

# Does Smart Money Move Markets?

*Institutional investors play a price-setting role.*

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U.S. equityholders can be divided generally into institutional investors and individual investors, who differ in the ways they generate and trade on information. Institutions such as mutual funds, bank trust departments, pension funds, and insurance companies that engage in active portfolio management spend billions, if not tens of billions, of dollars every year in an effort to identify stocks that are mispriced relative to their fundamental values. The equity accounts managed by the College Retirement Equities Fund alone claimed investment advisory expenses of approximately \$100 million for the one-year period ending March 31, 2000.

These so-called smart money institutional investors attempt to profit on their information production by buying what they believe to be underpriced stocks and selling overpriced stocks. Institutions are typically characterized as informed investors who accumulate or sell off stocks until their trades move prices so that they fully reflect their information. Individual investors, on the other hand, are often characterized as uninformed traders who merely add noise to the price formation process.<sup>1</sup>

We examine whether this characterization of institutional investors as price setters is borne out by the data. Our tests use quarterly Securities and Exchange Commission 13(f) holdings reports filed by all U.S. institutions with \$100 million or more in exchange-traded or Nasdaq-quoted equity securities under management. This is our benchmark for dividing aggregate ownership

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flows in individual stocks along institutional and individual investor lines.

With the notable exception of small-capitalization stocks, the evidence is consistent with a conclusion that institutional trades lead stock prices. Stocks that institutions as a group buy from individuals experience positive benchmark-adjusted returns. Stocks that institutions as a group sell to individuals experience negative benchmark-adjusted returns.<sup>2</sup>

Stocks in the quintile experiencing the greatest increase in institutional ownership outperform those in the quintile experiencing the greatest decline by an average of 8.1% per quarter over 1980–1994. The direction of the positive association is stable; stocks that institutions buy outperform those they sell in each year from 1980 through 1994. The average return difference more than doubles from 6.2% per quarter over 1980–1984 to 13.0% per quarter over 1990–1994, consistent with the observation that institutions are playing an increasingly active price-setting role in equity markets.

This positive association between institutional ownership flows and returns may not be the result solely of institutions moving prices with their trades. It could be the result in whole or in part of institutions systematically engaging in a momentum trading strategy: buying stocks that have recently increased in price, and selling those that have declined in price. Results based on the pattern of returns within the quarter allow us to make inferences about the degree to which institutions move prices with their trades or, alternatively, engage in momentum trading. The evidence is consistent with the idea that institutions move prices with their trades, rather than through within-quarter momentum trading.

The notable exception occurs when institutions increase their holdings in small-capitalization stocks. Small-capitalization stocks that institutions buy from individuals exhibit negative, but statistically insignificant, benchmark-adjusted returns.

Do individuals have a reason to systematically sell small-capitalization stocks? The most studied rationale for systematic selling by individuals is capital loss recognition for tax reasons. Presumably because small-cap stocks are more widely owned by individuals and are relatively illiquid, the research finds the greatest support for the tax-loss-selling hypothesis in the returns of small-cap stocks.<sup>3</sup>

Our evidence is consistent with the notion that individuals initiate sales of small-capitalization stocks to establish tax-deductible capital losses, thereby causing

price declines. Recognizing that individual investors are more likely to sell loser stocks that recently declined in price for tax reasons, we separately examine the returns of stocks that were recent losers and winners. We find that small-capitalization losers that institutions buy from individuals exhibit negative benchmark-adjusted returns; small-capitalization winners that institutions sell to individuals exhibit positive benchmark-adjusted returns.

Recognizing that tax-loss selling by individuals is most likely to reach its peak in the fourth quarter, we examine the returns of small-capitalization stocks bought by institutions separately in each quarter. Again consistent with the tax-loss selling hypothesis, we find that the negative returns of small-capitalization stocks that institutions buy from individuals are concentrated in the fourth quarter.

We make three contributions to the literature. First is that the 13(f) database on institutional holdings allows for the most comprehensive characterization to date of the association between institutional ownership flows in individual stocks and same-period returns. And some of the inferences drawn from this more comprehensive evidence differ from those suggested by earlier evidence.

We also contribute to the momentum trading literature. Although Grinblatt, Titman, and Wermers [1995] and Wermers [1999] provide evidence that some mutual funds engage in momentum trading, Badrinath and Wahal [2000] find that institutions *as a group* do not engage in momentum trading over a quarter-to-quarter time frame. They reconcile these findings with the earlier evidence by suggesting that counterparties to the momentum trading of certain institutions are other institutions. We provide evidence that this lack of momentum trading by institutions *as a group* extends to periods shorter than one quarter.

Finally, we find evidence that complements the literature documenting a January effect for small-capitalization stocks. The evidence of positive abnormal returns in January has been attributed to rebounding of stock prices to fundamental values after they have been driven down by individual investors selling stocks to realize capital losses for tax reasons. We round out this story by providing evidence of the initial move of stock prices away from fundamental values. When we condition on small-capitalization stocks that individuals sell to institutions, we find evidence of price declines that are consistent with price pressures related to tax-loss selling.

## EXHIBIT 1

### Empirical Research on the Relationship of Institutional Ownership Changes and Same-Period Stock Returns

| Study                                   | Institutional Ownership Data Source                   | Sample Institutions                           | Sample Stocks                     | Length of Ownership Interval | Synchronous Ownership Data? | Time Period            | Empirical Relationship between Institutional Ownership Changes and Same-Period Stock Returns |
|---|---|---|-----------------------------------|------------------------------|-----------------------------|------------------------|--|
| Kraus and Stoll (1972)                  | SEC Institutional Investor Study                      | 229 SEC study participants                    | 325 NYSE and AMEX stocks          | Monthly                      | Yes                         | Jan. 1968 – Sept. 1969 | Weak positive relationship   |
| Lakonishok, Shleifer, and Vishny (1992) | SEI Database  | 341 tax-exempt (mostly pension) fund managers | All NYSE, AMEX, and Nasdaq stocks | Quarterly                    | Yes                         | 1985-1989              | No consistent relationship*  |
| Wermers [1999]                          | CDA Database  | All mutual funds                              | All NYSE, AMEX, and Nasdaq stocks | Quarterly                    | No**                        | 1975-1994              | Positive relationship  |
| Nofsinger and Sias [1999]               | Jan. issues of S&P <i>Security Owners Stock Guide</i> | All institutions                              | All NYSE stocks                   | Yearly                       | Yes                         | 1977-1996              | Positive relationship  |

\* Using cut-off points for size quintiles determined from the universe of NYSE and AMEX stocks, LSV find evidence of a positive relation for the smallest-capitalization stocks. Note, however, that pension funds traded in very few small-capitalization stocks during LSV's sample period.

