The Value of Active Mutual Fund Management: An Examination of the Stockholdings and Trades of Fund Managers*

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Abstract

We investigate the value of active mutual fund management by examining the stockholdings and trades of mutual funds. We find that stocks widely held by funds do not outperform other stocks. However, stocks purchased by funds have significantly higher returns than stocks they sell—this is true for large stocks as well as small stocks, and for value stocks as well as growth stocks. We find that growth-oriented funds exhibit better stock-selection skills than income-oriented funds. Finally, we find only weak evidence that funds with the best past performance have better stock-picking skills than funds with the worst past performance.

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I. Introduction

Over $5.5 trillion are currently managed by the U.S. mutual fund industry, with roughly $3 trillion managed in equity funds. A significant portion of this amount is actively managed by money managers who presumably rely on superior stock-selection skills to outperform passive strategies. Several billion dollars per year are expended by these active fund managers in pursuit of underpriced stocks, well in excess of the amount that is typically expended by their passive, index-fund counterparts.

Although investors seem to trust the ability of these mutual fund managers to invest their savings, academics have repeatedly questioned the ability of funds to systematically pick underpriced stocks. Starting with Jensen (1968), many studies claim that the net return provided by the average actively managed mutual fund is inferior to that of a comparable passive benchmark. While the evidence supportive of mutual fund managers possessing stock-selection talents is weak, it is possible that these tests, which are based on aggregate mutual fund holdings, are not sufficiently powerful to detect such talents. For example, mutual fund holdings, in aggregate, account for between three and 13 percent of the market value of all publicly traded stocks in the U.S. between 1975 and 1994; hence, it is unlikely that the funds, as a group, hold stocks that outperform their benchmarks by a large amount.

To enable more powerful tests of the stock-selection abilities of fund managers, we examine the performance of stocks held by mutual funds as well as stocks actively traded by the funds. Examining the performance of stocks held and traded by mutual funds focuses on the issue of whether the consensus opinion of the entire mutual fund industry about a stock represents superior information about the value of that stock. Further, we expect active stock trades to represent a stronger manager opinion than the passive decision of holding an existing position in a stock, since the latter may be driven by non-performance related reasons such as concerns over transaction costs and capital gains taxes.[1] We would, therefore, expect any evidence of stock-selection ability to be more discernible by examining trades rather than holdings.

Second, we examine whether mutual fund managers possess better skills at picking stocks with certain characteristics. In recent times, funds have increasingly attempted to differentiate their services by specializing in certain sectors of the stock market. For example, growth funds claim to specialize in "glamour" or low book-to-market stocks, while income funds claim to specialize in "value" or high book-to-market stocks. An interesting issue is whether such specialization is based on any unique skills of these fund managers, or whether these claims are simply marketing strategies designed to place the funds in certain market niches in an attempt to attract a particular clientele of investors. We examine, for example, whether growth funds are uniquely capable of picking underpriced growth stocks, relative to value funds.

Third, we investigate whether funds that trade more actively have better stock-selection skills than those that trade less frequently. If some mutual fund managers possess better stock-picking talents than others, we would expect to see these high-talent managers trading more frequently, unless low-ability managers trade simply to appear to have stock-picking talents. Prior evidence on the relation between turnover and performance is mixed: Grinblatt and Titman (1989) find a positive relation between turnover and pre-expense portfolio performance, while Carhart (1997) finds a negative relation between turnover and net mutual fund returns. We address this issue by comparing the returns on stocks held and traded by high-turnover funds with those held and traded by low-turnover funds.

The final issue that we examine is whether there is any persistence in the stock-selection skills of mutual funds. Again, the evidence in the extant literature is mixed. Hendricks, Patel, and Zeckhauser (1993), for example, report that mutual funds have "hot hands"—funds having better-than-average (worse-than-average) performance tend to continue their winning (losing) streaks. They conclude that funds possess persistent stock-selection skills. Carhart (1997), however, points out that funds classified as winners (losers) based on their past performance will tend to hold disproportionately large numbers of stocks with high (low) past returns. He argues that this fact, coupled with the one-year momentum in stock returns documented by Jegadeesh and Titman (1993), explains the hot-hands effect better than any persistent stock selection skills.

This paper directly investigates the extent to which winning funds are able to pick future winning stocks by examining the performance of stocks that are held and traded by

these funds. If persistence in performance is solely due to the momentum effect acting on past stockholdings of funds, then stocks newly purchased by winning funds should have roughly the same returns as those newly purchased by losing funds. On the other hand, if winning funds possess superior stock-selection abilities, then stocks newly purchased by these funds should exhibit higher returns than other stocks.

We find the following results in this paper. First, stocks that are most widely held by mutual funds do not outperform stocks that are least widely held. However, when we examine mutual fund trades, we find that stocks that funds newly buy have significantly higher returns than stocks they newly sell. This is true for large stocks as well as small stocks, and for value stocks as well as growth stocks. The evidence that stocks actively traded by the funds outperform stocks that are passively held from prior periods suggests that mutual funds hold stocks longer than the horizon over which they can predict returns, possibly because of a preference to avoid high transaction costs or capital gains taxes.

A more detailed examination reveals that growth-oriented funds exhibit better stock-selection skills than income-oriented funds, especially in picking large growth stocks. We also find that funds that trade more frequently have, at best, marginally better stock-selection skills than funds trading less often.

Finally, we find that much of the observed persistence in fund performance is due to the momentum effect in stock returns. Specifically, the holdings of winning funds significantly outperform the holdings of losing funds; to a large extent, this is due to the fact that losing funds generally hold stocks that are past losers, which tend to earn low future returns. Stocks that are newly bought by winning funds, however, only marginally outperform those newly bought by losing funds.

The rest of our paper is organized as follows. Section II describes our data. Section III presents our measures of fund holdings and trades, and Section IV applies these measures to examine the characteristics of aggregate mutual fund holdings and trades. Section V evaluates the performance of stocks held and traded by the funds. Section VI examines the performance persistence issue, and Section VII concludes.

II. Data

The mutual fund holdings data used in this study are obtained from CDA Investment Technologies, Inc., of Rockville, Maryland. The CDA database consists of quarterly stockholdings data for virtually all U.S. mutual funds between January 1, 1975 and January 1, 1995 (inclusive), with no minimum survival requirement for a fund to be included in the database. These data are collected both from reports filed by mutual funds with the SEC, as required by amendments to Section 30 of the Investment Company Act of 1940, and from voluntary reports generated by the funds. Although mutual funds have been required to file holdings reports with the SEC on a semi-annual basis since 1985, CDA managed to obtain quarterly reports from over 80 percent of funds during most of the period 1985-1995; prior to 1985, the fraction of funds reporting on a quarterly basis was over 90 percent.[2]

Table 1 presents summary statistics for the mutual funds in our data set. Statistics are presented for mutual funds having a self-declared investment objective of "aggressive-growth," "growth," "growth and income," "income," "balanced," "international," "metals," "venture capital/special situations," or "special purpose."[3] We exclude all other funds from this table, such as foreign funds (which mainly hold foreign stocks), funds with a self-declared investment objective of "bond and preferred," and funds for which CDA was not able to obtain an explicit investment objective (mainly foreign funds or sector funds). We exclude these funds from Table 1 to provide a more representative cross-section of the funds in our sample that normally hold and trade stocks listed on the New York Stock Exchange, American Stock Exchange, or Nasdaq (i.e., those stocks listed in the price and return files of the Center for Research in Security Prices (CRSP)).[4] Before June 30, 1980, CDA did not collect data on fund investment objectives; hence, prior to that date, we report statistics on all mutual funds in the CDA database.

[Table 1 here]

The number of mutual funds in the sample increases from 393 at the beginning of 1975 to 2,424 at the beginning of 1995. The aggregate value of fund investments in CRSP stocks increases from $28.5 billion in 1975 to $580.4 billion in 1995. In any given year, 60 to 80 percent of the aggregate total net assets of these funds are held in CRSP stocks. Overall, these mutual funds held 38.6 percent of the stocks listed in CRSP in early 1975, which amounted to 5.3 percent of the aggregate market capitalization of CRSP stocks.

Mutual funds gradually increased their stockholdings to 81.5 percent of CRSP stocks by early 1995, which amounted to 12.5 percent of the market capitalization. Clearly, the importance of mutual fund investments has increased dramatically over the past two decades.

III. Measures of Mutual Fund Holdings and Trades

This paper examines the holdings and trades of mutual funds to evaluate the stock-selection abilities of fund managers. To examine which stocks are most widely held by mutual funds at the end of a given quarter, we compute a measure of aggregate stockholdings,

$$\textbf{\textit{FracHoldings}}_{i,t} = \frac{\textbf{\textit{Number of Shares Held}}_{i,t}}{\textbf{\textit{Total Shares Outstanding}}_{i,t}},$$

where "*Number of Shares Held*$_{i,t}$" is the aggregate number of shares of stock *i* held at the end of quarter *t* by all mutual funds, and "*Total Shares Outstanding*$_{i,t}$" is the total number of stock *i* shares outstanding as of that date.

If all mutual funds hold the "market portfolio," then all stocks will have the same *FracHoldings* measure, which would be roughly 12.5 percent at the beginning of 1995. However, mutual fund managers actively managing their portfolios will have different levels of investments in different stocks and, hence, *FracHoldings* measures will vary substantially across stocks. If these managers have stock-selection talents, then we would expect that stocks with larger *FracHoldings* measures would have higher future returns than stocks with smaller *FracHoldings* measures.

We measure aggregate trades of a stock by mutual funds as the quarterly change in the *FracHoldings* measure for that stock. Specifically, we define the aggregate trades of stock *i* during quarter *t* as

$$\textbf{\textit{Trades}}_{i,t} = \textbf{\textit{FracHoldings}}_{i,t} - \textbf{\textit{FracHoldings}}_{i,t-1}.$$

During quarters with net inflows into (outflows from) the mutual fund industry, *Trades* will generally be positive (negative), with some dampening due to any changes in the cash holdings of the funds. If managers actively pick stocks rather than passively holding the market portfolio, then *Trades* will vary across stocks and will reflect the consensus opinion about the value of those stocks.[5]

Our *Trades* measure is, in some ways, similar to the "portfolio change measure" used by Grinblatt and Titman (1993; GT), but there are important differences. The GT measure computes the change in portfolio weight of each stock for each fund, then averages this measure across funds. Therefore, if a small fund buys a stock, while a large fund sells the same number of shares of that stock, the GT portfolio change measure will be positive. In contrast, our *Trades* measure will be zero, since we measure the net share trades across all funds. Also, the GT measure captures active fund trading as well as passive changes in portfolio weights that occur because of stock price changes during a quarter. Thus, stocks increasing significantly in price receive a larger portfolio-weight change than other stocks and, hence, the GT measure is tilted toward past winners. Our *Trades* measure, however, is designed to track only active trades by funds, and will not change when there are no net buys or sells by funds, in aggregate.

