buy Ratio: Number of Transactions
0.700
0.650
0.600
0.550
0.500
0.450
0.400
Ratio
1
2
3
4
5
6
7
8
9
10
11
12
Month
all
Q1
Q2
Q3
Q4
Q5

Figure 2: Buy Ratio: Excluding Last Day of Month (Equal Weighted)

The figure depicts the average 'buy ratio' for each month excluding the last day of the month. To measure the buy ratio we aggregate the value of buy (sell) transactions based on dollar value, shares traded, and number of transactions on the last day of each month. We then compute the buy ratio using the value of buys relative to the sum of buys and sells. For each institution, we calculate for each month three ratios based on dollar value of trading, shares trades and number of transactions. We then compute equal-weighted buy ratios across all institutions for each month. We calculate the buy ratios for all stocks in the sample (ALL) and also separately for stocks in the five size quintiles (Q1 – Q5). Panel A reports the equal-weighted buy ratios and Panel B reports the value-weighted buy ratio. The sample spans from 1999 through 2005, and includes the trades of more than 300 separate institutions in each of the seven years that we study.




Buy Ratio: Number of Shares
0.750
0.700
0.650
0.600
0.550
0.500
0.450
0.400
Ratio
1
2
3
4
5
6
7
8
9
10
11
12
Month
all
Q1
Q2
Q3
Q4
Q5


