Rational Cross-Sectional Differences in Market Efficiency: Evidence from Mutual Fund Returns

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1. Introduction

In the U.S., there is fierce competition among mutual funds, hedge funds, and other investors to earn high returns on their stock market investments. If there were no costs of obtaining information, no costs of arbitrage, and no transactions costs, this competition for investment profits would eliminate any mispricings and the stock market would be informationally efficient. Unfortunately though, it is costly to obtain information, arbitrage involves both risk and out-of-pocket expenses, and trading is costly. Grossman and Stiglitz (1980) show that under these circumstances, stocks should be mispriced just enough to compensate the marginal investor for the costs of becoming informed and the costs of trading.[1]

There are large differences in the costs of security analysis and the costs of trading across stocks. As a result, we would expect significant cross-sectional differences in the amount of mispricing, or equivalently, in the level of market efficiency. When informed investors choose to invest in a type of stock that is costly to analyze and trade, we would expect them to earn particularly large returns to compensate them for their expenses.

In this paper, I use actively managed mutual funds as a proxy for smart investors. I examine the level of market efficiency for different types of stocks by comparing the abnormal returns before costs that mutual funds earn on their holdings of these stocks. I examine returns on fund holdings rather than returns on the funds because I am interested in how well mutual funds do on their investments - not how much of their returns are passed on to their investors. Several authors, including Daniel, Grinblatt, Titman and Wermers (1997) and Wermers (2000) find that stocks held by mutual funds outperform stocks with similar sizes, book-to-market values, and momentum. Hence prior mutual fund research supports the assumption that funds are smart, informed investors.

Firm size is one factor that should be correlated with the level of market efficiency. There are three reasons why mispricings are likely to be greater for small stocks than large stocks. First, small stocks are more costly to trade. A ubiquitous finding in market microstructure research is

[1]Several papers discuss fund performance in the context of the Grossman-Stiglitz version of market efficiency. See Daniel, Grinblatt, Titman, and Wermers (1997), Elton, Gruber, Das, and Hlavka (1993), and Ippolito (1989), among others.

that quoted and effective percentage spreads are larger for small stocks.[2] In addition, retail investors face higher percentage commissions for lower priced small stocks. Small stocks are also more costly for institutions to trade. Chan and Lakonishok (1997) examine transactions made by 33 large investment management firms over 1989 - 1991. As in this paper, they divide all stocks into five size categories based on NYSE size quintiles. When they use the opening price on the first day that a package is traded as a benchmark, they find that round trip trading costs average 3.31% for small NYSE stocks, and 0.90% for large NYSE stocks. For Nasdaq stocks, the round-trip trading costs are 2.22% for large stocks and 1.23% for small stocks.

Second, small stocks are more difficult and costly to sell short than large stocks. D'Avolio (2002, p283) observes that "about one-third of the stocks in the bottom (NYSE) size decile and one-third of stocks priced under $5 appear unshortable." Even when they can be shorted, it is expensive to borrow small stocks. Cohen, Diether, and Malloy (2006) obtain data on stock loan fees and quantities from a large institutional investor for September 1999 through August 2003. They document that for this period, mean annual loan fees for stocks that are larger than the NYSE median capitalization are 0.39% per year. For stocks that are smaller than the median NYSE size, loan fees average 3.94% per year. Because they are difficult to short, small stocks should be misrpiced more on average. In Diamond and Verrecchia (1987), unfavorable information is not directly impounded into prices through trading when there are short-sale constraints. Rational traders impute expectations of unrevealed negative information into prices so that hard-to-borrow stocks are not overpriced on average. But, because expectations of negative information rather than the information itself is impounded in stock prices, hard-to-borrow stocks are mispriced more on average than stocks that are easily shorted. This may provide trading opportunities for smart investors who are able to determine whether stocks are mispriced.

Third, information on small stocks is difficult to obtain. Few investors receive "free" information on a small company through exposure to its products or advertisements, or through interactions with its employees. Among others, Barth, Kasznik, and McNichols (2001) find that

[2]Among others, see Bessembinder (1999), Lesmond, Schill ,and Zhou (2004), and Stoll and Whaley (1983).

the number of analysts covering a stock has a strong positive relation with firm size, even after adjusting for trading volume, growth in sales, a dummy variable for securities issuance, and many other variables.

We would expect then, that returns from skilled fundamental analysis will be greater for small stocks to make up for the higher costs of analyzing and trading them. That is what this paper finds. Small stocks held by mutual funds earn 33 basis points per month than do stocks with similar sizes, book-to-market values and past returns. For large stocks, the difference is only seven basis points per month.