In a later section of this paper, we examine the performance of stocks held and traded by funds with varying levels of portfolio turnover in order to determine whether funds trading more frequently outperform other funds. Data on portfolio turnover are obtained from the CRSP Mutual Fund files. CRSP defines the turnover of fund k during year t as

$$\boldsymbol{Turnover_{k,t} = min(Buys_{k,t}, Sells_{k,t}) / TNA_{k,t}},$$

where $Buys_{k,t}$ ($Sells_{k,t}$) is the total value of stock purchases (sales) during year t by fund k, and $TNA_{k,t}$ is the average total net assets of fund k during year t. Note that the CRSP definition of mutual fund turnover uses the minimum of buys and sells, since the dollar value of buys minus sells is equal to the net inflow (or outflow) of money (controlling for changes in cash holdings). This definition of turnover, therefore, captures fund trading that is unrelated to investor inflows or redemptions.

IV. Stock Characteristics of Aggregate Mutual Fund Holdings and Trades

Actively managed funds use a wide variety of criteria in choosing stocks. While it is difficult to fully quantify these criteria, this section investigates whether funds systematically "tilt" their portfolios towards stocks with certain characteristics. Specifically, we examine the market capitalization, the ratio of the book-equity to market-equity, the price momentum, and the market turnover of the stocks that mutual funds hold and trade. We obtain market capitalization data from CRSP and data on the book value of equity from Compustat. The book-to-market ratio for each stock at the beginning of each quarter is the ratio of the book value of equity for that stock, at the latest fiscal year-end, to its market capitalization at the beginning of the quarter.[6] Price momentum is measured as the compounded return over the six-month period immediately prior to the beginning of the quarter, while turnover is measured as the average daily market trading volume over the previous quarter divided by the total shares outstanding.

During each quarter from January 1, 1975 to January 1, 1995, we determine rank scores of these four characteristics for each stock held or traded by mutual funds. The characteristic rank score for a stock is that stock's percentile rank on that characteristic relative to all stocks covered by both the CRSP and Compustat databases. For example, a size rank score of 0.6 for a stock indicates that 60 percent of stocks have a smaller market capitalization than that stock. By construction, the average rank score across all stocks is 0.5. Therefore, an average portfolio rank score higher than 0.5 indicates a tilt toward a particular characteristic, while a rank score less than 0.5 indicates a tilt away from that characteristic.

Table 2 presents the characteristics of stocks within *FracHoldings* and *Trades* deciles. These deciles are constructed as follows. At the end of each quarter, we separately rank stocks based on *FracHoldings* and *Trades*, and assign the most widely held (or traded) ten percent of stocks to Decile 1, the next ten percent to Decile 2, and so on. We exclude stocks in which mutual funds have zero aggregate holdings (for the ranking on *FracHoldings*) or make zero aggregate trades (for the ranking on *Trades*) during a given quarter. The resulting number of stocks in each of these decile portfolios ranges from over 150 at the beginning of 1975 to over 500 at the beginning of 1995. Table 2 presents the equal-weighted characteristic ranks across all stocks within a given decile, averaged across all quarters.

[Table 2 here]

On average, mutual funds own 17.8 percent of the firms in *FracHoldings* Decile 1, while they own only 0.3 percent of firms in Decile 10 (see Table 2). The average ownership *changes* in a quarter range from almost four percent in the top *Trades* decile to about minus three percent in the bottom decile. The wide dispersion in mutual fund ownership, and changes in ownership, indicates that mutual funds, as a group, deviate significantly from the market portfolio.

The mutual funds have a clear preference for large stocks. For instance, the average size rank for the most widely held decile of stocks is 0.74, compared with 0.56 for the least widely held decile. This size rank declines monotonically across *FracHolding* deciles. The funds also exhibit a distinct preference for growth stocks. The book-to-market rank increases nearly monotonically from 0.41 for Decile 1 stocks to 0.52 for Decile 10. As we report in a later section, there are more growth-oriented funds than value-oriented funds, which may partly account for the aggregate preference for growth stocks. The funds also prefer to hold past winners. For instance, the average momentum rank of Decile 1 stocks is 0.54, while that of Decile 10 is 0.50.

Finally, we examine the liquidity characteristics of stocks held by mutual funds. The turnover rank score for *FracHoldings* Decile 1 is 0.71, while the score for Decile 10 is only 0.42—in addition, there is a monotonic relation in turnover rank scores across the decile portfolios. This does not seem surprising, since our sample of mutual funds consists of large numbers of actively managed funds, which tend to look for liquidity in their investments. Falkenstein (1996) reports a similar result for his early 1990s sample period. We note that this preference for liquidity may be hurting the performance of mutual funds, since the empirical evidence in Datar, Naik, and Radcliffe (1998) and Lee and Swaminathan (1998) indicates that low-turnover stocks, on average, earn higher returns than high-turnover stocks.[7]

The average characteristic ranks of the *Trades* decile portfolios present a picture of mutual fund preferences consistent with those of the *FracHoldings* decile portfolios. On average, mutual funds trade large stocks much more frequently than small stocks, as indicated by the high size ranks across all *Trades* deciles. Funds also prefer growth stocks as well as stocks with high past returns, as shown by the book-to-market and momentum ranks of the *Trades* deciles.[8] Finally, the turnover ranks across *Trades* deciles exhibit a distinct U-

shaped pattern—turnover ranks are substantially higher for the extreme deciles than for the middle deciles. Thus, funds avoid trading less liquid stocks.

Overall, mutual funds tend to prefer large stocks to small stocks, and growth stocks to value stocks. Interestingly, in both cases, the characteristics that mutual funds prefer are associated with lower average future returns (see Fama and French (1993)). The preference of funds for high momentum stocks, however, will tend to enhance their performance, since past winners typically outperform past losers (see Jegadeesh and Titman (1993)). Since mutual funds prefer stocks with characteristics that are related to average returns, we evaluate the stock-selection skills of funds in later sections by evaluating both unadjusted returns and returns adjusted for stock characteristics.

V. The Performance of Mutual Fund Holdings and Trades

A. Aggregate Results

If mutual fund managers have stock-picking skills, then stocks widely held by funds should outperform their benchmarks. Similarly, stocks that are newly purchased should outperform their benchmarks, while stocks that are newly sold should underperform their benchmarks. On the other hand, if the average mutual fund manager has no talent for picking stocks, then we should find no relation between stock returns and the level of mutual fund holdings or trades. This section addresses this issue by examining the performance of stocks held and traded by mutual funds.

Before proceeding further, we note that it is possible that many mutual funds simply mimic the strategies of other funds and herd into the same stocks. If mutual funds herd into stocks simply based on noise, we would expect that they would push prices up when, as a group, they take large positions in a stock. In this case, subsequent return reversals would lead to lower returns for stocks with large aggregate mutual fund positions than for stocks with small mutual fund positions.

Table 3, Panel A, presents buy-and-hold returns on various stock portfolios formed based on aggregate mutual fund holdings or trades. Specifically, the panel presents returns on the portfolio consisting of all mutual fund holdings ("All Holdings"), the portfolio of all

stocks bought by funds ("Buys"), the portfolio of all stocks sold by funds ("Sells"), and on decile portfolios formed from separate rankings on the *FracHoldings* and *Trades* measures. In all cases, these portfolios are formed each quarter based on the stockholdings information available for funds that quarter from the CDA files.

[Table 3 here]

We compute returns on each portfolio over a given horizon as the buy-and-hold return that would accrue to a strategy of purchasing the aggregate mutual fund shareholdings of each stock in that portfolio at the end of the formation quarter (in the case of the *FracHoldings* portfolios) or of purchasing the net *change* in shareholdings of each stock during the formation quarter (in the case of the *Trades* portfolios).[9] We label the formation quarter as "Qtr 0" in this table, as well as in the tables to follow. We report one-, two-, three-, and four-quarter buy-and-hold returns, averaged across all event quarters. For example, the average "All Holdings" return reported for Qtr +1 (3.85 percent) is the average quarterly return that would accrue to a strategy of mimicking the aggregate shareholdings of the universe of mutual funds on April 1, 1975 and holding this portfolio until July 1, 1975, rebalancing to mimic the revised portfolio holdings as of that date, and so on. The final portfolio is formed on January 1, 1995.

Similarly, the buy-and-hold return for Qtr +1 through Qtr +2 (7.6 percent) is the average two-quarter return that would accrue to a strategy of mimicking the aggregate shareholdings of the universe of mutual funds on April 1, 1975 and holding this portfolio until October 1, 1975, mimicking the aggregate shareholdings on July 1, 1975 and holding this portfolio until January 1, 1976, and so on. Thus, the holding periods overlap across event quarters for all horizons greater than one quarter, and, hence, we compute the corresponding *t*-statistics using autocorrelation consistent standard errors. For consistency, returns during event quarters prior to the formation date (Qtrs -2, -1, and 0) follow the same logic—the return reported for event Qtr -1 (4.55 percent), for instance, is the average return to the aggregate shareholdings at the end of Qtr 0 if that portfolio were held during the quarter immediately prior to Qtr 0.

Table 3 also reports benchmark-adjusted returns measured with respect to the portfolio benchmarks developed by Daniel, Grinblatt, Titman, and Wermers (1997; DGTW). We briefly discuss the benchmark construction procedure here and refer the reader to DGTW

for further details. To construct the DGTW benchmark portfolios, we start with all stocks having book-equity values listed in Compustat, and stock returns and market capitalization of equity listed in CRSP. We first rank stocks based on their market capitalizations and assign them to size quintiles (using NYSE size quintile breakpoints). Within each size quintile, we further rank stocks based on their book-to-market ratios, and assign them to book-to-market quintiles, yielding a total of 25 size- and book-to-market-sorted fractiles. We then further sort stocks in each of these 25 fractiles into quintiles, based on the prior 12-month return of each stock. This results in a total of 125 fractiles; benchmark portfolio returns are then computed as the value-weighted holding period buy-and-hold return of each of the 125 fractile portfolios. The benchmark portfolios are reconstituted at the end of each June.

The benchmark for each stock is the portfolio to which it belongs. The benchmark-adjusted return for each stock is the difference between the stock return and its benchmark portfolio return over a particular holding period. We refer to these benchmark-adjusted returns as DGTW-adjusted returns.

Table 3, Panel B, presents the DGTW-adjusted returns for the portfolios in Panel A. The abnormal returns on the holdings (see "All Holdings") are not reliably different from zero during any of the four quarters subsequent to the portfolio formation quarter. To obtain further insight, we examine whether stocks that are more widely held by the funds have higher returns than stocks that are less widely held. We partition stocks held by the funds into ten groups based on *FracHoldings*, and Table 3 presents both unadjusted (Panel A) and DGTW-adjusted returns (Panel B) for these decile portfolios. In both cases, the point estimates suggest that stocks that are more widely held have higher returns than stocks that are less widely held, but the difference is insignificant.