\*\* CDA collects its mutual fund stock ownership data from SEC N30-D filings and voluntary reports. Wermers reports that since 1985, N30-Ds are filed only twice per year in conjunction with the mutual fund's fiscal year. CDA fills in missing quarters by carrying forward the holdings given in the N30-D filing of the prior quarter. Because more than one-third of mutual funds' fiscal year-ends are not the same as the end of a calendar quarter, a substantial fraction of the calendar-quarter ownership change estimates may not be synchronous with calendar-quarter stock returns. CDA's practice of filling missing quarters with prior-quarter data exacerbates this non-synchronicity.

## BACKGROUND RESEARCH

The empirical evidence on the relationship of institutional ownership changes in individual stocks and same-period returns is mixed. Moreover, it is characterized by data limitations, some of which are remediated in the database we use. Exhibit 1 summarizes the research.

The first three articles examine ownership changes of institutions that are a subset of the sample we examine. In the first study of this type, Kraus and Stoll [1972] find a (weak) positive relationship between returns and ownership changes for 229 institutions that voluntarily participated in a Securities and Exchange Commission study. Casting doubt on the price leadership role of institutional investors, Lakonishok, Shleifer, and Vishny [1992] find no association between returns and ownership changes for 341 pension funds. Wermers [1999], on the other hand, reports evidence that stocks bought (sold) at the same time by a predominant number of mutual funds exhibit positive (negative) abnormal returns.

The SEC 13(f) database that we use overcomes limitations of the databases in these three studies. We are able to study a much broader set of institutional investors. Perhaps less apparent, but significant, our ownership data are same-time figures. That is, our data permit us to measure ownership levels for all institutions as of the same time (at the end of each calendar quarter). This allows us to

directly analyze the relationship between quarterly ownership flows for institutions as a group and same-quarter stock returns.

The CDA database examined in some other studies uses N30-Ds as a key input. N30-Ds are filed by mutual funds only twice a year in conjunction with fund fiscal year-ends. As Gibson, Safieddine, and Titman [2000] report, funds' fiscal year-ends are spread widely over the year. Clearly an empirical methodology that shifts N30-D ownership data forward to the end of the nearest calendar quarter creates problems in the context of a study such as ours.

Perhaps the most closely related research to ours is Nofsinger and Sias [1999], who find a positive association between yearly institutional ownership changes and same-year returns for New York Stock Exchange companies. Again the 13(f) database overcomes data limitations. Although the Nofsinger and Sias [1999] breadth of institutions is similar to ours, we measure ownership changes over much shorter intervals (quarterly versus yearly). More can potentially be inferred from examining shorter intervals, given that institutions may be moving stock prices with their trades or engaging in short-term (within-period) momentum trading.<sup>4</sup>

Also differentiating our study is a sample that includes all NYSE, AMEX, and Nasdaq stocks; the Nofsinger and Sias [1999] sample includes only NYSE stocks. This

## EXHIBIT 2

### Characteristics of Ownership Flow-Based and Capitalization-Based Portfolios

| Market Capitalization | 5-Year Subperiods |                 |                  |                 |                  |                 | 15-Year Period   |                 |
|-----------------------|-------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|-----------------|
|                       | 1980 – 1984       |                 | 1985 – 1989      |                 | 1990 – 1994      |                 | 1980 – 1994      |                 |
|                       | Sell Stocks       | Buy Stocks      | Sell Stocks      | Buy Stocks      | Sell Stocks      | Buy Stocks      | Sell Stocks      | Buy Stocks      |
| All Stocks            | 21.92<br>(-3.18)  | 21.96<br>(4.77) | 26.95<br>(-4.23) | 28.23<br>(5.52) | 32.35<br>(-4.92) | 33.79<br>(6.24) | 27.93<br>(-4.25) | 28.97<br>(5.63) |
| Small-Capitalization  | 8.63<br>(-3.25)   | 8.04<br>(5.21)  | 11.49<br>(-3.68) | 11.37<br>(5.37) | 14.43<br>(-4.64) | 12.26<br>(5.64) | 11.95<br>(-3.95) | 10.79<br>(5.43) |
| Mid-Capitalization    | 18.44<br>(-3.16)  | 18.39<br>(4.90) | 25.07<br>(-4.22) | 25.29<br>(5.59) | 31.49<br>(-5.22) | 31.24<br>(6.61) | 26.17<br>(-4.39) | 26.08<br>(5.85) |
| Large-Capitalization  | 37.95<br>(-2.92)  | 37.29<br>(4.20) | 43.89<br>(-4.26) | 42.11<br>(5.26) | 47.99<br>(-4.20) | 49.62<br>(5.32) | 43.88<br>(-3.87) | 43.92<br>(5.02) |

Time series means of the beginning-of-quarter institutional ownership. Quarterly institutional ownership changes are in parentheses.

broader sample of stocks used in our study proves significant, as our empirical results for large-capitalization stocks differ dramatically from those for small-capitalization stocks (which are almost entirely Nasdaq stocks).

#### DATA AND SAMPLE

Institutional stock ownership data for the 60 quarters from the first quarter of 1980 through the fourth quarter of 1994 are obtained from the Spectrum database compiled by CDA Investment Technologies. Spectrum provides quarterly information on institutional ownership of NYSE, AMEX, and Nasdaq stocks extracted from 13(f) reports filed with the SEC. The 1975 revision to the Securities Exchange Acts requires all institutional investment managers with \$100 million or more in exchange-traded or Nasdaq-quoted equity securities under management to file 13(f) reports within 45 days of the end of each calendar quarter. Institutions are required to report all equity positions greater than either 10,000 shares or \$200,000 in market value.