Similarly, growth stocks should be less efficiently priced than value stocks and should offer larger abnormal returns. There are two reasons why the market for growth stocks should be less efficient than the market for value stocks. First, growth stocks are more costly and difficult to analyze than value stocks. Growth stock prices reflect cash flows to be generated in the distant future, which are more difficult to predict than near-term cash flows. Growth stocks' cash flows may depend on successful research and development or technological innovation. Or, they may depend on expansion into new product lines or new markets. Hence analysts may be required to develop technical expertise to evaluate growth stocks. They may have to travel to different countries to evaluate expansions. An analyst's knowledge of a company or industry is more likely to grow stale for rapidly changing growth companies than for more staid value companies. All of these factors are likely to make the analysis of growth stocks costly.

Barth, Kasznik, and McNichols (2001) use the average number of stocks covered by a firm's analysts as a measure of the effort required to analyze that firm. They find that analyst expend more effort to cover firms with intangible assets, which are typically growth firms, than firms with tangible assets. They also find that analysts expend more effort to cover firms with high sales growth over the last five years, which is also associated with low book-to-market ratios (growth stocks).

Second, growth stocks are more costly to short than value stocks. Most shares that are borrowed by shortsellers are loaned by institutions. D'Avolio (2002, p283) notes that "after controlling for institutional ownership, lenders are additionally biased in favor of large stocks with high turnover, high book-to-market values, low momentum (prior 6-month returns), and

prices above $5. He also explains that institutional investors who do not lend stocks are "funds who hold small, positive momentum, or glamour stocks."

The results of this paper are consistent with the idea that growth stocks are less efficiently priced than value stocks. Mutual funds earn returns on growth stock investments that exceed the returns of stocks with similar characteristics by 17 basis points per month. For value stocks, the difference is only five basis points.

It is not surprising that the stocks that seem to be least efficiently priced are small growth stocks. On average, funds earn abnormal returns of 0.76% per month on investments in stocks that are in the smallest quintile and lowest book-to-market quintile. In the first month after a small growth stock shows up in a fund's holdings, it earns an average abnormal return of 1.86%.

The remainder of the paper is organized as follows. Section 2 discusses previous research on mutual funds. Section 3 describes the data used here. Section 4 provides empirical results. Section 5 concludes and summarizes the paper.

2. The returns of mutual funds

Examining the returns of mutual funds on investments in different types of stocks is a particularly appealing way of testing for differences in market efficiency. A finding that mutual funds earn larger abnormal returns on growth stocks than value stocks for example, means that growth stocks are less efficiently priced than value stocks. Unlike most tests of efficiency, which see whether specific pieces of information are incorporated into prices, a comparison of mutual fund returns tests whether all of the myriad pieces of information that clever and hardworking fund analysts can uncover are incorporated in prices.

Of course, this analysis relies on the assumption that mutual funds are "smart investors" who are able to analyze securities and identify mispricings. Previous work on mutual funds indicates that these are reasonable assumptions. A brief summary of the extensive literature on mutual fund returns is that they are able to find undervalued securities, but that the abnormal returns they earn are consumed by expenses and fees.

Several recent paper show that stocks held by funds earn abnormal returns before fees and expenses. Daniel, Grinblatt, Titman, and Wermers (1997) examine holdings of mutual funds at

the end of each quarter from 1974 through 1994. They then compare returns of each stock in each fund's portfolio with the returns of one of 125 portfolios based on quintiles of size, book-to-market, and momentum. Stocks held by funds in general outperform by about 79 basis points per year before expenses. Stocks held by aggressive growth funds outperform similar stocks by about 1.49% per year.

An alternative approach to testing whether funds are able to find mispriced securities is used by Baker, Litov, Wachter, and Wurgler (2005). They examine the returns of stocks that funds have bought and sold around their next earnings announcement. By examining returns around a short announcement period window, the impact of any mismeasurement of risk is minimized. Baker, Litov, Wachter, and Wurgler find that the difference in returns between purchased and sold stocks is around 12 basis points at the next earnings announcement. This evidence that fund managers can pick stocks is unambiguous and statistically significant even if the measured economic consequences of their stock-picking is small.

Despite evidence that funds are able to pick undervalued securities, it would be surprising if active mutual funds were able to beat benchmarks after expenses and trading costs. For one thing, successful funds will attract additional capital until diseconomies of scale make it impossible for them to produce abnormal returns (see Berk and Green (2004)). In addition, fund managers and analysts with scarce investment skills should be able to extract most of the gains from their abilities in the form of higher fees.