These results do not provide much support for the hypothesis that mutual fund managers possess stock-selection skills. It is quite possible, however, that the managers do have some stock-selection skills, but the *FracHoldings*-based tests are not sufficiently powerful to pick up any evidence of such skills. During our sample period, mutual funds in aggregate account for between three and 13 percent of the value of all publicly traded stocks in the U.S. Because of their large aggregate share of the market, it is likely that the funds, as a group, would find it difficult to hold stocks that outperform their benchmarks by a large magnitude.

Since stock trades likely represent stronger manager opinions about value than passive decisions of holding existing positions, we would expect any evidence of stock-selection ability to be more discernible by examining trades rather than holdings. In particular, if fund managers have stock-selection skills, we would expect stocks in which mutual funds are net buyers ("Buy" stocks) to outperform stocks in which mutual funds are net sellers ("Sell" stocks). Therefore, we next examine the performance of stocks that are actively traded by funds.

The *Trades* results shown in Panel A of Table 3 indicate that, in aggregate, mutual funds buy winners and sell losers, as indicated by the difference in returns between Buys and Sells during Qtr -2 through Qtr 0—this difference is especially large (5.6 percent) during quarter 0. The large difference between Qtr 0 returns of the extreme *Trades* decile portfolios (Deciles 1 and 10) presents a similar picture.

The unadjusted returns for *Trades* presented in Panel A indicate that the returns on the Buys are higher than those of the holdings, while the returns on Sells are smaller. For instance, the return on All Holdings is 3.85 percent during Qtr +1, compared with 4.58 percent for Buys and 3.35 percent for Sells. Noteworthy, also, are the future quarter return differences. Buys outperform Sells by almost five percent during the year following the formation date, while *Trades* Decile 1 outperforms *Trades* Decile 10 by over six percent (see "Qtr +1 through Qtr +4"). Roughly half of this return difference occurs during the first six-month holding period (see "Qtr +1 through Qtr +2).

Panel B presents DGTW-adjusted returns for stocks actively traded by the funds (see the *Trades* section of that panel). In general, Buys have positive abnormal returns, while Sells have negative abnormal returns. The difference in abnormal returns between Buys and Sells during the first year is 2 percent, which is smaller than the corresponding unadjusted return difference of 4.69 percent (in Panel A). This result indicates that Buys outperform Sells partly due to differences in their characteristics, such as their price momentum.
In unreported results, we find that the difference in DGTW-adjusted returns between Buys and Sells is insignificant during the second year following the portfolio formation quarter. Therefore, the horizon over which funds are able to forecast returns seems fairly short. Mutual funds, however, often hold stocks longer than a year, which suggests that they hold

stocks well beyond the time horizon that they provide superior returns, perhaps to avoid the high transactions costs or capital gains taxes they might incur by trading.

B. Mutual Fund Performance within Subsamples of Stocks

This subsection investigates whether mutual fund managers are better able to pick stocks having certain characteristics. Specifically, we test whether managers have differential abilities in picking small stocks versus large stocks, and value stocks versus growth stocks. To examine this issue, we partition all stocks, listed by both CRSP and COMPUSTAT, into large stocks and small stocks, where large stocks (small stocks) have an above-median (below-median) market capitalization among all NYSE-listed stocks. Similarly, we classify value or growth stocks based on the book-to-market ratio of a stock relative to the median of all NYSE firms; thus, we follow Fama and French (1996) in using NYSE breakpoints for both size and book-to-market characteristics.

Table 4 reports DGTW-adjusted returns for aggregate holdings ("All Holdings") and for aggregate trades ("Buys" and "Sells") of stocks in each characteristic category. Consistent with our results for all stocks (Table 3), the "All Holdings" portfolios exhibit insignificant abnormal returns in each category over all holding periods.

[Table 4 here]

Table 4 also presents the returns on trades (see "Buys," "Sells," and "Buys minus Sells"). Although the abnormal returns during event quarters -2, -1 and 0 indicate that funds most strongly trade on momentum when they trade small stocks, there is some evidence of momentum investing in all categories of stocks. Also, in each category of stocks, Buys outperform Sells by roughly one percent during the first six-month holding period, and by roughly two percent during the first year. In unreported F-tests, we could not reject the hypotheses that the DGTW-adjusted returns are jointly equal across the four stock characteristic categories for All Holdings, Buys, Sells, and Buys minus Sells.

Also interesting to note is that, among all four types of stocks, the positive abnormal returns exhibited by Buys is roughly equal in magnitude to the negative abnormal returns exhibited by the Sells. For example, small stock Buys outperform their DGTW benchmarks by about 1.1 percent during the first year, while small stock Sells underperform by about 1.3 percent. Thus, mutual funds show about the same level of ability in identifying stocks that

will outperform their benchmarks as they do in identifying stocks (that are already in their portfolios) that will underperform during future periods.

Overall, our results indicate that any stock-selection skills that funds exhibit do not seem to be related to stock characteristics. However, given the heterogeneous investment objectives of the universe of mutual funds, it is possible that any evidence of differential stock-picking talents in different types of stocks is much stronger within subgroups of funds with homogeneous investment objectives. We investigate this in the next subsection.

C. Investment Objective Subgroups of Mutual Funds

During recent times, funds have increasingly attempted to differentiate their services by specializing in certain sectors of the stock market. For example, growth funds claim to specialize in "glamour" or low book-to-market stocks, while income funds claim to specialize in "value" or high book-to-market stocks. Are these claims rooted in any unique skills of these fund managers, or are they simply marketing strategies designed to place the funds in certain market niches?

In this subsection, we investigate this issue by partitioning funds on their self-declared investment objectives at the beginning of each quarter. *FracHoldings* and *Trades* measures are separately computed within each investment-objective category, and fractile portfolios of these stocks are formed based on these measures, both in aggregate and in the four stock-characteristic classifications (small and large stocks, value and growth stocks) described in the last subsection.

We include the most common investment objective categories in these tests: "aggressive growth," "growth," "growth and income," "balanced," and "income" funds. We combine balanced funds and income funds into a category labeled "balanced or income" because these two categories of funds are similar in nature. We refer to the aggressive growth and growth funds as "growth-oriented" funds, and the remainder as "income-oriented" funds.

The CDA database provides fund investment objective information beginning June 30, 1980. In order to classify funds during earlier years, we rely on hand-collected investment objective information for funds existing at the beginning of 1975.[10] Thus, new

funds entering the CDA database after January 1, 1975 are not included in the tests of this section until June 30, 1980.

Table 5 presents the total number of funds in each investment objective subgroup, as well as the proportion of total mutual fund assets (across all four subgroups) held by each subgroup, at the beginning of 1975, 1985, and 1995. During 1975, the distribution of the number of funds across various categories is about equal, with numbers ranging from 50 for balanced or income funds to 81 for growth funds. The growth and income category of funds has the largest asset base, with 38.8% of the assets in our sample invested in this category in 1975. Over the next twenty years, the growth fund category experiences dramatic increases in numbers and in total net assets. The balanced or income category actually experiences the greatest increase in total net assets, but funds in this category hold substantial investments in bonds by 1995.

[Table 5 here]

Table 5 also presents cross-sectional average turnover levels during 1975, 1985, and 1994 (note that our final stockholdings data is for January 1, 1995). The turnover averages show that mutual fund trading has increased substantially, roughly doubling over the 20-year period. Turnover is consistently highest among aggressive growth funds, indicating that the objective of holding the latest high growth stocks involves substantial trading. The general increase in turnover over time is likely (at least in part) to be related to the general decline in trading costs over time, particularly after the elimination of the fixed commission structure in May 1975.

Finally, the table presents the characteristics of stocks held by funds belonging to each investment objective subgroup. The time-series average proportion of total assets (invested in equities) represented by investments in stocks with different characteristics is shown for each subgroup. Aggressive growth funds, true to their objective, are the largest investors in small-capitalization growth stocks, roughly tripling the growth fund holdings of these stocks.

Overall, we find that the investments of all fund categories span all four types of stocks, although funds do tilt their investments more towards stocks that match their stated objectives. In unreported results, we determine more precisely where funds allocate their assets by creating deciles of stocks based on book-to-market rankings. We find that growth

funds typically invest about two-thirds of their stock portfolios in the bottom two book-to-market deciles (growth stocks). By contrast, value (income) funds invest about one-fourth of their stock portfolios in the two highest book-to-market deciles (value stocks). Thus, growth funds make much larger bets on growth stocks than value funds make on value stocks.

Table 6, Panel A presents DGTW-adjusted returns for portfolios of stocks held and traded by funds in each investment-objective category. Our holdings-based results for each category of funds (see "All Holdings") are generally consistent with our earlier results: all investment-objective groups exhibit insignificant DGTW-adjusted returns during the one-year holding period that follows the portfolio formation quarter.

[Table 6 here]

Trades-based portfolios, however, show that, in general, stock Buys of growth-oriented funds significantly outperform their Sells, while the return difference between Buys and Sells for income-oriented funds is insignificant. Specifically, aggressive growth funds purchase stocks that outperform the stocks they sell by 2.59 percent during the first year, while growth fund buys outperform their sells by 1.8 percent. However, growth and income funds as well as balanced or income funds show little evidence of stock-picking talents—both categories exhibit an insignificant difference in DGTW-adjusted returns between buys and sells. The autocorrelation-adjusted F-statistic for the hypothesis that the "Buys minus Sells" portfolio abnormal returns across the four fund groups are jointly equal is 2.65. This statistic suggests rejection of the null hypothesis at the five percent significance level.

Further insight may be obtained by examining subgroups of stocks traded by each category of mutual funds. Table 6, Panel B, presents the DGTW-adjusted returns for these subgroups—small and large growth stocks as well as small and large value stocks—traded by each category of funds. Procedures for characterizing stocks as small or large market capitalization as well as growth or value stocks are identical to that described for Table 4, although we now form portfolios of stocks based on both characteristics. For example, "small growth" stocks are those stocks that are smaller than the median NYSE stock, and also have a book-to-market ratio lower than the NYSE median.

For each stock type, the panel presents the abnormal return difference between the quintile of stocks that are most heavily bought (Q1) and the quintile of stocks most heavily sold (Q5) by funds within a given investment objective category. These quintiles are formed

by ranking all stocks of each type (each quarter) by the *Trades* measures of the stocks computed for each investment objective subgroup. For example, the panel shows that small growth stocks that are heavily bought by aggressive growth funds outperform small growth stocks that are heavily sold by 0.61 percent during Qtr +1.