The Spectrum database may underestimate institutional ownership for three reasons. First, unless voluntarily reported in 13(f) filings, individual stock positions of fewer than 10,000 shares and under \$200,000 in market value are excluded. Second, institutions with assets of less than \$100 million that do not voluntarily file 13(f) reports are excluded. Finally, some institutions with assets greater than \$100 million, such as non-U.S. institutions,

are not required to file 13(f)s. The Spectrum database nevertheless allows us to measure the direction and extent of ownership flows between institutional and individual investors without any readily apparent systematic biases.

Stock return data are obtained from the Center for Research in Security Prices. Financial statement data are obtained from Compustat.

#### Construction of Portfolios—Ownership Flows

For each stock and each quarter, we compute the net change in aggregate institutional ownership as a percentage of the firm's outstanding shares. Specifically, we measure the net change in ownership for stock  $n$  in quarter  $q$ ,  $\Delta own_{nq}$ , as:

$$\Delta own_{nq} = \frac{\sum_{i=1}^I \text{shares owned of stock } n \text{ by institution } i \text{ at the end of quarter } q}{\text{shares outstanding of stock } n \text{ at the end of quarter } q} - \frac{\sum_{i=1}^I \text{shares owned of stock } n \text{ by institution } i \text{ at the beginning of quarter } q}{\text{shares outstanding of stock } n \text{ at the beginning of quarter } q}$$

where  $I$  is the total number of institutions in the Spectrum database at that time. In other words, if a firm has 100 shares outstanding and one institution sells five shares and another buys ten shares, we measure the net change in aggregate institutional ownership as a 5% increase in outstanding shares.

We use the  $\Delta own_{nq}$  measure to sort portfolios while

controlling for the level of institutional ownership as of the beginning of the quarter. Stocks are first sorted into quintiles based on beginning-of-quarter ownership levels. Within each quintile, stocks are then sorted into quintiles based on the  $\Delta own_{nq}$  measure. The lowest (highest)  $\Delta own_{nq}$  quintiles from each capitalization quintile are then combined and categorized as sell (buy) stocks.

The sell and buy portfolios constructed in this manner have roughly equal beginning-of-quarter institutional holdings. Thus, any difference in stock market performance that we find between the sell and buy subgroups is not due to the *level* of institutional ownership but instead to *changes* in institutional ownership.

### **Construction of Portfolios— Market Capitalization**

The analysis takes into consideration a stock's market capitalization. Falkenstein [1996] and Gompers and Metrick [2001] have suggested that institutions' information production and trading strategies may be influenced by liquidity considerations. Unlike individuals, institutions are more likely to be wary of the price effects of their trades. For a stock to receive coverage by an institution that actively manages its portfolio, it must provide at least the potential to recoup the associated research costs. An institution must thus be able to both accumulate and unwind sufficiently large stock positions before its trades move prices so that they fully reflect its information.

The empirical implication for the level of holdings, confirmed by the findings of Falkenstein [1996] and Gompers and Metrick [2001], is that institutions hold smaller positions in small-capitalization stocks. We want to examine the extent to which differences in information production and trading strategies affect institutional ownership flows and associated price movements across stocks with varying liquidity characteristics. We do this by separately examining stocks at small- and large-capitalization extremes.

We split the sample into quintiles based on market capitalization as of the beginning of the quarter. Stocks in the lowest, the middle three, and the highest capitalization quintiles are categorized as small-, mid-, and large-capitalization stocks, respectively. We repeat the buy/sell classification methodology described above for each capitalization portfolio.

### **Institutional Ownership Levels and Ownership Flows**

Exhibit 2 reports institutional ownership levels and ownership flow for the entire sample and capitalization subgroups for the entire 1980-1994 period and three five-year subperiods.

Institutional ownership levels (measured as a percentage of firms' outstanding shares) increase dramatically over the sample period. Regardless of capitalization, the average ownership level for sell stocks increases from an average of 21.92% over 1980-1984 to 32.35% over 1990-1994, and for buy stocks from 21.96% to 33.79%. A similar pattern of increasing institutional ownership levels is present in each capitalization subgroup. Consistent with Falkenstein [1996] and Gompers and Metrick [2001], we find that institutions own a higher percentage of the outstanding shares of large-capitalization stocks than small-capitalization stocks.

The extent of institutional ownership flows (measured as a percentage of firms' outstanding shares) also increases over the sample period. Unlike ownership levels, ownership flows are similar across capitalization subgroups. For example, over 1980-1994 the average declines in holdings for small and large-capitalization sell stocks are 3.95% and 3.87%, respectively, and the average increases in holdings for small and large-capitalization buy stocks are 5.43% and 5.02%, respectively.

Given the similarity in ownership flows, one might expect to observe similar return patterns for the sell/buy portfolios across capitalization subgroups. In fact, this is not the case.

### **OWNERSHIP FLOWS AND BENCHMARK-ADJUSTED RETURNS**

We examine how quarterly ownership flows between institutional and individual investors are related to same-quarter benchmark-adjusted stock returns in order to determine whether the evidence is consistent with the belief that so-called smart money institutional investors play a price-setting leadership role in the equity markets. Of course the finding of a positive relation between institutional ownership flows and returns is consistent not only with the notion that institutions move stock prices with their trades, but also that institutions have a tendency to sell recent losers and buy recent winners.



## Calculation of Benchmark-Adjusted Returns and Test Statistics

We calculate benchmark-adjusted returns using a standard market model approach. We subtract the CRSP value-weighted index return from the equally weighted return of each portfolio. Remember that the sorting methods give the resulting sell and buy portfolios similar levels of institutional holdings as of the beginning of a quarter. Hence any return differences found between sell and buy portfolios cannot be attributed to differences in institutional ownership levels.