Empirical evidence generally supports the hypotheses that mutual funds underperform after expenses. In the classic early study of mutual funds performance, Jensen (1969) examines the returns after expenses of 115 mutual funds over the 1955-1964 period. Despite a survivorship bias in his data, he estimates that on average, mutual funds underperformed by about 1.1% per year. This conclusion held even after adding back all expenses except brokerage commissions. In a comprehensive study of the returns to 1,892 diversified equity funds over 1962-2003, Carhart (1997) finds that on average, the funds slightly underperformed the market. After adjustment for characteristics of fund holdings though, underperformance was more striking. Funds tended to overweight small firms, and firms with low book-to-market ratios in their portfolios. After adjusting for these factors, funds on average underperformed by just under 2% per year.

Wermers (2000) compares mutual fund returns before and after expenses. Over the 20 year period from 1975 through 1994, the S&P 500 earned annual returns of 15.4%, and the CRSP value-weighted index earned returns of 15.6%. When mutual funds are weighted by total net assets, the portfolios they held returned 16.9% per year, or 1.3% per year more than the market. When the funds are equally-weighted, they returned 17.7% per year, thus outperforming the market by 2.1% per year. Net returns, after expenses and transactions costs, averaged 14.6% for a value-weighted average of funds, and 14.9% for an equal-weighted average. Hence after expenses, funds underperformed the market by 0.7% to 1.0% per year.

In recent years, cash flows into the mutual fund sector have resulted in both new mutual funds, and larger asset bases for existing funds. Nevertheless, despite diseconomies of scale in the mutual fund industry, we might still expect to see large returns before expenses for fund investments in stocks that are costly to analyze and trade. That is because the number of funds actively trying to pick stocks can adjust so that the returns to analysis will just offset costs of analysis at the margin. Funds that are able to pick stocks will invest disproportionately in the stocks they believe to be undervalued, while other funds, perhaps run by less skillful managers, may become closet indexers.

This is consistent with the findings of several recent papers. Cremers and Petajisto (2006) define the active share of fund's holdings as the proportion of its portfolio invested in shares that exceed what would be held if the fund simply held its benchmark. They show that funds with larger active shares have greater expenses and higher turnover, but also produce greater risk-adjusted net returns. Similar results are obtained by Baks, Busse, and Green (2006). They find that focused funds, those that concentrate their holdings among a small number of stocks, outperform those that are more diversified. Similarly, Kacperczyk, Sialm, and Zheng (2004) find that funds with above median industry concentration produce abnormal gross returns of 1.58% per year, and abnormal net returns of 0.33%. Funds with below median concentration produce gross abnormal returns of 0.36% and net abnormal returns of -0.77%. Finally, Kacperczyk and Seru (2007) use changes in analysts' consensus recommendations over the prior four quarters as a measure of public information. There is significant variation in funds' use of public information to update portfolio holdings. Kacperczyk and Seru (2007) show that abnormal

returns earned by funds are significantly negatively related to the proportion of changes in holdings that are explained by public information.

To summarize, previous work on mutual funds indicates that they are indeed the smart investors who should be able to earn a return on their analysis that is sufficient to cover their costs. To date, there is no research that explicitly compares abnormal returns earned by mutual fudns across different types of stocks, and there is no research that attempts to infer the level of market efficiency for different types of stocks from mutual fund returns. That is the subject of the remainder of this paper.

3. Data

Mutual funds are included in this study if they are classified as by CDA Spectrum as aggressive growth, growth, or growth and income. I want to restrict the sample to funds that attempt to pick stocks, so I exclude all funds that include the term index in their name. In an effort to exclude "closet indexers," I also exclude funds with 500 or more stocks in the their portfolio during a given month.

I obtain periodic snapshots of fund holdings from the CDA Spectrum data. I assume that funds maintain the same positions for three calendar months following their reports. I do this regardless of whether the fund is reporting every three months or every six months. If funds are able to pick stocks, this is likely to understate the actual abnormal returns earned by their holdings. Funds' actual purchases of securities typically occur before the first date I use for their holdings, while stocks may be sold before the end of the assumed three month holding period.

Each month from June 1980 through September 2006, all stocks with prices above $5 are divided into one of 125 characteristic portfolios based on size, book-to-market value, and momentum as in Daniel, Grinblatt, Titman, and Wermers (1997). Stocks are first ranked on size and placed into five size quintiles defined by the size quintile breakpoints of NYSE stocks. Because Nasdaq and Amex stocks tend to be much smaller, the smaller size quintiles contain more stocks than the larger ones. Each size quintile is next divided into five book-to-market quintiles. Book values are obtained from Compustat, as in Fama and French (1993), by summing stockholder's equity and deferred tax and investment credits and subtracting out the value of

preferred stock. I use redemption value of the preferred stock if available, then the liquidation value, and finally the carrying value if that is Compustat's only value for the preferred stock. Book-to-market values are computed each month by dividing the month-end equity value by the most recent book value that is at least six months old. This ensures that book-to-market values were actually available to investors at the portfolio formation date, and that the strategies can therefore be implemented. Next, I sort each of the 25 size and book-to-market portfolios into five portfolios based on returns for the 12 months ending one month before the formation date. The end result then is that each stock is assigned to one of 125 characteristic portfolios each month. These characteristic portfolios are updated each month, using the book-to-market values and prior returns available at the end of the previous month.