The results shown in Panel B suggest that growth-oriented funds generally have better stock-picking talent than income-oriented funds, and that this difference in talent is most pronounced in large growth stocks. Specifically, aggressive growth funds buy large growth stocks that outperform the large growth stocks they sell by 3.5 percent (adjusted for stock characteristics) during the following year, while the adjusted return difference between buys and sells for growth funds is 1.58 percent. An autocorrelation-adjusted *F*-test rejects the equality of the DGTW-adjusted portfolio return difference (between buys and sells) for large growth stocks across the four investment objective categories at the 10 percent significance level (*F*-statistic = 2.20).[11]

D. Portfolio Turnover and Fund Performance

Although most of the mutual funds in our sample are actively managed, some funds trade much more frequently than others. For instance, the quintile of funds trading most frequently in 1985 have turnover levels roughly ten times that of the quintile of funds trading the least. It is possible that some fund managers trade too often simply based on noise. If this were the case, then we would expect no relation between fund performance and turnover.

Alternatively, it is possible that some fund managers are able to routinely identify attractive investment opportunities and, hence, trade frequently, while managers with more limited skills may be much more cautious in their trades. In this case, we would expect to find a positive relation between fund performance and turnover. Prior research on the relation between performance and turnover shows mixed results. Grinblatt and Titman (1989) find a positive relation between pre-expense portfolio performance and turnover, while Carhart (1997) finds a negative relation between net mutual fund return and turnover.

We add new evidence to this issue by examining whether stocks held and traded by high-turnover funds outperform stocks held and traded by low-turnover funds. Moreover, our analysis of the returns on stocks actively *traded* by funds provides sharper evidence of the benefits of frequent trading than the Grinblatt and Titman (1989) and Carhart (1997)

studies, which examine the performance of fund *holdings*. The turnover data used in this subsection are obtained from the CRSP mutual fund files.

To examine the relation between fund turnover and performance, we first rank funds, at the end of a given quarter, on their turnover level of the prior calendar year. We use prior-year rather than contemporaneous-year turnover for ranking because the latter could potentially capture correlation between returns and turnover unrelated to fund manager skill. A spurious correlation may arise, for instance, if fund managers are overconfident and increase their trading activity following periods of high returns.[12]

After ranking on prior-year turnover, the most actively trading quintile of funds are labeled "high-turnover funds," while the least actively trading are "low-turnover funds." We then proceed (each quarter) by computing *FracHoldings* and *Trades* measures for each stock, separately for high-turnover and for low-turnover funds. Since turnover levels are updated each year in the CRSP files, we reconstitute turnover quintiles of funds once per year.

Table 7 presents both unadjusted and DGTW-adjusted returns for All Holdings, Buys, and Sells of high- and low-turnover funds. Interestingly, high-turnover funds are momentum investors, while low-turnover funds are contrarians. For instance, the return difference between Buys and Sells during Qtr -1 for high-turnover funds is 2.53 percent, while the difference for low-turnover funds is -1.94 percent. Also, past returns of Buys of high-turnover funds are generally higher than past returns of their All Holdings portfolio; the opposite is true for low-turnover funds.

[Table 7 here]

At first blush, it would also appear that high-turnover funds hold stocks that solidly outperform stocks held by their low-turnover counterparts during future holding periods. For example, the difference in unadjusted returns between All Holdings portfolios of these two categories is 2.48 percent (and significant) during the one-year holding period following the portfolio formation quarter (see Panel A). However, much of this return difference can be attributed to differences in the characteristics of stocks held by these two groups of funds—the DGTW-adjusted return difference is only 1.17 percent during this holding period (see Panel B).

Further evidence is provided by the *Trades*-based results. Both high- and low-turnover funds buy stocks that outperform the stocks they sell (see "Buys-Sells" in Panel B for each category). However, this difference is not related to fund turnover, as the magnitude is roughly the same for the two categories of funds. Specifically, the (DGTW-adjusted) return difference between Buys and Sells over a one-year holding period for high-turnover funds is 1.87 percent, while it is 1.45 percent for low-turnover funds.

Since managers of low-turnover funds appear to have stock-picking skills, it is interesting that they do not trade more frequently to capitalize on these skills. Indeed, our results for low-turnover funds are consistent with these managers exhibiting caution in executing potentially profitable trades; this caution could be hurting the returns on their overall holdings (at least before trading costs are deducted).

One might argue that stronger evidence can be obtained by looking at the performance of Buy stocks alone, as funds might avoid selling stocks from their portfolios for many non-performance reasons. Indeed, Panel B shows that the Buys of high-turnover funds outperform the Buys of low-turnover funds by 1.1 percent during the first year (adjusted for their characteristics; this point estimate is significant at the 10 percent significance level).

Overall, high-turnover funds seem to capitalize on their stock-selection abilities by trading frequently. In addition, the evidence indicates that these funds have marginally better stock-picking skills than low-turnover funds. However, it is not clear whether the difference in performance between the Buys and Sells of high-turnover funds is sufficient to cover the cost of their frequent transactions.[13] The deadweight of trading costs likely explains Carhart's (1997) findings of a negative relation between fund turnover and net fund returns.

VI. Persistence in Performance

Funds with superior past performance tend to flaunt their records through press releases and advertisements that promote the funds. Although there is the standard disclaimer in all fund promotions that past performance is not necessarily indicative of future performance, there is a strong undertone in these promotions that past performance is a good

measure of stock-selection ability. An issue of significant interest is whether there is indeed persistence in mutual fund performance or, in other words, do some mutual fund managers have "hot hands?"

The existing literature provides mixed evidence on this issue. Hendricks, Patel, and Zeckhauser (1993), for example, report that mutual funds with superior (or poor) past performance tend to continue that trend. Obviously, one possible explanation for this finding is that fund managers possess persistent (superior or poor) stock-selection skills. Carhart (1997), however, points out that winning funds, by definition, hold a large number of stocks that earned high returns in the past, which may be entirely due to chance. Since funds typically do not fully liquidate their holdings in any given quarter, high past return stocks in winning fund portfolios tend to continue earning high returns the following year, due to the momentum effect documented by Jegadeesh and Titman (1993).

This section directly addresses whether persistence in mutual fund performance is due to the momentum effect acting on the holdings of funds, or whether winning funds actually exhibit superior stock-picking skills. We first identify mutual fund "winners" and "losers" by examining their past returns. Specifically, at the end of each quarter, we rank all mutual funds by the unadjusted return of their stock portfolios of the prior four quarters—the resulting top quintile of funds are labeled "winners" for that quarter, while the bottom quintile are labeled "losers". The ranking process is repeated every quarter.

[Table 8 here]

Table 8 presents returns for stocks held and traded by winners vs. losers. First, consider the performance of the All Holdings portfolio of winners. The average unadjusted return for winning funds during Qtrs -2, -1, and 0 are 6.66 percent, 7.26 percent, and 5.25 percent, respectively; the corresponding returns for losing funds are 1.68 percent, 1.77 percent, and 3.54 percent (see Panel A). Stocks held by winning funds, therefore, have substantially higher momentum than stocks held by losing funds—due simply to the ranking of funds on their past returns.

A further examination shows that the All Holdings portfolio of winning funds outperforms that of losing funds by 1.27 percent during the first quarter and by 2.14 percent during the first six months (this point estimate is significant at the 10 percent level).[14] Adjusted for stock characteristics, the difference between these All Holdings portfolios is

somewhat lower—0.51 percent during the first quarter (adjusted returns for longer holding periods are all insignificant). It appears, therefore, that the difference in future returns between past winning and losing funds is largely due to differences in the price momentum of their stockholdings.

Table 8 also presents returns for the Buy and Sell portfolios of these funds. First, Panel A shows that the Buys of winning funds have past returns that are comparable to the past returns of their overall holdings. The past returns of losing fund Buys, however, are substantially lower than those of winning fund Buys; this indicates that winning funds, to a much greater degree than losing funds, tend to systematically add high momentum stocks to their portfolios.[15] Further, the one-year holding period return on winning fund Buys is 17.12 percent, which is higher than that of their holdings, 16.23 percent.

This evidence of active momentum investing by winners, to a much greater degree than by losers, seemingly contradicts Carhart's (1997) assertion that the superior future performance of winners over losers is entirely due to the influence of the momentum effect on the past stockholdings of funds. However, although winning fund Buys outperform losing fund Buys by 1.26 percent during the first year, this difference is not statistically significant. Note that, for losing funds, the Buy portfolio has higher past returns than the All Holdings portfolio, and that the Buys tend to also earn higher future returns. This result supports the Carhart argument that losing funds are "accidentally" stuck with past losers, and that this hurts their future returns.

Controlling for differences in stock characteristics, our results for Buy and Sell portfolios generally do not support the persistence of fund performance. For the most part, the trades of winning funds do not exhibit significantly different characteristic-adjusted returns than the trades of losers (see Panel B).

The Sell portfolios of winning and losing funds exhibit some interesting return patterns as well. Since losing funds hold more low past return stocks than winning funds by construction, it is not surprising that losing fund Sells have lower past returns than winning fund Sells. However, it is noteworthy that losing funds sell stocks with lower past returns than the stocks they continue to hold in their portfolios. These Sell portfolio stocks continue to underperform during future quarters, even adjusted for their momentum characteristics. Specifically, the Sell portfolio exhibits a DGTW-adjusted return of -1.17 percent during the

first year, while the Sell portfolio of winning funds exhibits an insignificant return during this period. This result suggests that losing funds have special skills in identifying the "dogs" in their holdings compared to winning funds; however, losing funds also have more potential future underperformers in their portfolios to begin with.

In summary, our evidence suggests that there is persistence in unadjusted returns on mutual fund portfolio holdings. However, the characteristic-adjusted returns of stocks held by winning funds are about the same as those of stocks held by losing funds. Furthermore, there is only weak evidence that stocks newly bought by winning funds outperform stocks newly bought by losing funds. Interestingly, although losing funds sell their extreme losers, they are still "stuck" with more past losers in their holdings than winning funds. The future underperformance of the losing funds seem to be largely driven by the subsequent low returns on these past losers due to the momentum effect, rather than by their poor stock-selection skills.

VII. Concluding Remarks

This paper investigates the value of active mutual fund management by examining the performance of both the holdings and the trades of mutual funds. Our sample includes all mutual funds in the U.S. existing at any time between January 1, 1975 and January 1, 1995.

We find that stocks held by mutual funds do not outperform the general population of stocks. However, when we examine mutual fund trades, we find that stocks that the funds actively buy have significantly higher returns than stocks that they actively sell. This return difference is roughly two percent during the one-year holding period following the trades, adjusted for the characteristics of the stocks that are traded. This performance estimate is more than double the stockholdings-based estimate provided by Daniel, Grinblatt, Titman, and Wermers (1997), which is 0.8 percent per year over the same time period. The larger magnitude of our performance estimate illustrates the advantage our trades-based measure confers.