To apply a robustness check that the CRSP value-weighted model does not properly account for risk factors that are somehow systematically related to institutional trading, we also calculate benchmark-adjusted returns using the three-factor characteristic model. That is, we compare the return of each stock to the return of a benchmark portfolio consisting of stocks in the same capitalization quintile, the same book-to-market quintile, and the same price momentum quintile at the beginning of the quarter.<sup>5</sup>

The benchmark-adjusted returns for each sell and buy portfolio are computed as the equally weighted average of the benchmark-adjusted returns of all stocks meeting the portfolio criteria. The composition of the characteristic portfolios and each sell and buy portfolio is updated quarterly.

The benchmark-adjusted returns calculated in the two ways described above may not be independent within each quarter, so *t*-statistics computed from cross-sectional standard errors may be biased upward. To account for this possibility, we report the time series average of the cross-sectional mean benchmark-adjusted returns and the associated *t*-statistics computed from the time series standard errors.

Recognize that the test statistics we report are thus based on 60 quarterly observations over the 1980–1994 period, or only 20 observations over the five-year subperiods. Given the relatively small number of observations, the finding of statistically significant return patterns that are linked to ownership flows is likely not the result of Type I errors.

## Benchmark-Adjusted Return Results

Exhibit 3 reports the time series average of the cross-sectional mean benchmark-adjusted returns for the sell and buy portfolios and the return differentials between

the sell and buy portfolios. Panel A is based on the CRSP value-weighted model and Panel B on the three-factor characteristic model. The *t*-statistics in parentheses below the benchmark-adjusted returns are computed from the time series standard errors.

We first examine the CRSP value-weighted benchmark-adjusted returns. When all stocks are pooled together regardless of capitalization, we find that those experiencing a decline (increase) in institutional ownership exhibit negative (positive) returns. Over 1980–1994, the returns (*t*-statistics) of  $-2.63\%$  (3.93) for the sell portfolios and  $5.44\%$  (5.10) for the buy portfolios are highly significant. The return difference (*t*-statistic) of 8.06 percentage points (6.41) between the sell and buy portfolios is also highly significant.

The positive relationship between institutional flows and returns is stable, with significant return differences between the sell and buy portfolios in each of the 1980–1984, 1985–1989, and 1990–1994 subperiods. As further testament to the stability of the relationship, unreported results confirm that the return difference is significant in each of the 15 years 1980–1994.<sup>6</sup>

Notable is an increase in the extent of the return difference in the last part of the sample period. The return difference (*t*-statistic) more than doubles from 6.16 percentage points (3.39) over 1980–1984 to 13.03 percentage points (5.71) over 1990–1994.

We observe the same pattern in mid- and large-capitalization stocks: negative returns for those sold by institutions, and positive returns for those bought. The same return pattern, however, is not found for small-capitalization stocks. Small-capitalization stocks that institutions buy from individuals experience negative benchmark-adjusted returns that are not significantly different from zero. Over 1980–1994, the returns (*t*-statistics) for the small-capitalization sell and buy portfolios are  $-6.24$  (4.45) and  $-0.39$  (0.25), respectively.

Looking at the three-factor characteristic benchmark-adjusted returns in Panel B, we find that the inferences drawn are qualitatively the same as those drawn from the CRSP value-weighted results. Again the return pattern, with the exception of that for small-capitalization stocks bought by institutions, is consistent with the idea that institutions either move stock prices or engage in within-quarter feedback trading.

## WITHIN-QUARTER RETURN PATTERNS

Are institutions moving stock prices with their trades, or are they engaging in within-quarter momen-

## EXHIBIT 3

### Benchmark-Adjusted Returns

Panel A: CRSP Value-Weighted Benchmark-Adjusted Returns

| Market Capitalization | 5-Year Subperiods |                 |                 |                  |                  |                  |                  |                 |                  | 15-Year Period   |                 |                 |
|-----------------------|-------------------|-----------------|-----------------|------------------|------------------|------------------|------------------|-----------------|------------------|------------------|-----------------|-----------------|
|                       | 1980 – 1984       |                 |                 | 1985 – 1989      |                  |                  | 1990 – 1994      |                 |                  | 1980 – 1994      |                 |                 |
|                       | Sell Stocks       | Buy Stocks      | Buy–Sell        | Sell Stocks      | Buy Stocks       | Buy–Sell         | Sell Stocks      | Buy Stocks      | Buy–Sell         | Sell Stocks      | Buy Stocks      | Buy–Sell        |
| All Stocks            | -1.29<br>(1.23)   | 4.87<br>(3.29a) | 6.16<br>(3.39a) | -2.84<br>(4.18a) | 2.16<br>(3.32a)  | 5.00<br>(5.32a)  | -3.75<br>(2.45a) | 9.28<br>(5.49a) | 13.03<br>(5.71a) | -2.63<br>(3.93a) | 5.44<br>(5.10a) | 8.06<br>(6.41a) |
| Small-Capitalization  | -5.24<br>(2.24b)  | -1.09<br>(0.41) | 4.15<br>(1.18)  | -7.81<br>(7.15a) | -3.25<br>(1.47)  | 4.56<br>(1.85c)  | -5.67<br>(1.57)  | 3.16<br>(1.05)  | 8.83<br>(1.88c)  | -6.24<br>(4.45a) | -0.39<br>(0.25) | 5.85<br>(2.77a) |
| Mid-Capitalization    | -1.04<br>(0.90)   | 4.41<br>(2.69a) | 5.44<br>(2.72a) | -2.30<br>(2.37b) | 2.00<br>(2.41b)  | 4.30<br>(3.37a)  | -3.06<br>(1.94b) | 9.73<br>(5.37a) | 12.79<br>(5.32a) | -2.13<br>(3.01a) | 5.38<br>(4.58a) | 7.51<br>(5.48a) |
| Large-Capitalization  | -1.78<br>(2.33b)  | 6.23<br>(5.29a) | 8.01<br>(5.71a) | -0.87<br>(2.27b) | 4.08<br>(18.53a) | 4.95<br>(11.19a) | -2.83<br>(4.28a) | 9.95<br>(9.06a) | 12.79<br>(9.97a) | -1.83<br>(4.61a) | 6.75<br>(8.24a) | 8.58<br>(9.43a) |