As a first step to calculating abnormal returns to stocks held by mutual funds, I calculate abnormal returns for each stock each month. An abnormal return for a stock is estimated by subtracting the value-weighted return of all the other securities in the stock's characteristic as in Daniel, Grinblatt, Titman, and Wermers (1997). Note that the security's own return is not included in the return of the characteristic portfolio that serves as its benchmark. This refinement is particularly important for large stocks, which are assigned to characteristic portfolios with as few as ten stocks during some months. Abnormal returns earned by funds for a specific characteristic portfolio are calculated for each month as a weighted average of the abnormal returns of all the stocks in the characteristic portfolio held by funds. The weights are the total value of each stock held by all funds.

Of course, fund holdings are only provided quarterly or semiannually. Most, but not all funds, report holdings for the end of each calendar quarter. In calculating the total holdings by funds, I assume funds hold stocks for three months following the date for which holdings are reported. Weights are based on the value of fund holdings as of the date for which they are reported.

Panel A of Table 1 provides descriptive statistics for stocks by size, book-to-market, and momentum quintiles. These statistics are obtained by first calculating averages within quintiles for each month from June 1980 through September 2006, and then averaging across months. Mean firm sizes range from $90.46 million for stocks in the smallest quintile to over $14 billion

for stocks in the largest quintile. The requirement that stock prices exceed $5 at the beginning of a month to be included in the characteristic portfolio and in the fund holdings eliminates the smallest stocks.[3] Mean book-to-market ratios range from 0.12 for growth firms to 1.46 for value firms. Prior year returns range from a mean loss of 27% for the momentum quintile of losers, to 105.2% for the quintile of winners.

Size quintile breakpoints are based on capitalizations of New York Stock Exchange (NYSE) stocks only. Because most American Stock Exchange (Amex) and Nasdaq stocks are small relative to NYSE stocks, the smaller size quintiles have more stocks than the larger size quintiles. Table 1 shows that on average, each of the 25 characteristic portfolio based on book-to-market and momentum that are contained in the large firm quintile have 11.8 stocks. Characteristic portfolios of firms in the smallest quintile average 74.2 stocks.

To save space, some of the results of this paper will be reported for 25 portfolios based on the intersection of size and book-to-market quintiles, rather than the 125 characteristic portfolios based on size, book-to-market, and momentum. Panel B of Table 1 reports average sizes for stocks in each of the 25 size and book-to-market portfolios. Most of the variation in size occurs across the size quintiles of course, but within the large and small quintiles value stocks tend to be smaller than growth stocks. Panel C reports book-to-market values for the same 25 portfolios. Within a book-to-market quintile, small stocks tend to have greater book-to-market values than large stocks. This is not true however for the growth stock quintile. Here, book-to-market values are slightly larger for large firms than small firms.

Table 2 provides some details on sample funds and their holdings. On average, 854 funds appear in the sample each month. Of these, 110 are classified as aggressive growth, 551 as growth, and 193 as growth and income. These latter funds are similar to value funds, a classification that is unused in the CDA Spectrum data.

Panel B of Table 2 breaks down fund holdings by stock characteristic quintiles. Fund holdings in each characteristic quintile are calculated monthly over the 1980 - 2006 period and a simple time-series average is reported in the table. More than 66% of the value of mutual funds'

[3]Stocks with prices below $5 were included in an earlier version of this paper. Results are essentially the same, but abnormal returns of fund holdings are even larger for small stocks.

holdings is in the quintile of the largest stocks. Only 2.3% of the value of funds' holdings is in stocks in the smallest quintile. Funds' holdings overweight growth stocks and underweight value stocks. Book-to-market quintiles are formed after sorting on size, so each of these quintiles contains very close to 20% of the value of stocks each month. Despite this, the quintile of stocks with the highest book to market ratio accounts for only 15.45% of the fund holdings while the growth stocks that make up the quintile with the lowest book-to-market ratios provide 24.58% of fund holdings. Stocks in the medium momentum quintile are overweighted by funds and make up 23.23% of their holdings. Funds underweight past losers by investing only 17.93% of their money in them. Winners make up 19.65% of fund holdings - very close to the 20% that would occur if holdings were allocated randomly.