Overall, our evidence is suggestive of the funds possessing superior stock-selection skills. The value of any superior information that some mutual funds might possess,

however, is fairly short-lived—the stocks that they buy outperform the stocks they sell for only the first year following the trades. The fact that mutual funds often hold stocks longer than one year indicates that they often avoid selling stocks from their portfolios because of transaction cost considerations, or that they have only limited abilities in finding new, underpriced stocks to buy.

Mutual funds, as a group, have roughly the same level of skill in picking growth stocks as they do in picking value stocks, and in picking large stocks versus small stocks. However, we find that growth-oriented funds are better at picking large growth stocks than income-oriented funds. In addition, we find that high-turnover funds have marginally better stock-selection skills than low-turnover funds.

Finally, we examine the persistence in mutual fund performance, which has been a controversial issue in the literature. Since we have stockholdings data for mutual funds, we are able to directly address whether persistence in mutual fund performance is due to the influence on returns of the characteristics of stocks passively carried over from previous periods, or whether persistence is due to returns on stocks actively traded by winning versus losing funds. We find that stockholdings passively carried over by winning funds outperform holdings of losing funds. However, stocks that are newly bought by winning funds only marginally outperform stocks newly bought by losing funds. Our results also indicate that the superior performance of these passive holdings is attributable to the general tendency of past winners to outperform past losers (or the momentum effect) rather than due to any persistent stock selection skills.

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TABLE 1

Summary Statistics

	Mutual Fund Universe						Proportion of All CRSP Stocks Held by Mutual Fund Universe	
	Fund Count and Total Net Assets		Holdings of CRSP Stocks		CRSP Universe			
Beginning of Year	Number of Funds	Aggregate TNA ($Billion)	Aggregate Value ($Billion)	Number of Distinct Stocks	Aggregate Value ($Billion)	Number of Distinct Stocks	Value (Percent)	Number (Perc
1975	393	38.8	28.5	1,781	533.7	4,612	5.3	3
1976	466	52.3	35.1	1,941	722.3	4,656	4.9	4
1977	408	53.0	42.3	1,835	894.6	4,723	4.7	3
1978	613	51.0	36.4	2,170	841.1	4,641	4.3	4
1979	579	49.0	35.6	2,166	872.2	4,571	4.1	4
1980	554	52.4	40.3	2,264	1,026.5	4,536	3.9	4
1981	509	60.7	48.8	2,426	1,323.5	4,712	3.7	5
1982	499	55.4	42.6	2,558	1,231.2	5,077	3.5	5
1983	483	65.1	54.9	2,733	1,410.8	5,047	3.9	5
1984	501	94.8	81.5	3,330	1,741.8	5,653	4.7	5
1985	522	96.5	81.3	3,398	1,682.7	5,777	4.8	5
1986	556	129.2	107.7	3,675	2,090.5	5,750	5.2	6
1987	627	169.5	131.1	3,817	2,352.7	6,024	5.6	6
1988	711	199.9	150.5	3,691	2,312.2	6,319	6.5	5
1989	782	209.2	159.7	3,792	2,509.1	6,049	6.4	6
1990	846	263.2	199.4	3,696	3,056.6	5,856	6.5	6
1991	923	260.3	193.1	3,447	2,749.2	5,714	7.0	6
1992	1,101	377.5	300.1	3,665	3,717.4	5,760	8.1	6
1993	1,252	508.8	381.8	3,813	4,114.4	5,878	9.3	6
1994	1,771	745.2	507.5	5,143	4,674.3	6,415	10.9	8
1995	2,424	972.7	580.4	5,484	4,629.3	6,732	12.5	8

At the beginning of each calendar year, we provide a count of the total number of funds represented in the CDA database, along with the aggregate total net assets of these funds. We include only mutual funds with a self-declared investment objective of “aggressive-growth,” “growth,” “growth and income,” “income,” “balanced,” “international,” “metals,” “venture capital/special situations,” and “special purpose”. We exclude all other funds, which include funds having a self-declared investment objective of “bond and preferred” as well as foreign funds (which mainly hold foreign stocks) and funds not providing an explicit investment objective to provide a more representative cross-section of funds normally holding and trading U.S. equities. Before 1980, all mutual funds are included, as CDA did not collect investment objective information prior to June 30, 1980. The first two columns present the total number of funds in these categories, as well as the aggregate total net assets (TNA) held by these funds. The next columns present the aggregate mutual fund holdings of stocks covered by CRSP, as well as the number of distinct CRSP stocks held by at least one mutual fund. In compiling these totals, we include only CRSP stocks having a sharecode of 10 or 11 (which are common stocks of U.S. firms). Finally, the aggregate value of the CRSP universe, as well as the number of distinct stocks in the CRSP files are presented, along with the proportion of these totals represented by the mutual fund universe (in all cases, stocks are limited to those with a CRSP sharecode of 10 or 11).

TABLE 2

Characteristics of Stocks Held and Traded by Mutual Funds

	FracHoldings or *Trades* (%)	Size rank	Book-to-Market rank	Momentum rank	Turnover rank
FracHoldings					
Decile 1 (Top)	17.77	0.74	0.41	0.54	0.71
Decile 2	11.14	0.74	0.44	0.53	0.66
Decile 3	8.46	0.73	0.46	0.52	0.61
Decile 4	6.64	0.73	0.47	0.52	0.58
Decile 5	5.16	0.71	0.47	0.52	0.56
Decile 6	3.88	0.69	0.48	0.51	0.53
Decile 7	2.76	0.64	0.50	0.51	0.50
Decile 8	1.83	0.59	0.52	0.50	0.48
Decile 9	0.98	0.58	0.51	0.50	0.46
Decile 10 (Bottom)	0.27	0.56	0.52	0.50	0.42
Trades					
Decile 1 (Top)	3.93	0.65	0.41	0.57	0.70
Decile 2	1.30	0.69	0.44	0.54	0.62
Decile 3	0.64	0.71	0.46	0.53	0.56
Decile 4	0.29	0.69	0.48	0.52	0.51
Decile 5	0.10	0.61	0.53	0.50	0.45
Decile 6	0.01	0.57	0.54	0.49	0.42
Decile 7	-0.10	0.66	0.49	0.50	0.48
Decile 8	-0.36	0.73	0.46	0.50	0.55
Decile 9	-0.91	0.72	0.45	0.50	0.62
Decile 10 (Bottom)	-3.25	0.67	0.46	0.49	0.69

At the end of each calendar quarter for the period beginning January 1, 1975 and ending January 1, 1995, we compute both the fraction of the market capitalization of each stock that is held by the universe of mutual funds (*FracHoldings*) and the change in that fraction during the quarter (*Trades*). We then compute the equal-weighted average characteristic scores for decile portfolios formed based on separate rankings on *FracHoldings* and on *Trades*. To compute the rank score of a given stock on a given characteristic, we sort all stocks (belonging to the intersection of the CRSP and Compustat databases) separately by their market capitalization, book-to-market ratio, prior six-month return, and prior-quarter average daily turnover ratio at the end of each calendar quarter. We then assign each stock a rank score on each characteristic, where the rank lies between zero (low) and one (high).[a] Daily turnover ratio is defined as the average daily trading volume divided by the number of shares outstanding. Finally, we report the time-series average of all measures across all quarters.

[a] For example, if there are N stocks in the intersection of CRSP and Compustat at the end of a given quarter, then the i^{th}–ranked stock (on a particular characteristic) is assigned a rank score of $(i\text{-}1)/(N\text{-}1)$ for that quarter.

TABLE 3

Performance of Stocks Held and Traded by Mutual Funds

Panel A - Gross Returns

	Event Time						
	Qtr -2	Qtr -1	Qtr 0	Qtr +1	Qtr +1 through Qtr +2	Qtr +1 through Qtr +3	Qtr +1 through Qtr +4
FracHoldings							
All Holdings	4.13	4.55	4.33	3.85	7.60	11.57	15.48
Decile 1 (Top)	5.82	6.36	5.73	4.40	8.69	13.11	17.21
Decile 2	4.70	5.04	4.84	4.21	8.09	12.25	16.13
Decile 3	4.25	4.61	4.18	3.84	7.68	11.48	15.28
Decile 4	3.58	4.04	3.91	3.52	6.92	10.76	14.65
Decile 5	3.32	3.74	3.71	3.66	7.21	11.13	15.17
Decile 6	3.38	3.60	3.47	3.42	6.86	10.53	14.33
Decile 7	2.89	3.55	3.43	3.50	6.80	10.17	13.75
Decile 8	2.41	2.86	3.14	3.23	6.75	10.88	14.71
Decile 9	3.20	3.55	3.85	3.92	7.83	11.79	15.61
Decile 10 (Bottom)	3.17	3.60	3.79	3.95	7.87	11.95	16.26
Top – Bottom	2.65**	2.76**	1.94**	0.45	0.83	1.16	0.95
	(3.76)	(4.17)	(2.75)	(0.63)	(0.58)	(0.56)	(0.36)
Trades							
Buys (*Trades>0*)	4.17	5.60	7.48	4.58	8.78	13.44	17.82
Sells (*Trades<0*)	3.88	3.44	1.85	3.35	6.68	9.75	13.12
Buys – Sells	0.29	2.15**	5.63**	1.24**	2.10**	3.68**	4.69**
Decile 1 (Top)	5.11	7.02	9.45	5.13	9.63	14.49	18.97
Decile 2	3.81	5.16	7.02	4.40	8.49	13.00	17.25
Decile 3	3.57	4.59	5.83	3.69	7.68	12.27	16.44
Decile 4	3.46	3.99	5.09	3.85	7.50	11.85	15.93
Decile 5	3.03	2.50	5.15	4.97	8.49	11.38	15.24
Decile 6	2.14	1.84	2.55	2.40	5.32	7.99	10.17
Decile 7	3.15	3.67	2.40	3.51	6.81	10.25	14.46
Decile 8	3.51	3.50	2.18	3.16	6.48	10.12	13.73
Decile 9	3.96	3.23	1.73	3.38	6.79	10.11	13.44
Decile 10 (Bottom)	4.16	3.57	1.69	3.47	6.74	9.53	12.89
Top – Bottom	0.95*	3.45**	7.76**	1.66**	2.90**	4.96**	6.08**
	(2.15)	(5.28)	(9.49)	(4.27)	(3.29)	(4.55)	(4.50)

(continued on next page)

TABLE 3 (continued)