Panel B: 3-Factor Characteristic Benchmark-Adjusted Return

| Market Capitalization | 5-Year Subperiods |                  |                 |                   |                  |                  |                   |                  |                   | 15-Year Period   |                 |                  |
|-----------------------|-------------------|------------------|-----------------|-------------------|------------------|------------------|-------------------|------------------|-------------------|------------------|-----------------|------------------|
|                       | 1980 – 1984       |                  |                 | 1985 – 1989       |                  |                  | 1990 – 1994       |                  |                   | 1980 – 1994      |                 |                  |
|                       | Sell Stocks       | Buy Stocks       | Buy–Sell        | Sell Stocks       | Buy Stocks       | Buy–Sell         | Sell Stocks       | Buy Stocks       | Buy–Sell          | Sell Stocks      | Buy Stocks      | Buy–Sell         |
| All Stocks            | -1.76<br>(3.13a)  | 3.73<br>(5.63a)  | 5.48<br>(6.32a) | -1.16<br>(12.15a) | 3.36<br>(10.38a) | 4.52<br>(13.40a) | -4.27<br>(45.64a) | 8.24<br>(16.27a) | 12.51<br>(24.29a) | -2.40<br>(5.97a) | 5.11<br>(7.81a) | 7.50<br>(9.78a)  |
| Small-Capitalization  | -5.37<br>(6.40a)  | -2.09<br>(1.86c) | 3.28<br>(2.34b) | -4.80<br>(5.10a)  | -0.97<br>(0.51)  | 3.83<br>(1.80c)  | -6.67<br>(5.12a)  | 2.68<br>(1.37)   | 9.35<br>(3.98c)   | -5.61<br>(9.40a) | -0.13<br>(0.12) | 5.49<br>(4.51a)  |
| Mid-Capitalization    | -1.75<br>(4.39a)  | 3.73<br>(6.27a)  | 5.48<br>(7.65a) | -0.46<br>(1.31c)  | 3.47<br>(7.25a)  | 3.93<br>(6.62a)  | -3.68<br>(12.44a) | 8.72<br>(19.26a) | 12.40<br>(22.93a) | -1.96<br>(4.90a) | 5.31<br>(7.56a) | 7.27<br>(8.99a)  |
| Large-Capitalization  | -1.66<br>(2.08b)  | 5.43<br>(5.73a)  | 7.09<br>(5.72a) | -0.86<br>(2.43b)  | 4.10<br>(54.94a) | 4.96<br>(13.77a) | -3.08<br>(14.55a) | 8.68<br>(16.01a) | 11.76<br>(20.21a) | -1.87<br>(5.04a) | 6.07<br>(9.88a) | 7.94<br>(11.06a) |

Time series mean of quarterly benchmark-adjusted returns. *t*-statistics based on time series standard errors are in parentheses. *a*, *b*, and *c* indicate statistical significance at the 1%, 5%, and 10% level, respectively.

tum trading? To answer this question, we examine the pattern of returns within the quarter.

### Methodology

To understand the rationale behind our methodology, first suppose that institutions engage in security analysis and move prices with information-based trades. Under the presumption that institutional information production efforts result in trades that are on average evenly spread out over the quarter, the price effects of such trades ought also to be on average evenly spread out over the quarter. If we condition on a portfolio of stocks that institutions buy (sell) within a given quarter, we ought to observe positive (negative) returns that are on average equal in extent across the quarter.

Presume next that institutions engage in a momentum trading strategy. Suppose a particular stock has a sig-

nificant price run-up at the very beginning of the quarter. Institutions following a momentum trading strategy have the rest of the quarter to buy the stock. Now consider a different stock that has a price run-up at the very end of the quarter. Institutions following a momentum trading strategy will still buy the stock, but their buying will spill over into the next quarter.

The implication is that, if we condition on a portfolio of stocks that institutions buy within a given quarter, we ought to observe positive returns that are greater toward the beginning of the quarter than toward the end of the quarter; stocks sold would similarly have more negative returns toward the beginning of the quarter.

To make a test of these alternative empirical predictions operational, we examine how the return difference between the buy and sell portfolios compares in the first and the last weeks of the quarter. If institutions as a group are moving prices with their trades and not engag-

## EXHIBIT 4

### Return Differentials Between Buy and Sell Portfolios in First and Last Week of the Quarter

| Quarter              | 5-Year Subperiods |                 |                 |                 |                 |                 |                 |                 |                 | 15-Year Period  |                 |                 |
|----------------------|-------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                      | 1980 – 1984       |                 |                 | 1985 – 1989     |                 |                 | 1990 to 1994    |                 |                 | 1980 – 1994     |                 |                 |
|                      | First Week        | Last Week       | First–Last      | First Week      | Last Week       | First–Last      | First Week      | Last Week       | First–Last      | First Week      | Last Week       | First–Last      |
| All Stocks           | 0.31<br>(2.61a)   | 0.49<br>(3.29a) | -0.18<br>(0.82) | 0.26<br>(2.98a) | 0.35<br>(2.74a) | -0.09<br>(0.59) | 0.64<br>(5.43a) | 0.55<br>(4.97a) | 0.09<br>(0.54)  | 0.40<br>(6.16a) | 0.46<br>(6.21a) | -0.06<br>(0.55) |
| Small-Capitalization | 0.25<br>(1.10)    | 0.25<br>(1.02)  | 0.00<br>(0.00)  | -0.10<br>(0.56) | 0.31<br>(1.41)  | -0.41<br>(1.32) | 0.26<br>(0.82)  | -0.05<br>(0.16) | 0.31<br>(0.91)  | 0.14<br>(0.98)  | 0.17<br>(0.25)  | -0.03<br>(0.17) |
| Mid-Capitalization   | 0.30<br>(3.67a)   | 0.41<br>(2.87a) | -0.11<br>(0.61) | 0.21<br>(2.19b) | 0.22<br>(2.91a) | -0.01<br>(0.10) | 0.59<br>(1.54)  | 0.63<br>(6.33a) | -0.04<br>(0.10) | 0.37<br>(2.76a) | 0.42<br>(6.39a) | -0.05<br>(0.35) |
| Large-Capitalization | 0.04<br>(0.31)    | 0.47<br>(2.37b) | -0.43<br>(1.56) | 0.23<br>(2.57b) | 0.20<br>(2.53b) | 0.03<br>(0.41)  | 0.76<br>(3.02a) | 0.58<br>(3.94a) | 0.18<br>(0.54)  | 0.34<br>(3.24a) | 0.42<br>(4.76a) | -0.07<br>(0.49) |