Buy Ratio: Number of Transactions
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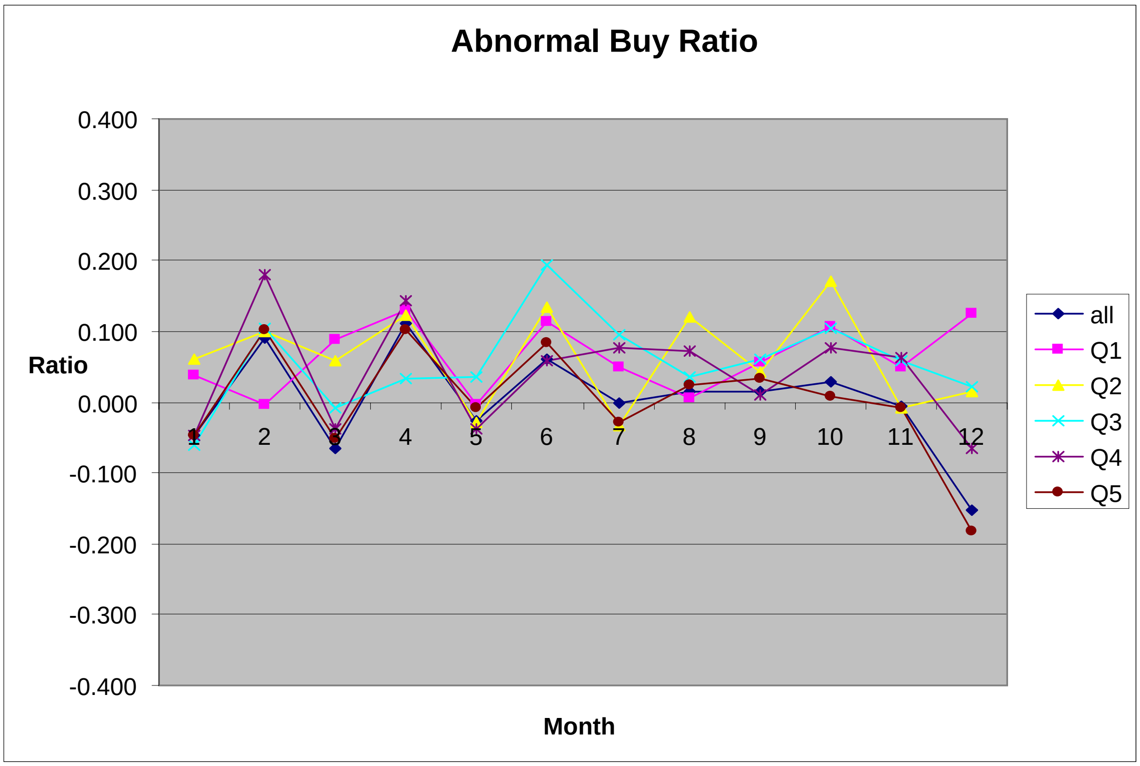
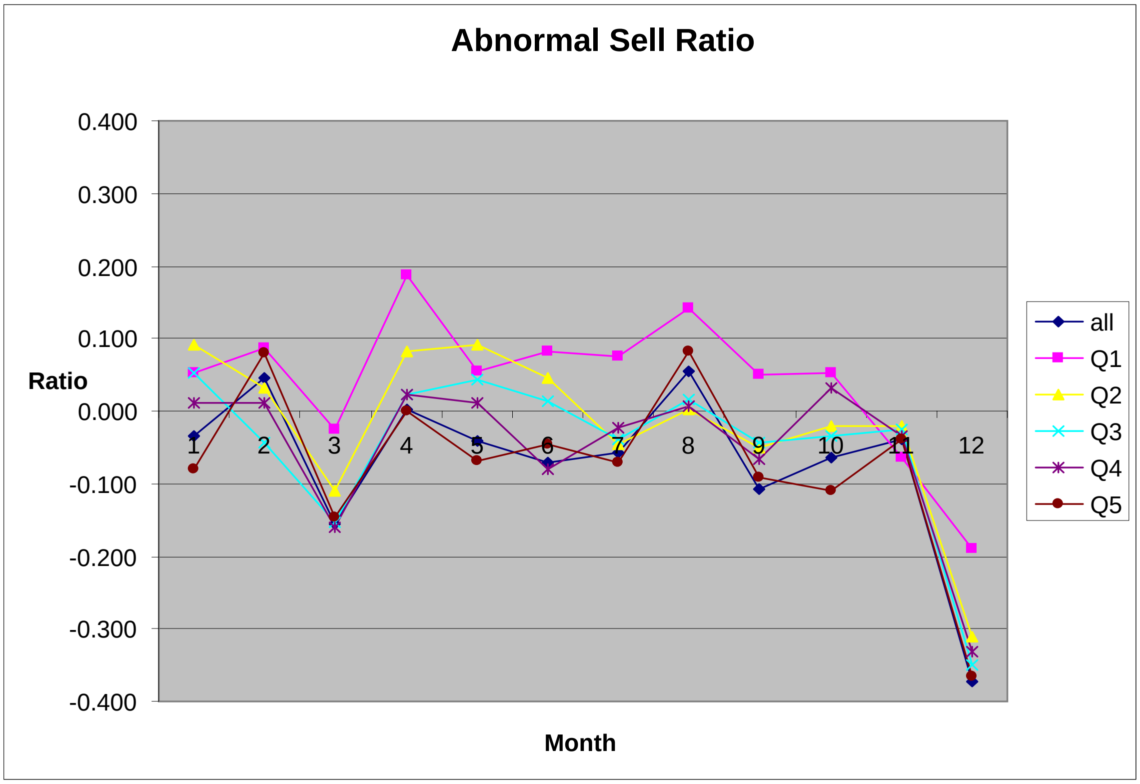
0.700
0.650
0.600
0.550
0.500
0.450
0.400
Ratio
1
2
3
4
5
6
7
8
9
10
11
12
Month
all
Q1
Q2
Q3
Q4
Q5

Figure 3: Last Day of Month Trading vs. Last Five Days of Month Trading

The figure depicts the ratio of trading activity of the last day of the month minus the average trading activity in the last five days of the month, all scaled by the average trading activity in the last five days of the month. We compute the equal-weighted ratios across the institutions for each month. The ratios are computed for all stocks in the sample and also separately for stocks in the five size quintiles (Q1 – Q5), and are averaged for the six year sample period. The sample spans from 1999 through 2005, and includes the trades of more than 300 separate institutions in each of the seven years that we study.





Abnormal Sell Ratio
0.400
0.300
0.200
0.100
0.000
-0.100
-0.200
-0.300
-0.400
Ratio
1
2
3
4
5
6
7
8
9
10
11
12
Month
all
Q1
Q2
Q3
Q4
Q5