Performance of Stocks Held and Traded by Mutual Funds

Panel B – DGTW-Adjusted Returns

	Event Time						
	Qtr -2	Qtr -1	Qtr 0	Qtr +1	Qtr +1 through Qtr +2	Qtr +1 through Qtr +3	Qtr +1 through Qtr +4
FracHoldings							
All Holdings	0.35**	0.38**	0.32**	0.13	0.20	0.19	0.17
Decile 1 (Top)	1.47**	1.64**	1.24**	0.40	0.75	0.83	0.75
Decile 2	0.70**	0.60**	0.69**	0.30	0.32	0.37	0.30
Decile 3	0.44*	0.48**	0.24	0.11	0.36	0.41	0.46
Decile 4	0.06	0.06	0.01	-0.06	-0.13	-0.14	-0.12
Decile 5	-0.13	-0.07	0.003	0.18	0.18	0.34	0.56
Decile 6	-0.20	-0.41*	-0.34*	-0.18	-0.40	-0.74	-1.03
Decile 7	-0.49**	-0.19	-0.21	-0.04	-0.13	-0.41	-0.46
Decile 8	-0.84**	-0.78**	-0.46	-0.49*	-0.80	-0.84	-1.06
Decile 9	-0.62*	-0.63*	-0.36	0.14	0.45	0.47	0.37
Decile 10 (Bottom)	-0.63	-0.64	-0.46	0.14	0.07	0.07	0.22
Top – Bottom	2.10**	2.27**	1.70**	0.26	0.68	0.76	0.53
	(4.11)	(4.39)	(3.28)	(0.49)	(0.66)	(0.54)	(0.29)
Trades							
Buys (*Trades>0*)	0.09	0.96**	2.48**	0.44**	0.63*	0.89*	0.99*
Sells (*Trades<0*)	0.06	-0.47*	-1.64**	-0.14	-0.31	-0.86*	-1.01*
Buys – Sells	0.03	1.44**	4.12**	0.59**	0.93**	1.74**	2.00**
Decile 1 (Top)	0.42	1.82**	3.75**	0.70**	0.91	1.05	1.22
Decile 2	-0.12	0.58*	2.20**	0.44*	0.68*	0.97*	0.92*
Decile 3	0.02	0.46**	1.34**	-0.12	0.14	0.63	0.78
Decile 4	0.01	-0.02	0.80**	0.14	0.35	0.63*	0.60
Decile 5	-1.27	-2.00	0.59	1.07	0.94	-0.01	0.70
Decile 6	-0.32	-0.62**	-0.45*	-0.05	-0.17	-0.27	-0.45
Decile 7	-0.36	-0.004	-0.70**	-0.26	-0.36	-0.63	-0.18
Decile 8	-0.16	-0.25	-1.14**	-0.19	-0.36	-0.54	-0.64
Decile 9	0.36	-0.54*	-1.56**	-0.25	-0.40	-0.84*	-1.12**
Decile 10 (Bottom)	0.05	-0.53	-1.98**	-0.04	-0.29	-1.01	-1.11
Top - Bottom	0.37	2.35**	5.73**	0.73*	1.19*	2.06**	2.34**
	(0.94)	(4.50)	(9.07)	(2.49)	(2.29)	(3.41)	(2.74)

At the end of each calendar quarter for the period beginning January 1, 1975 and ending January 1, 1995, we compute both the fraction of the market capitalization of each stock that is held by the universe of mutual funds (*FracHoldings*) and the change in that fraction during the quarter (*Trades*). Next, in Panel A, we compute the buy-and-hold return on the portfolio of all stocks held in non-zero amounts by the universe of funds ("All Holdings"), as well as the return on the portfolios of all stocks bought or sold, in aggregate, by all funds ("Buys" and "Sells," respectively). We also compute buy-and-hold returns on two groups of decile portfolios, which are formed by separate rankings on *FracHoldings* and on *Trades* (again, all stocks with zero *FracHoldings* or *Trades*, respectively, are excluded). Buy-and-hold returns on holdings portfolios are based on mimicking the aggregate shareholdings of each stock at the end of each calendar quarter, while buy-and-hold returns on trade portfolios are based on mimicking the *changes* in shareholdings during each quarter. The portfolio formation quarter is labeled "quarter 0." Panel B presents portfolio-weighted buy-and-hold adjusted returns, where each buy-and-hold stock return is adjusted by subtracting the buy-and-

hold return on the matching DGTW characteristic portfolio at the beginning of that time period. In all cases, we report the average (across all event dates) portfolio gross return (or DGTW-adjusted return) during event quarters –2, -1, 0, and during various holding periods following the formation quarter, for portfolios with weights based on the end of quarter 0 shareholdings (or the quarter 0 shares traded) of each stock multiplied by the per-share price of that stock at the beginning of each holding period. These returns are reported in percent per holding period, with time-series t-statistics (adjusted for overlapping observations, where appropriate) in parentheses. * and ** indicate significance at the 5 percent and 1 percent levels, respectively, for a two-tailed test.

TABLE 4

Performance of Stocks with Different Characteristics
(DGTW-Adjusted Returns)

	Event Time						
	Qtr -2	Qtr -1	Qtr 0	Qtr +1	Qtr +1 through Qtr +2	Qtr +1 through Qtr +3	Qtr +1 through Qtr +4
Small Firms							
All Holdings	-1.05**	-1.10**	-1.32**	0.22	0.21	0.13	0.19
Buys (*Trades>0*)	0.13	1.24**	1.39**	0.48*	0.67	0.84	1.08
Sells (*Trades<0*)	-2.49**	-3.64**	-3.79**	-0.48*	-0.86**	-1.27*	-1.27
Buys - Sells	2.62**	4.88**	5.18**	0.96**	1.53**	2.12**	2.35*
	(7.72)	(13.08)	(12.52)	(3.48)	(3.19)	(3.06)	(2.40)
Large Firms							
All Holdings	0.53**	0.58**	0.54**	0.13	0.20	0.21	0.19
Buys (*Trades>0*)	0.11	0.92**	2.75**	0.43**	0.63*	0.91*	0.97*
Sells (*Trades<0*)	0.68**	0.26	-1.12**	-0.09	-0.21	-0.79*	-0.99*
Buys - Sells	-0.58*	0.66*	3.87**	0.53*	0.84**	1.71**	1.97**
	(-2.33)	(2.24)	(9.49)	(2.54)	(2.88)	(4.74)	(3.78)
Growth firms							
All Holdings	1.36**	1.39**	1.36**	0.17	0.32	0.42	0.48
Buys (*Trades>0*)	1.16**	2.15**	3.87**	0.35*	0.53	0.83*	1.08
Sells (*Trades<0*)	1.31**	0.72**	-0.51	-0.17	-0.23	-0.83*	-0.96
Buys - Sells	-0.15	1.43**	4.39**	0.53*	0.76*	1.66**	2.05**
	(-0.58)	(4.72)	(10.33)	(2.38)	(2.42)	(4.31)	(3.51)
Value firms							
All Holdings	-1.54**	-1.63**	-1.77**	0.20	0.14	-0.01	-0.15
Buys (*Trades>0*)	-1.62**	-1.08**	-0.07	0.74**	0.99**	1.25*	1.14
Sells (*Trades<0*)	-2.30**	-2.95**	-4.16**	-0.09	-0.35	-0.74	-0.95
Buys - Sells	0.68*	1.87**	4.10**	0.83**	1.34**	1.99**	2.09**
	(2.14)	(5.47)	(9.49)	(2.95)	(2.87)	(3.30)	(2.99)

At the end of each calendar quarter for the period beginning January 1, 1975 and ending January 1, 1995, we compute the buy-and-hold DGTW-adjusted return on the portfolio of stocks held in non-zero amounts by the universe of funds ("All Holdings"), as well as the DGTW-adjusted return on the portfolios of stocks bought or sold, in aggregate, by all funds ("Buys" and "Sells," respectively; see the legend for Table 3 for further details on the DGTW adjustment procedure). Before doing so, we separate all stocks held (traded) into four groups: small firms, large firms, growth firms, and value firms.[a] Buy-and-hold DGTW-adjusted

[a] At the end of each calendar quarter, we place each stock into one of two groups, based on the market capitalization of that stock compared to the stock having the median market capitalization among all NYSE stocks. We repeated this procedure by placing the stock into one of two groups, based on its book-to-market ratio compared to the median book-to-market ratio of all NYSE stocks.

returns on holdings portfolios are based on mimicking the aggregate shareholdings of each stock at the end of each calendar quarter, while buy-and-hold DGTW-adjusted returns on trade portfolios are based on mimicking the *changes* in shareholdings during each quarter. The portfolio formation quarter is labeled "quarter 0." In all cases, we report the average (across all event dates) portfolio DGTW-adjusted return during event quarters –2, -1, 0, and during various holding periods following the formation quarter, for portfolios with weights based on the end of quarter 0 shareholdings (or the quarter 0 shares traded) of each stock multiplied by the per-share price of that stock at the beginning of each holding period. These returns are reported in percent per holding period, with time-series t-statistics (adjusted for overlapping observations, where appropriate) in parentheses. * and ** indicate significance at the 5 percent and 1 percent levels, respectively, for a two-tailed test.

TABLE 5

Mutual Fund Statistics, by Self-Declared Investment Objectives

Number of Funds			Proportion of all Mutual Fund Assets (Percent)			Turnover (Percent)			Proportion of Fund Assets in Stock Categories (Percent)			
									Large Cap		Small Cap	
1975	1985	1995	1975	1985	1995	1975	1985	1994	Value	Growth	Value	Growth
Aggressive Growth												
73	97	219	11.9	16.6	8.9	67.9	98.6	104.9	11.31	60.48	5.96	22.25
Growth												
81	217	1,341	29.4	32.7	36.8	37.0	78.9	80.5	19.93	68.45	4.21	7.41
Growth and Income												
57	124	385	38.8	38.6	26.2	33.9	80.3	73.3	39.07	56.95	2.24	1.74
Balanced or Income												
50	67	216	19.9	12.1	28.1	44.0	83.5	87.9	42.99	50.38	3.79	2.84

This table shows the total number of mutual funds existing at the beginning of 1975, 1985, and 1995 that belong to each investment objective subgroup. quarterly investment objective data is available from the CDA files beginning June 30, 1980, and is supplemented with hand-collected data for the quarter beginning January 1, 1975. The table also shows the proportion of total mutual fund assets (across the four major subgroups below) that is represented by the assets of all funds within a given subgroup. Cross-sectional average turnover levels, from the CRSP mutual fund files, are presented for each subgroup for 1975, 1985, and 1994, and, finally, the proportion of fund assets (invested in equities) that are invested in stocks belonging to four characteristic categories is shown. Specifically, stocks are characterized at the beginning of each quarter based on the stock's market capitalization and book-to-market ratio, compared to the median values for all stocks listed on the NYSE. For example, a large-cap, value stock is a stock with a market capitalization greater than half of all NYSE firms, and with a book-to-market ratio also greater than half of NYSE stocks. At the beginning of each quarter from January 1, 1975 to January 1, 1995, the proportion of the total dollar investment in equities by all funds in a given subgroup that is held in stocks of each characteristic type is computed (before June 30, 1980, the investment objective data for January 1, 1975 is used to classify funds—funds entering the sample after that date are excluded until June 30, 1980). Finally, the table reports the time-series average proportion for each characteristic category over all quarters.