Return differentials between buy and sell portfolios in first and last five trading days of each quarter. *t*-statistics based on time series standard errors are in parentheses. *a*, *b*, and *c* indicate statistical significance at the 1%, 5%, and 10% level, respectively.

ing in momentum trading, we ought to observe a positive return differential between stocks institutions buy and those they sell that is equal in the first week and the last week of the quarter. Alternatively, if institutions do not move prices with their trades and are engaging in short-term momentum trading, the first-week return differential ought to be positive, and the last-week return differential ought to approach zero.

#### Within-Quarter Return Results

Exhibit 4 reports the time series average of the difference between the raw returns for the sell and buy portfolios in the first week and the last week of the quarter, as well as the return differentials between the first and last week. The *t*-statistics in parentheses below the returns are computed from the time series standard errors.

We find evidence consistent with institutions moving prices with their trades, but not with within-quarter momentum trading. Over 1980-1994 for the entire sample of stocks regardless of capitalization, the first-week and last-week return differentials (*t*-statistics) of 0.40% (6.16) and 0.46% (6.21), respectively, are significantly different from zero, but not from each other. The same pattern of first-week and last-week return differentials significantly different from zero, but not from each other, holds for each five-year subperiod.

In the mid- and large-capitalization subgroups over 1980-1994, we find the same pattern of first-week and last-week return differentials significantly different from zero, but not from each other. This is not the case for small-capitalization stocks, however; first-week and last-week

return differences are not significant. This lack of significant return differences again suggests that the price-setting roles of institutions and individuals differ when it comes to small-capitalization stocks.

Taken as a whole, the evidence on first-week and last-week returns is consistent with the notion that institutions move prices with their trades, but not that they engage in within-quarter momentum trading. These results complement those of Badrinath and Wahal [2000], who find that institutions as a group do not engage in momentum trading in individual stocks.

#### TAX-LOSS SELLING HYPOTHESIS

We have documented that small-capitalization stocks that institutions buy from individuals experience negative, although insignificant, benchmark-adjusted returns on average. Is this return pattern the result of a tendency by individuals to sell their losers so that they can recognize capital losses for tax reasons?

The well-known tax-loss selling hypothesis holds that investors who take the other side of these systematic tax loss sales receive compensation for the transaction costs and portfolio risks they bear by purchasing stocks at a temporary price discount to fundamental values. Researchers have attributed the finding of positive January returns for small-capitalization stocks to a rebounding of these temporarily depressed prices to fundamental values. Presumably this tax-loss selling effect is concentrated in small-capitalization stocks because of their relative lack of liquidity and the fact that they are more widely held by individuals.



## EXHIBIT 5

### Benchmark-Adjusted Returns for Prior Losers and Winners

#### Panel A: Prior Losers

| Market Capitalization | 5-Year Subperiods |                 |                 |                   |                 |                 |                  |                  |                  | 15-Year Period   |                 |                 |
|-----------------------|-------------------|-----------------|-----------------|-------------------|-----------------|-----------------|------------------|------------------|------------------|------------------|-----------------|-----------------|
|                       | 1980 – 1984       |                 |                 | 1985 – 1989       |                 |                 | 1990 – 1994      |                  |                  | 1980 – 1994      |                 |                 |
|                       | Sell Stocks       | Buy Stocks      | Buy–Sell        | Sell Stocks       | Buy Stocks      | Buy–Sell        | Sell Stocks      | Buy Stocks       | Buy–Sell         | Sell Stocks      | Buy Stocks      | Buy–Sell        |
| All Stocks            | -2.59<br>(1.20)   | 2.11<br>(1.12)  | 4.70<br>(1.64)  | -4.38<br>(4.09a)  | -0.90<br>(0.80) | 3.48<br>(2.24)  | -4.20<br>(2.00b) | 7.46<br>(2.82a)  | 11.66<br>(2.82a) | -3.72<br>(3.68a) | 2.89<br>(2.05b) | 6.61<br>(3.82a) |
| Small-Capitalization  | -9.85<br>(1.99b)  | 1.54<br>(0.30)  | 11.39<br>(1.59) | -12.40<br>(5.73a) | -8.98<br>(1.35) | 3.42<br>(0.49)  | -3.73<br>(0.63)  | -1.20<br>(0.22)  | 2.52<br>(0.31)   | -8.66<br>(3.26a) | -2.88<br>(0.87) | 5.78<br>(1.36)  |
| Mid-Capitalization    | -2.59<br>(1.23)   | 0.83<br>(0.37)  | 3.42<br>(1.11)  | -2.59<br>(2.75a)  | -1.71<br>(1.19) | 0.88<br>(0.51)  | -2.20<br>(0.75)  | 5.56<br>(1.92c)  | 7.76<br>(1.88c)  | -2.46<br>(2.13b) | 1.56<br>(1.07)  | 4.02<br>(2.16b) |
| Large-Capitalization  | -2.94<br>(1.83c)  | 5.38<br>(4.05a) | 8.33<br>(4.00a) | -2.80<br>(1.62)   | 2.32<br>(1.47)  | 5.12<br>(2.19b) | -3.66<br>(2.50)  | 12.75<br>(6.30a) | 16.41<br>(6.57a) | -3.13<br>(3.63a) | 6.82<br>(4.64a) | 9.95<br>(5.84a) |