4. Results

4.1 Abnormal returns of fund holdings calculated relative to characteristic portfolios

Table 3 reports average abnormal returns to mutual fund holdings by size, book-to-market, and momentum quintiles. Each month, a weighted average abnormal return is calculated for fund holdings for each quintile, where the weights are the dollar value of fund holdings of each stock. A time series average is then calculated using the months from July 1980 through 2006. T-statistics are based on the time-series standard deviation of the monthly fund abnormal returns. Note that while the abnormal returns are reported by stock characteristic quintile, the abnormal returns are calculated by comparing the returns of stocks held by funds with returns of the 125 size, book-to-market, and momentum characteristic portfolios.

Panel A shows the abnormal returns of fund holdings by size quintiles. Funds earn positive and significant abnormal returns on their investments in stocks in all size quintiles. The average abnormal return decreases monotonically from 33 basis points per month for the quintile of small stocks, to seven basis points per month for the largest stocks. This implies that funds are able to identify greater mispricing among small firms. In other words, there is more identifiable inefficiency in the pricing of small firm stocks than in the pricing of large firm stocks.

This is not surprising. It is likely to be more difficult and more costly to obtain information on small firms than on large firms. In general, fewer investors are aware of a small firm's business and products than are aware of a larger firms. Small firms are less likely to receive coverage in the national press or to be covered by analysts. In addition, small stocks are more costly to trade, and hence relatively large mispricings may remain unexploited. Finally, small stocks are also more difficult to short, making it impossible in many cases for smart arbitrageurs to profit from overpriced small stocks.

Panel B shows abnormal returns by book-to-market quintile. With average monthly abnormal returns of five and three basis points, funds fail to earn statistically significant abnormal returns on their holdings in value stocks, and in stocks in the second-highest book-to-market quintile. On the other hand, growth stocks that are held by funds outperform growth stocks of similar size and momentum by 17 basis points per month. This abnormal performance is statistically significant with a t-statistic of 3.72. These results indicate that growth stocks are not as efficiently priced as value stocks. This is not surprising. To price growth stocks, the market estimates cash flows in the distant future. These future cash flows may depend on technological breakthroughs, entry into new markets, successful patent applications or drug tests. On the other hand, successful pricing of value stocks depends more on forecasting cash flows in the near future. This is not always easy - particularly if a company faces possible financial distress or bankruptcy. Nevertheless, pricing value stocks involves evaluating companies' current businesses, not forecasting the type of business they are likely to have in several years' time.

Panel C reports the abnormal returns of fund holdings across momentum quintiles. Holdings of recent losers do not earn significant abnormal returns, but funds are able to find recent winners that outperform other recent winners. Fund holdings in the quintile of stocks with the highest return over the previous 12 months outperform other winners of similar size and book-to-market value by 22 basis points per month. These abnormal returns are highly significant with a t-statistic of 5.18. It is not obvious why funds earn higher abnormal returns on their investments in past winners than in past losers. This is not a manifestation of momentum. These results indicate that funds earn higher returns on their investments in past winners than they would earn in other past winners with similar levels of momentum. It is possible that past

winners are stocks with recently revealed information, and that funds are able to interpret this information than less sophisticated investors.

It is particularly interesting to see how mutual fund returns, and by implication, levels of market efficiency, vary across combinations of characteristics. In Table 4, I report average abnormal returns for fund holdings for stocks in combinations of size and book-to-market quintiles. Although results are reported for just 25 size and book-to-market portfolios, abnormal returns are calculated for each stock by subtracting returns of all other stocks in the characteristic portfolio formed on size, book-to-market, and momentum.

Panel A reports results for the entire period. This table, like others in the paper, contains a lot of statistics. To make the tables easier to read, I print t-statistics above 2 and returns of more than 50 basis points in boldface.

Reading down columns shows that holding size quintiles constant, funds earn larger abnormal returns on their holdings of stocks with lower book-to-market ratios than they earn on their holdings of stocks with high book-to-market ratios. For example, in the second smallest size quintile, funds earn mean abnormal returns of 54 basis points per month on growth stocks, but earn negative abnormal returns of 2 basis points per month on their holdings of value stocks. Similarly, reading down columns reveals that within a book-to-market quintile, funds earn larger abnormal returns on their holdings of small stocks than on their holdings of large stocks. For example, funds earn average monthly abnormal returns of 26 basis points on their holdings of small stocks in the third book-to-market quintile, but only seven basis points per month on their holdings of large stocks in the same book-to-market quintile. The interaction between size and book-to-market is readily apparent here. Going from the northwest corner of the table, with its large value stocks, to the southeast corner of the table, with small growth stocks, brings a steady increase in mean abnormal returns. The largest mean abnormal returns, 76 basis points per month, appear at the intersection of small and growth stocks.