TABLE 6

Performance of Stocks Traded by Funds of Various Categories
(DGTW-Adjusted Returns)

Panel A: Aggregate Figures

	Event Time						
	Qtr -2	Qtr -1	Qtr 0	Qtr +1	Qtr +1 through Qtr +2	Qtr +1 through Qtr +3	Qtr +1 through Qtr +4
Aggressive Growth Funds							
All Holdings	1.89**	1.82**	1.28**	0.47*	0.88*	1.12	1.25
Buys (*Trades>0*)	1.62**	3.24**	4.17**	0.50*	1.03*	1.47*	1.75
Sells (*Trades<0*)	0.61*	-0.90**	-2.34**	0.14	0.08	-0.71	-0.84
Buys - Sells	1.01**	4.14**	6.52**	0.36	0.95	2.18**	2.59**
	(2.84)	(10.55)	(14.63)	(1.37)	(1.88)	(3.40)	(3.31)
Growth Funds							
All Holdings	0.55**	0.57**	0.46**	0.18	0.28	0.27	0.22
Buys (*Trades>0*)	0.38	1.19**	2.48**	0.38**	0.65*	0.84*	0.85
Sells (*Trades<0*)	0.14	-0.51*	-1.41**	-0.08	-0.41	-0.89**	-0.95*
Buys - Sells	0.25	1.71**	3.88**	0.46**	1.06**	1.73**	1.80**
	(1.03)	(6.01)	(9.41)	(2.85)	(3.73)	(5.29)	(5.20)
Growth and Income Funds							
All Holdings	-0.16	-0.09	0.01	0.04	0.02	-0.01	-0.01
Buys (*Trades>0*)	-0.74**	-0.81**	0.47*	0.45**	0.30	0.35	0.39
Sells (*Trades<0*)	0.37*	0.72**	0.15	-0.06	0.001	-0.11	-0.25
Buys - Sells	-1.12**	-1.53**	0.33	0.52*	0.30	0.45	0.64
	(-5.93)	(-5.68)	(1.10)	(2.48)	(0.97)	(1.09)	(1.20)
Balanced or Income Funds							
All Holdings	-0.21**	-0.13	-0.05	-0.02	-0.08	-0.18	-0.26
Buys (*Trades>0*)	-0.57**	-0.40*	0.51**	0.16	0.18	0.38	0.52
Sells (*Trades<0*)	0.33	0.52**	0.23	-0.10	-0.16	-0.15	-0.34
Buys - Sells	-0.90**	-0.92**	0.28	0.25	0.34	0.54	0.86
	(-4.01)	(-4.23)	(1.08)	(1.29)	(1.04)	(1.34)	(1.90)

(continued on next page)

TABLE 6 (continued)

Performance of Stocks Traded by Funds of Various Categories
(DGTW-Adjusted Returns)

Panel B: Subsamples of Stocks

	Event Time						
	Qtr -2	Qtr -1	Qtr 0	Qtr +1	Qtr +1 through Qtr +2	Qtr +1 through Qtr +3	Qtr +1 through Qtr +4
Aggressive Growth Funds							
Small Growth	2.15**	6.97**	6.98**	0.61	1.02	1.66*	1.59**
Q1-Q5	(3.75)	(11.10)	(11.79)	(1.38)	(1.80)	(2.37)	(3.94)
Small Value	3.24**	6.86**	7.66**	0.91	3.17**	3.17**	3.81**
Q1-Q5	(5.50)	(11.55)	(11.76)	(1.85)	(3.92)	(3.59)	(3.24)
Large Growth	0.27	4.14**	8.04**	0.28	0.53	2.63*	3.50**
Q1-Q5	(0.51)	(6.49)	(11.34)	(0.64)	(0.64)	(2.36)	(2.66)
Large Value	0.10	3.37**	5.64**	-0.05	0.90	1.72	1.77
Q1-Q5	(0.15)	(5.68)	(9.79)	(-0.09)	(1.39)	(1.79)	(1.77)
Growth Funds							
Small Growth	1.47**	2.53**	2.51**	0.58	1.47*	2.35*	2.41
Q1-Q5	(3.04)	(5.62)	(3.80)	(1.38)	(2.14)	(2.43)	(1.93)
Small Value	2.34**	4.07**	4.11**	0.77	1.28	1.63*	1.50
Q1-Q5	(5.18)	(6.34)	(6.74)	(1.63)	(1.85)	(2.00)	(1.31)
Large Growth	0.02	1.78**	4.47**	0.28	0.83	1.52*	1.58*
Q1-Q5	(0.05)	(3.89)	(7.30)	(0.96)	(1.81)	(2.30)	(2.29)
Large Value	0.07	1.72**	4.78**	0.62	1.87**	2.76**	2.09**
Q1-Q5	(0.16)	(3.30)	(7.07)	(1.81)	(3.13)	(4.84)	(3.20)
Growth and Income Funds							
Small Growth	-0.45	0.47	-0.19	0.32	-0.21	0.43	1.32
Q1-Q5	(-0.65)	(0.67)	(-0.29)	(0.53)	(-0.37)	(0.62)	(1.65)
Small Value	0.79	1.15	2.59**	0.11	0.28	0.44	-0.80
Q1-Q5	(1.43)	(1.70)	(3.35)	(0.16)	(0.20)	(0.29)	(-0.46)
Large Growth	-2.25**	-2.84**	-0.09	0.37	0.44	0.68	1.04
Q1-Q5	(-7.25)	(-6.68)	(-0.21)	(1.15)	(0.97)	(1.23)	(1.53)
Large Value	-0.19	-0.82	0.33	1.24**	0.69	0.85	0.96
Q1-Q5	(-0.44)	(-1.86)	(0.67)	(2.94)	(0.94)	(0.92)	(0.81)
Balanced or Income Funds							
Small Growth	0.63	0.11	-0.09	1.05	0.58	1.11	2.34
Q1-Q5	(0.62)	(0.11)	(-0.06)	(1.07)	(0.34)	(0.79)	(1.58)
Small Value	0.77	1.57*	0.80	0.47	0.74	-0.01	1.26
Q1-Q5	(1.24)	(2.29)	(1.04)	(0.73)	(0.63)	(-0.01)	(0.77)
Large Growth	-1.31**	-2.06**	0.66	0.14	0.10	0.17	0.44
Q1-Q5	(-3.15)	(-5.61)	(1.37)	(0.41)	(0.17)	(0.22)	(0.60)
Large Value	-1.21**	-0.41	0.49	0.28	0.79	1.36*	1.46
Q1-Q5	(-2.83)	(-1.16)	(1.04)	(0.72)	(1.40)	(2.26)	(1.96)

At the end of each calendar quarter for the period beginning January 1, 1975 and ending January 1, 1995, we compute the buy-and-hold DGTW-adjusted return on the portfolio of stocks held in non-zero amounts by all funds within a given investment-objective subgroup ("All Holdings"), as well as the DGTW-adjusted

return on the portfolios of stocks bought or sold, in aggregate, by that subgroup ("Buys" and "Sells," respectively; see the legend for Table 3 for further details on the DGTW adjustment procedure). These figures are shown in Panel A. In Panel B, we first split fund holdings into four stock groups[a] and then form quintile portfolios based on a ranking on the *Trades* measure of each stock for each subgroup during each calendar quarter. We report the buy-and-hold return difference between the top quintile and the bottom quintile. In all cases, buy-and-hold DGTW-adjusted returns on holdings portfolios are based on mimicking the aggregate shareholdings of each stock at the end of each calendar quarter, while buy-and-hold DGTW-adjusted returns on trade portfolios are based on mimicking the *changes* in shareholdings during each quarter. The portfolio formation quarter is labeled "quarter 0." In all cases, we report the average (across all event dates) portfolio DGTW-adjusted return during event quarters –2, -1, 0, and during various holding periods following the formation quarter, for portfolios with weights based on the end of quarter 0 shareholdings (or the quarter 0 shares traded) of each stock multiplied by the per-share price of that stock at the beginning of each holding period. These returns are reported in percent per holding period, with time-series t-statistics (adjusted for overlapping observations, where appropriate) in parentheses. * and ** indicate significance at the 5 percent and 1 percent levels, respectively, for a two-tailed test.

[a] They are large cap value, large cap growth, small cap value, and small cap growth stocks. Please see the detailed explanation given in Table 5.

TABLE 7

Performance of Stocks Held and Traded by Funds Classified by Turnover

	Event Time						
	Qtr -2	Qtr -1	Qtr 0	Qtr +1	Qtr +1 through Qtr +2	Qtr +1 through Qtr +3	Qtr +1 through Qtr +4
Panel A –Gross Returns							
Funds with High Turnover							
All Holdings	5.24	5.57	5.45	3.96	8.11	12.38	16.43
Buys (*Trades>0*)	4.18	6.19	8.61	4.05	8.35	12.93	17.21
Sells (*Trades<0*)	4.94	3.66	1.63	3.37	6.88	10.17	13.81
Buys - Sells	-0.76	2.53**	6.98**	0.68*	1.47**	2.76**	3.40**
	(-1.83)	(6.73)	(13.12)	(2.19)	(2.66)	(4.40)	(5.09)
Funds with Low Turnover							
All Holdings	2.93	3.23	3.56	3.33	6.80	10.37	13.95
Buys (*Trades>0*)	1.96	2.03	3.45	3.77	7.74	11.60	15.32
Sells (*Trades<0*)	3.36	3.97	4.16	2.82	5.97	9.02	12.26
Buys - Sells	-1.41**	-1.94**	-0.71	0.95**	1.77*	2.58*	3.06*
	(-3.51)	(-5.12)	(-1.60)	(2.91)	(2.42)	(2.47)	(2.55)
Funds with High Turnover minus Funds with Low Turnover							
All Holdings	2.31**	2.34**	1.89**	0.63*	1.30*	2.02**	2.48*
Buys (*Trades>0*)	2.23**	4.17**	5.17**	0.28	0.61	1.33	1.89
Sells (*Trades<0*)	1.58**	-0.30	-2.53**	0.54	0.91	1.16	1.55
Buys - Sells	0.65	4.47**	7.69**	-0.26	-0.30	0.18	0.34
	(1.11)	(8.10)	(10.87)	(-0.64)	(-0.36)	(0.16)	(0.25)
Panel B – DGTW Adjusted Returns							
Funds with High Turnover							
All Holdings	1.35**	1.47**	1.21**	0.28	0.51	0.70	0.73
Buys (*Trades>0*)	0.53*	1.86**	3.56**	0.24	0.53	0.94	1.11
Sells (*Trades<0*)	1.19**	0.03	-1.71**	-0.04	-0.29	-0.69	-0.76
Buys - Sells	-0.66*	1.84**	5.27**	0.28	0.82	1.63**	1.87**
	(-2.18)	(6.68)	(12.39)	(1.16)	(1.90)	(3.22)	(3.01)
Funds with Low Turnover							
All Holdings	-0.28**	-0.18	-0.08	-0.04	-0.16	-0.31	-0.44
Buys (*Trades>0*)	-1.25**	-1.16**	-0.34	0.29	0.27	0.19	-0.02
Sells (*Trades<0*)	0.17	0.58*	0.62**	-0.35	-0.68*	-1.14*	-1.47*
Buys - Sells	-1.43**	-1.75**	-0.96**	0.64*	0.95*	1.33*	1.45**
	(-5.85)	(-5.59)	(-2.67)	(2.38)	(1.99)	(2.24)	(2.65)
Funds with High Turnover minus Funds with Low Turnover							
All Holdings	1.63**	1.65**	1.29**	0.32*	0.67**	1.01**	1.17**
Buys (*Trades>0*)	1.78**	3.02**	3.90**	-0.04	0.26	0.75	1.13
Sells (*Trades<0*)	1.01**	-0.56	-2.33**	0.31	0.40	0.44	0.71
Buys - Sells	0.77	3.58**	6.23**	-0.36	-0.13	0.30	0.42
	(1.91)	(8.09)	(10.89)	(-1.01)	(-0.20)	(0.43)	(0.52)