#### Panel B: Prior Winners

| Market Capitalization | 5-Year Subperiods |                 |                 |                 |                 |                 |                  |                  |                  | 15-Year Period   |                 |                 |
|-----------------------|-------------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|------------------|------------------|-----------------|-----------------|
|                       | 1980 – 1984       |                 |                 | 1985 – 1989     |                 |                 | 1990 – 1994      |                  |                  | 1980 – 1994      |                 |                 |
|                       | Sell Stocks       | Buy Stocks      | Buy–Sell        | Sell Stocks     | Buy Stocks      | Buy–Sell        | Sell Stocks      | Buy Stocks       | Buy–Sell         | Sell Stocks      | Buy Stocks      | Buy–Sell        |
| All Stocks            | 0.77<br>(0.52)    | 7.07<br>(2.86a) | 6.30<br>(2.18b) | -0.74<br>(1.24) | 4.34<br>(7.23a) | 5.07<br>(6.01a) | -2.58<br>(1.80c) | 13.50<br>(6.66a) | 16.08<br>(6.48a) | -0.85<br>(1.12)  | 8.30<br>(5.78a) | 9.15<br>(5.64a) |
| Small-Capitalization  | -3.94<br>(2.16b)  | 1.86<br>(0.46)  | 5.80<br>(1.30)  | -2.92<br>(1.17) | -0.76<br>(0.38) | 2.16<br>(0.68)  | -1.86<br>(0.46)  | 6.17<br>(1.48)   | 8.02<br>(1.38)   | -2.91<br>(1.83c) | 2.42<br>(1.18)  | 5.33<br>(2.06b) |
| Mid-Capitalization    | 1.42<br>(0.76)    | 7.98<br>(3.24a) | 6.56<br>(2.11b) | -1.04<br>(1.37) | 4.29<br>(4.64a) | 5.33<br>(4.46a) | -3.20<br>(3.45a) | 14.15<br>(6.72a) | 17.35<br>(7.54a) | -0.94<br>(1.10)  | 8.81<br>(5.85a) | 9.74<br>(5.63a) |
| Large-Capitalization  | 0.18<br>(0.10)    | 6.19<br>(3.05a) | 6.01<br>(2.24b) | 0.50<br>(0.63)  | 7.03<br>(4.16a) | 6.52<br>(3.49a) | -1.81<br>(1.38)  | 15.23<br>(7.28a) | 17.04<br>(6.90a) | -0.38<br>(0.49)  | 9.48<br>(6.29a) | 9.86<br>(5.83a) |

Time series mean of quarterly benchmark-adjusted returns. *t*-statistics based on time series standard errors are in parentheses. *a*, *b*, and *c* indicate statistical significance at the 1%, 5%, and 10% level, respectively.

## Methodology

If the return pattern for small-capitalization stocks is the result of institutions being on the buying side of tax-loss selling by individuals, the price effects ought to be more pronounced for certain stocks at certain times of the year. That is, the negative price effects ought to be more pronounced for small-capitalization stocks that were prior losers than for those that were prior winners. In addition, although some tax-loss selling by individuals may take place in the first three quarters of the year, more ought to occur in the fourth quarter.

To test the first prediction, we separately examine the returns of stocks that were prior losers and winners, which we define as those stocks in the lowest and highest quintiles, respectively, of prior-year returns. To test the second prediction, we separately examine returns in each quarter.

We calculate CRSP value-weighted returns in the same fashion as before. We do not report three-factor characteristic benchmark-adjusted returns, because we are now examining sell and buy portfolios that are sorted both on market capitalization and prior price momentum. Because the characteristic portfolios that serve as benchmarks are also formed by sorting on capitalization and prior price momentum, the stocks constituting the sell or buy portfolios may represent a sizable fraction of the stocks in the characteristic portfolios.

## Results for Prior Losers and Winners

Exhibit 5 reports the CRSP value-weighted benchmark-adjusted returns of prior losers and winners. We also examine mid- and large-capitalization losers and winners for comprehensiveness, and to determine whether tax-loss selling potentially extends into these groups.

## EXHIBIT 6

### Benchmark-Adjusted Returns for Small-Capitalization Stocks across Calendar Quarters

| Quarter | 5-Year Subperiods |                 |                |                   |                   |                |                   |                  |                 | 15-Year Period    |                  |                 |
|---------|-------------------|-----------------|----------------|-------------------|-------------------|----------------|-------------------|------------------|-----------------|-------------------|------------------|-----------------|
|         | 1980 – 1984       |                 |                | 1985 – 1989       |                   |                | 1990 – 1994       |                  |                 | 1980 – 1994       |                  |                 |
|         | Sell<br>Stocks    | Buy<br>Stocks   | Buy–<br>Sell   | Sell<br>Stocks    | Buy<br>Stocks     | Buy–<br>Sell   | Sell<br>Stocks    | Buy<br>Stocks    | Buy–<br>Sell    | Sell<br>Stocks    | Buy<br>Stocks    | Buy–<br>Sell    |
| First   | -3.20<br>(0.87)   | 0.76<br>(0.15)  | 3.96<br>(0.61) | 2.57<br>(2.01b)   | 6.48<br>(1.25)    | 3.91<br>(0.73) | 10.11<br>(1.58)   | 13.91<br>(2.34b) | 3.80<br>(0.43b) | 3.16<br>(1.14)    | 7.05<br>(2.17b)  | 3.89<br>(0.91)  |
| Second  | -0.20<br>(0.04)   | 2.32<br>(0.83)  | 2.52<br>(0.45) | -7.45<br>(2.44b)  | -4.31<br>(1.69c)  | 3.13<br>(0.79) | -8.55<br>(1.94c)  | -0.19<br>(0.05)  | 8.37<br>(1.50)  | -5.40<br>(2.22b)  | -0.73<br>(0.42)  | 4.67<br>(1.56)  |
| Third   | -8.55<br>(1.60)   | -3.73<br>(0.72) | 4.81<br>(0.65) | -7.83<br>(2.84a)  | -4.48<br>(1.76c)  | 3.35<br>(0.89) | -4.07<br>(0.95)   | 1.73<br>(0.49)   | 5.80<br>(1.05)  | -6.81<br>(2.91a)  | -2.16<br>(0.97)  | 4.65<br>(1.44)  |
| Fourth  | -8.76<br>(3.12a)  | -3.25<br>(0.61) | 5.54<br>(0.92) | -13.72<br>(4.51a) | -10.79<br>(5.28a) | 2.93<br>(0.80) | -13.75<br>(2.42b) | -2.19<br>(0.43)  | 11.56<br>(1.51) | -12.08<br>(5.35a) | -5.41<br>(2.10b) | 6.68<br>(1.95b) |