The last row of the table reports mean differences in abnormal returns between fund holdings of growth stocks and value stocks. T-statistics, in parentheses, are based on the time series standard deviation of monthly differences in returns. The abnormal returns earned by funds on their holdings of growth stocks are significantly greater, at the 5% level, than the abnormal

returns earned by value stock holdings for every size quintile but the largest. The differences in abnormal returns are quite large for the smallest and second smallest size quintiles: 57 and 56 basis points per month. The market for growth stocks appears to be less efficient than the market for value stocks before the costs of analysis and trading.

The last column of Panel A reports mean differences in abnormal returns between fund holdings of small and large stocks. In each case, the difference is positive, but it is only significant at the 5% level for two book-to-market quintiles: the third quintile, and growth stocks. As a whole, the evidence suggests that there are more identifiable inefficiencies in the prices of small stocks than in the prices of large stocks.

Panels B and C report abnormal returns for holdings in the intersections of book-to-market and size quintiles for 1980 - 1993 and for 1994 - 2006. During both subperiods, abnormal returns are larger for fund holdings of smaller growth stocks than for fund holdings of larger value stocks. Abnormal returns earned by mutual funds are generally smaller during 1980 - 1993 than during 1994 - 2006. For the first subperiod, abnormal returns for fund holdings of growth stocks are significantly greater than abnormal returns for holdings of value stocks for the second and third smallest size quintiles. Abnormal returns of small stock holdings are significantly higher than abnormal returns of large stock holdings for the growth stock quintile.

In general, fund holdings earned larger abnormal returns in the second subperiod than the first. Small growth stocks earned mean monthly abnormal returns of 1.17%. This time period includes the volatile "bubble" period though, and hence some abnormal returns are of only marginal significance. The difference in abnormal returns between growth stock and value stock holdings is statistically significant at the 5% level for three of the five size quintiles. None of the differences between abnormal returns of small and large firms is significant at the 5% level, although holdings of small growth stocks outperform holdings of small value stocks by over 1% per month.

As a whole, the relation between book-to-market and fund returns is much stronger than it appeared when holdings of all sizes are lumped together. Recall that about two-thirds of the dollar value of fund holdings is in the quintile of the largest stocks. When holdings of all size stocks are combined, the weak relation between fund holding returns and book-to-market for large stocks

obscures the relation between book-to-market and abnormal returns that appears in other fund holdings.

Space constraints prohibit reporting results for each characteristic portfolio separately throughout the paper. Nevertheless, it is interesting to see returns for all of the characteristic portfolios at least once. Table 5 reports the abnormal returns of fund investments in stocks in each of the 125 characteristic portfolios for the entire period. Panels A and B report results for stocks in the largest and second largest size quintiles. The abnormal returns of fund holdings of stocks in the characteristic portfolios in the largest and second largest quintiles are typically small and statistically insignificant. Fund holdings actually underperform for eight of the 25 characteristic portfolios in the largest size quintile. Nevertheless, there is evidence of identifiable inefficiency for some types of large stocks. Significant abnormal returns appear in the lower lefthand portions of each panel. That is, funds seem to be able to identify mispriced large stocks in the characteristic portfolios that include recent winners and growth stocks. Fund holdings in the characteristic portfolio that contains stocks in the intersection of the largest quintile, the quintile with the lowest book-to-market values, and the quintile with the largest returns over the prior 12 months earn average abnormal returns of 41 basis points per month. Fund holdings in the characteristic portfolio of the second largest quintile, highest quintile of prior returns, and lowest quintile of book-to-market earn abnormal returns of 47 basis points per month. The abnormal returns on fund holdings of growth stocks that were past winners are statistically significant in both Panels A and B with t-statistics of 3.27 and 3.46 respectively.

For the most part, funds do not seem to earn abnormal returns on their investments in the stocks in the characteristic portfolios in the upper right-hand portions of Panels A and B. That is, fund holdings of large, value stocks that were recent losers seem to earn returns that are similar to other large, value stocks that were recent losers. Evidence of inefficiency is minimal for these stocks.

Results for Panel C, the median size quintile, are similar. The size of the abnormal returns for growth stock winners is larger though. Abnormal returns of fund holdings of these stocks averages 73 basis points per month.

Panels D and E provide results for the second smallest and smallest size quintiles. Here

results are a little different. There is still little evidence that funds can find mispriced value stocks, but funds earn particularly large and highly significant abnormal returns on their investments in small growth stocks. Average abnormal returns range from 43 basis points per month to 80 basis points per month for stocks in the five growth stock characteristic portfolios in Panel D. For the smallest quintile of stocks in Panel E, average abnormal returns range from 53 basis points per month to 97 basis points per month for stocks in the five growth stock characteristic portfolios. The amount of identifiable market inefficiency appears to be especially large for small growth stocks.

In contrast to large stocks, higher abnormal returns appear in fund holdings of past losers rather than past winners. One possible explanation for this could be that small stocks that suffer losses lose analyst and press coverage and are thus less efficiently priced after falling from grace. Large stocks that perform poorly are still followed.