At the end of each calendar quarter during the period beginning January 1, 1976 and ending January 1, 1995, we sort funds into quintiles based on their turnover level of the prior calendar year. We form three aggregate portfolios, *All*

Holdings, *Buys*, and *Sells*, based on the stocks held, bought, and sold by all funds (in the highest and lowest prior-year turnover quintiles) at the end of (or during) Qtr 0. Buy-and-hold returns on holdings portfolios are based on mimicking the aggregate shareholdings of each stock at the end of each calendar quarter, while buy-and-hold returns on trade portfolios are based on mimicking the *changes* in shareholdings during each quarter. The portfolio formation quarter is labeled "quarter 0." Panel A presents unadjusted (gross) portfolio returns, while Panel B presents DGTW-adjusted portfolio returns (see the legend to Table 3 for further details on these returns). In all cases, we report the average (across all event dates) portfolio gross return (or DGTW-adjusted return) during event quarters –2, -1, 0, and during various holding periods following the formation quarter, for portfolios with weights based on the end of quarter 0 shareholdings (or the quarter 0 shares traded) of each stock multiplied by the per-share price of that stock at the beginning of each holding period. These returns are reported in percent per quarter, with time-series t-statistics (adjusted for overlapping observations, where appropriate) in parentheses. * and ** indicate significance at the 5 percent and 1 percent levels, respectively, for a two-tailed test.

TABLE 8

Performance Persistence of Holdings and Trades

	Event Time						
	Qtr -2	Qtr -1	Qtr 0	Qtr +1	Qtr +1 through Qtr +2	Qtr +1 through Qtr +3	Qtr +1 through Qtr +4
Panel A –Gross Returns							
Top Quintile Performing Funds							
All Holdings	6.66	7.26	5.25	4.40	8.66	12.55	16.23
Buys (*Trades>0*)	5.10	6.34	7.32	4.49	8.89	13.33	17.12
Sells (*Trades<0*)	6.45	6.30	2.76	3.97	7.44	10.57	14.03
Buys - Sells	-1.35**	0.05	4.56**	0.52	1.46**	2.76**	3.09**
	(-3.78)	(0.08)	(6.34)	(1.86)	(3.42)	(4.75)	(6.92)
Bottom Quintile Performing Funds							
All Holdings	1.68	1.77	3.54	3.13	6.52	10.33	14.10
Buys (*Trades>0*)	3.24	3.98	5.53	4.13	7.79	11.95	15.86
Sells (*Trades<0*)	1.38	0.71	2.16	2.75	5.91	9.05	12.53
Buys - Sells	1.86**	3.27**	3.37**	1.38**	1.88**	2.90**	3.33**
	(5.14)	(6.98)	(5.65)	(4.36)	(3.18)	(3.53)	(3.91)
Top Quintile Performing Funds minus Bottom Quintile Performing Funds							
All Holdings	4.98**	5.49**	1.71**	1.27*	2.14	2.22	2.13
Buys (*Trades>0*)	1.86**	2.36**	1.78**	0.36	1.10	1.38	1.26
Sells (*Trades<0*)	5.07**	5.59**	0.60	1.22*	1.52	1.52	1.50
Buys - Sells	-3.21**	-3.23**	1.18	-0.87*	-0.42	-0.14	-0.24
	(-5.84)	(-3.53)	(1.08)	(-2.00)	(-0.60)	(-0.16)	(-0.28)
Panel B – DGTW Adjusted Returns							
Top Quintile Performing Funds							
All Holdings	1.70**	1.99**	0.83**	0.37*	0.57	0.43	0.31
Buys (*Trades>0*)	0.68**	1.43**	2.50**	0.36	0.61	0.77	0.69
Sells (*Trades<0*)	1.59**	1.29**	-1.25**	0.20	0.02	-0.49	-0.41
Buys - Sells	-0.91**	0.15	3.75**	0.17	0.58*	1.26**	1.10*
	(-3.09)	(0.32)	(6.45)	(0.65)	(2.12)	(2.92)	(2.00)
Bottom Quintile Performing Funds							
All Holdings	-0.85**	-0.93**	0.15	-0.13	-0.13	0.004	0.03
Buys (*Trades>0*)	0.05	0.42	1.28**	0.39	0.43	0.64	0.70
Sells (*Trades<0*)	-1.23**	-1.81**	-0.85**	-0.37	-0.79**	-1.07**	-1.17*
Buys - Sells	1.28**	2.22**	2.13**	0.75**	1.22**	1.71**	1.88**
	(5.03)	(6.31)	(4.73)	(2.67)	(2.70)	(3.23)	(3.53)
Top Quintile Performing Funds minus Bottom Quintile Performing Funds							
All Holdings	2.55**	2.92**	0.68**	0.51*	0.70	0.43	0.28
Buys (*Trades>0*)	0.63*	1.02*	1.21*	-0.02	0.18	0.13	-0.01
Sells (*Trades<0*)	2.81**	3.09**	-0.40	0.56*	0.81*	0.58	0.76
Buys - Sells	-2.18**	-2.08**	1.62	-0.59	-0.63	-0.45	-0.77
	(-5.41)	(-3.01)	(1.91)	(-1.51)	(-1.30)	(-0.68)	(-0.92)

At the end of each calendar quarter during the period beginning January 1, 1976 and ending January 1, 1995, we sort funds into quintiles based on their stock portfolio return of the prior year. We form three aggregate portfolios, *All Holdings*, *Buys*, and *Sells*, based on the stocks held, bought, and sold by all funds

(in the highest and lowest past return quintiles) at the end of (or during) Qtr 0. Buy-and-hold returns on holdings portfolios are based on mimicking the aggregate shareholdings of each stock at the end of each calendar quarter, while buy-and-hold returns on trade portfolios are based on mimicking the *changes* in shareholdings during each quarter. The portfolio formation quarter is labeled "quarter 0." Panel A presents unadjusted (gross) portfolio returns, while Panel B presents DGTW-adjusted portfolio returns (see the legend to Table 3 for further details on these returns). In all cases, we report the average (across all event dates) portfolio gross return (or DGTW-adjusted return) during event quarters –2, -1, 0, and during various holding periods following the formation quarter, for portfolios with weights based on the end of quarter 0 shareholdings (or the quarter 0 shares traded) of each stock multiplied by the per-share price of that stock at the beginning of each holding period. These returns are reported in percent per quarter, with time-series t-statistics (adjusted for overlapping observations, where appropriate) in parentheses. * and ** indicate significance at the 5 percent and 1 percent levels, respectively, for a two-tailed test.

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[1] The so-called "short-short" rule of the IRS, which existed until 1997, might also have discouraged funds from turning over stocks during short time periods. This rule imposed tax penalties on funds that derive more than 30 percent of their profits from holdings of 91 or fewer days.

[2] Further details on the construction of this database by CDA are available in Wermers (1999a).

[3] The reader is referred to Grinblatt, Titman, and Wermers (1995) for a detailed description of these investment objectives.

[4] In this paper, we consider only CRSP stocks with a share code of either 10 or 11, which are common stocks of domestic firms.

[5] *FracHoldings* and *Trades* are modified appropriately for subgroups of mutual funds in a later section of this paper. For example, when analyzing holdings and trades by aggressive-growth funds, *Number of Shares Held*$_{i,t}$ equals the aggregate number of shares of stock *i* held at the end of quarter *t* by the group of aggressive-growth funds existing at that date.

[6] We allow a four-month lag after the end of the fiscal year for a given firm before using book value data for that year so that this information is available to the market on the date that we update the book-to-market ratio.

[7] See Amihud and Mendelson (1985) for a theoretical model where less liquid assets earn higher equilibrium returns than more liquid assets.

[8] Our finding of a preference by mutual funds for high momentum stocks is consistent with Grinblatt, Titman, and Wermers (1995).

[9] Since the bottom *Trades* deciles generally contain only stocks sold (in aggregate) by funds, we mimic these portfolios by purchasing (rather than shorting) the aggregate changes in shareholdings of the funds. One middle portfolio will contain both stocks bought and sold by the funds—in this case, we present the average return of the long and the short portfolio, rather than combining the long and short positions into a single portfolio.

[10] We thank Mark Grinblatt and Sheridan Titman for supplying these data.

[11] Although the results are also suggestive of superior growth-oriented fund talent in picking other types of stocks, we could not reject the equality of the DGTW-adjusted portfolio returns across the four investment objective categories for these other groups of stocks (small growth, small value, or large value stocks) over the first-year holding period.

[12] We note, however, that prior-year turnover is a noisy proxy for current-year turnover. Therefore, before proceeding, we check whether relative levels of fund turnover remain stable over time. To accomplish this, we compute cross-sectional correlations (across funds) between turnover levels during consecutive years. This correlation was roughly 0.7 during the five periods we tested: 1975/1976, 1979/1980, 1984/1985, 1989/1990, and 1993/1994. Thus, high-turnover funds in one year tend to persist in trading more frequently than low-turnover funds.

[13] The average round-trip transaction cost for large institutional investors is about two percent (see Chan and Lakonishok , 1995).

[14] Our results for the All Holdings portfolios indicate a return difference, between winners and losers, of about two percent during the year following the ranking of funds, while Carhart (1997) finds a difference of about six percent. This difference is partly because Carhart equally weights fund returns, while we essentially value-weight returns—Carhart's larger return difference is influenced by the very poor net returns of some small funds. In addition, Carhart's net returns include the contribution of the bond and cash holdings of funds, which are held in larger proportions by poorly performing funds during our sample period.

[15] This finding is consistent with Wermers (1997), who also reports that winning funds tend to be momentum investors.