*Time series mean of quarterly benchmark-adjusted returns. t-statistics based on time series standard errors are in parentheses. i, b, and c indicate statistical significance at the 1%, 5%, and 10% level, respectively.*

Consistent with the idea of tax-loss selling, the negative returns are more pronounced for small-capitalization losers than for winners. Over 1980-1994, small-capitalization losers that institutions buy from individuals experience returns (t-statistics) of  $-2.88$  (0.87); the figures for the winners bought from individuals are 2.42% (1.18).

Unreported results reveal that the return differential (t-statistic) of 5.30 percentage points (1.78) is marginally significant. This return difference between small-capitalization losers and winners that institutions buy from individuals, however, grows stronger over the latter part of the sample period. Over 1985-1994, the return difference of 7.80 percentage points (2.01) is significant at conventional levels.

Mid- and large-capitalization losers and winners exhibit the same positive association between institutional ownership flows and returns as documented earlier. There is weak evidence, though, that tax-loss selling by individuals dampens the returns of mid-capitalization losers. Over 1980-1994, mid-capitalization losers that institutions buy from individuals experience a positive return (t-statistic) of only 1.56% (1.07) that is statistically insignificant.

#### Results for Small-Capitalization Stocks Across Calendar Quarters

Exhibit 6 reports the CRSP value-weighted benchmark-adjusted returns of small-capitalization stocks across calendar quarters. The returns are consistent with the tax-loss selling hypothesis. Over 1980-1994, small-capitalization stocks that institutions buy from individuals exhibit the most negative returns in the fourth quarter.

Interestingly, the first-quarter return for small-capitalization stocks that institutions buy from individuals is positive. The fourth-quarter and first-quarter returns (t-statistics) of  $-5.41\%$  (2.10) and 7.05% (2.17), respectively, are both significantly different from zero.

The negative fourth-quarter returns are consistent with a conclusion that fourth-quarter institutional buying is motivated primarily by provision of liquidity to individuals who were selling for tax reasons. It is at least plausible that after fourth-quarter tax-loss selling culls losers from individuals' portfolios, negligible tax-loss selling is left for the first quarter. This would imply that the positive first-quarter returns are the result of first-quarter institutional buying motivated primarily by information.

#### CONCLUSION

We document that, except for small-capitalization stocks, increases in institutional ownership are associated with positive returns and declines with negative returns. We also find that the positive relationship between institutional ownership flows and returns is not explained by within-quarter momentum trading. We interpret this general finding as consistent with the common conclusion that institutions play a price-setting leadership role in equity markets.

The exception to the positive association between institutional ownership flows and returns is for small-capitalization stocks. We find that increased institutional ownership of small-capitalization stocks that were prior losers produces negative returns. Moreover, the negative returns of small-capitalization stocks are concentrated in

the fourth quarter. We interpret this different return pattern for smaller-capitalization stocks as consistent with the idea that institutions buy stocks at price discounts from individuals who are selling to establish tax-deductible capital losses.

Note that our results do not challenge efficient markets theory, at least as envisioned by Grossman and Stiglitz [1980]. In their noisy rational expectations model, investors who engage in costly information production receive compensation by buying underpriced securities and selling overpriced securities that eventually adjust to reflect the information. In equilibrium, the cost of information production equals any trading profits.

The positive relation that we find between institutional ownership flows and returns would seem to indicate the trades of informed investors lead stock prices toward fundamental values. Whether the trading profits of informed institutional investors compensate them for their costs of security analysis remains an open question.

## ENDNOTES

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<sup>1</sup>The asymmetric information market microstructure literature predicts that informed investors' trades lead stock prices. See, e.g., Copeland and Galai [1983], Glosten and Milgrom [1985], Kyle [1985], Easley and O'Hara [1987], and Back [1992].

<sup>2</sup>Other behavioral considerations potentially play an important role in ownership flows between individuals and institutions. Odean [1998], for example, provides evidence that individuals suffer from loss aversion, which leads them to hold their losing stocks too long and to sell their winning stocks prematurely. This implies that individuals, who are induced to sell (buy) when prices go up (down), provide liquidity to institutions who buy (sell) on the basis of information.

<sup>3</sup>See, for example, Dyl [1977], Givoly and Ovadia [1983], Reinganum [1983], Roll [1983], Schultz [1985], and Jones, Lee, and Apenbrink [1991], who all find consistent evidence in the returns and/or trading volume of stocks, especially small-capitalization stocks. Sias and Starks [1997] also examine whether the January effect is associated with individuals systematically selling losers before the year-end for tax reasons or with institutions selling losers in order to window-dress portfolios for clients. The trading of individuals appears to be primarily responsible for the January effect.

<sup>4</sup>Nofsinger and Sias [1999] also examine daily institutional ownership changes and returns for a very limited sample of 114 stocks over a single quarter. They document a positive association between daily institutional ownership changes and same-

day returns, but no relation between daily ownership changes and prior daily returns. This suggests a lack of feedback trading within the quarter they examine, and instead implies that institutions move stock prices.

<sup>5</sup>These are the benchmark portfolios used by Daniel et al. [1997] to evaluate mutual funds.

<sup>6</sup>Unlike the 20 or 60 quarterly observations available over the 5- or 15-year periods, only four observations are available over a one-year period. Hence unlike the t-statistics computed from time series standard errors reported in the exhibits, the unreported yearly results are based on t-statistics computed from cross-sectional standard errors. Because benchmark-adjusted returns may not be independent, the cross-sectional t-statistics on which this inference is drawn may be biased.

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