Tables 4 and 5 have shown how fund holdings have performed. It is also interesting to see how the stocks that funds have avoided have performed. For each month of the sample period, I form portfolios of stocks that are not in holdings of any mutual funds over the last three months. I calculate abnormal returns for these not-held stocks by subtracting out returns on their characteristic portfolio. I then calculate value-weighted abnormal returns for not-held stocks for each characteristic portfolio with at least five not-held stocks each month. Table 6 reports time-series mean abnormal returns for not-held stocks for characteristic portfolios in the smallest and second smallest size quintiles. There were too few months with five or more not-held stocks for the larger size quintiles to allow meaningful time-series estimates.

The results in Table 6 mirror those of Table 5. Stocks that funds avoid underperform relative to their characteristic portfolios. This is particularly true of small growth stocks. Not-held stocks in all of the five characteristic portfolios of small growth stocks underperform relative to their characteristic portfolios. For four of the five, not-held stocks underperform by 60 basis points per month or more, and the difference between the characteristic portfolio performance and the performance of not-held stocks is significant at the 5% level.

As a whole, these results are consistent with what we would expect if stocks are mispriced enough for smart investors to be compensated for the costs of analysis and trading.

4.2 Abnormal returns to fund holdings calculated with matching stocks

Up to this point, I have calculated the abnormal returns earned by funds by subtracting characteristic portfolio returns from the returns of fund holdings. This assumes that the stocks held by funds are well-matched by the characteristic portfolio. It is possible though for the stocks held by funds to differ systematically from the stocks in their characteristic portfolios. For example, funds could overweight the largest stocks within each characteristic portfolio, or the stocks with the best prior year performance in the characteristic portfolio.

As an alternative, I pair each fund holding with a matching stock of similar size, book-to-market, and prior 12-month returns. For each stock i and potential match m each month, I calculate the following match score:

$$Match\ Score_{i,m} = \left(\frac{Size_i - Size_m}{(Size_i + Size_m)/2}\right)^2 + \left(\frac{BM_i - BM_m}{(BM_i + BM_m)/2}\right)^2 + \left(\frac{Rt_i^{t-12,t-1} - Rt_m^{t-12,t-1}}{(Rt_i^{t-12,t-1} + Rt_m^{t-12,t-1})/2}\right)^2$$

$$where\ Size_i = the\ market\ capitalization\ of\ i$$

$$BM_i = the\ book-to-market\ ratio\ of\ i.$$

$$Rt_i^{t-12,t-1} = the\ return\ of\ i\ from\ months\ t-12\ to\ t-1$$

In calculating match scores, if book-to-market or prior year returns have absolute values less than 0.01, I arbitrarily set them to 0.02. Otherwise, the low value for book-to-market (or return) in the denominator will make it the dominant component of the match score. The matching stock m for stock i is the stock with the lowest match score. The abnormal return for a stock is obtained by subtracting the return of its match from its return. It is possible for a stock to be a match for more than one stock during a particular month. It is also possible, but not necessary, for stock i to be a match for stock j during a month, and stock j to be a match for stock i. Abnormal returns are calculated for three months after a fund reports holding a stock using the same matched stock. If the match is delisted during the three months, I use the stock with the second (or third) lowest

match score to calculate abnormal returns.

In Table 7, I present evidence on how well the matching procedure works. Panel A reports time-series means of size, book-to-market, and prior year returns for fund holdings and matching stocks for each of the 25 book-to-market and prior return portfolios in the second smallest size quintile. Panel B reports the same statistics for the 25 portfolios in the smallest size quintile. I concentrate on the two smallest size quintiles because abnormal returns on fund holdings are greatest for these stocks, and because differences between the characteristic portfolios and fund holdings could have the greatest impact for these stocks.

Table 7 documents that the matching procedure works extremely well. Consider for example, the portfolio of growth stocks that were prior year winners in Panel A. The stocks held by funds had an average size of $408.3 million while the average size of their matches was $410.1 million. The mean book-to-market ratio of stocks in that portfolio that held by funds was 0.113 while the book-to-market ratio of matches was 0.119. The prior year return was 216.6% for stocks held by funds (this is after all, the winner portfolio) while the prior year return for matches was 199.5%. This portfolio is typical. Across all of the 50 portfolios in Panels A and B, characteristics of matching firms are always very close to characteristics of stocks held by funds.The extremely close correspondence between the characteristics of fund holdings and matching stocks suggests that differences in returns between fund holdings and matches cannot be attributed to differences in characteristics.

Table 8 reports abnormal returns for fund holdings of stocks in the second smallest and smallest size quintiles. Abnormal returns are calculated by subtracting the return of the matching stock from each stock held by the fund. Abnormal returns are calculated for each characteristic portfolio each month by weighting each stock held by funds by the total amount invested by funds in that stock. A simple average of monthly abnormal returns is then calculated across the entire sample period. T-statistics are calculated from time-series standard deviations of monthly abnormal returns.

Abnormal returns of stocks held by funds are very similar regardless of whether matching stocks or characteristic portfolios are used to measure abnormal performance. In some cases, abnormal returns are quite a bit higher when calculated with matching stocks. For example, in

Panel B, growth stocks that were prior winners outperform matching stocks by a whopping 1.41% per month, but only outperform characteristic portfolios by 0.93% per month.

We would expect the statistical significance of abnormal returns to fall when calculated with matching firms rather than characteristic portfolios. When using matching stocks, abnormal returns are computed by subtracting out the returns of just one stock, while the characteristic portfolio method involves subtracting out the returns of a diversified portfolio. In general, t-statistics do decline when the matching firm technique is used to calculate abnormal returns, but most of the abnormal returns that were statistically significant when calculated with characteristic portfolios remain significant when calculated with matching firms. For example, the mean abnormal return for fund holdings in the second smallest quintile, growth quintile, and highest prior return quintile is 0.0073 per month with a t-statistic of 4.60 when characteristic portfolio returns are used to compute abnormal returns. When the matching firm technique is used, mean returns rise slightly to 0.0075 per month, but the t-statistic falls to a still highly significant 2.97.

The abnormal returns that mutual funds earn on their investments in small growth stocks is not an artifact of poor benchmarking.

4.3 Abnormal returns in the months following the holding date

In estimating the abnormal returns of stocks held by funds, I assume that funds maintain positions in stocks for the three months following the quarterly (or semiannual) date for which holdings are announced. If funds are able to successfully pick stocks, we would expect abnormal returns to be highest in the first month following the holding date, to be lower in the second month, and to be lowest in the third month. There are three reasons why we would expect abnormal returns to decline over time. First, mutual funds do turn over their shares fairly rapidly, and the likelihood that they are still holding a security should decline steadily as the holding date recedes further in the past. Second, the information that funds have will eventually be incorporated in stock prices, and after that time expected abnormal returns should be zero. Third, there is a lag between the holding date and the time a fund's holdings are announced. When a funds holdings are announced, we would expect the market to incorporate this information into

prices quickly.

On the other hand, both the risk of the stocks held by funds and the risk of characteristic portfolios should be relatively unchanged over three month intervals. Therefore, if the abnormal returns of mutual fund holdings reflect differences in risk, we would expect the abnormal performance of holdings to be relatively constant over the three months.

Table 9 reports abnormal fund holdings separately for the first, second, and third months following the holding date. To conserve space, momentum quintiles are combined and abnormal returns are reported for just 25 portfolios based on quintiles of size and book-to-market. In calculating each stock's abnormal return however, all of the 125 characteristic portfolios are used so stock returns are compared with those of firms of similar size, book-to-market, and momentum.

Panel A reports results for the first month after the holding date. In the first month, funds earn statistically abnormal returns on their holdings of all types of stocks. Abnormal returns are only about 20 basis points for large value stocks, but increase steadily as stock size and book-to-market ratios fall. Funds earn huge average abnormal returns of 1.86% for stocks in the smallest size quintile and lowest book-to-market quintile for the first month after the holding date. The t-statistic is a highly significant 6.97.

The last column of Panel A reports mean differences between monthly abnormal returns of fund holdings for small stocks in a given book-to-market quintile, and monthly abnormal returns of fund holdings of large stocks in the same book-to-market quintile. The results of this column provide striking confirmation for the idea that funds earn larger abnormal returns on their investments in small stocks than on their investments in large stocks. For each book-to-market quintile, monthly abnormal returns of fund holdings of small stocks exceed abnormal returns of holdings of large stocks by at least 90 basis points. The differences are highly significant, with t-statistics ranging from 3.75 to 5.49.

The last row of Panel A reports mean differences between abnormal returns of fund holdings of growth stocks and abnormal returns of fund holdings of value stocks for each size quintile. Here is especially strong evidence that growth stocks, which are more costly to analyze and trade than value stocks, provide larger abnormal returns to mutual funds. For each size quintile, funds earn larger abnormal returns on growth stocks than on value stocks. The

differences are statistically significant at the 1% level for all size quintiles but the smallest.

Panel B provides abnormal returns for the second month after the funds' holding date. Abnormal returns are smaller for all types of stocks and are less significant in the second month. They remain relatively large and significant for small firms with low book-to-market ratios however. T-tests of differences in abnormal returns indicate that funds earn significantly higher abnormal returns on small stocks than large stocks for three of the five book-to-market quintiles. Abnormal returns on fund holdings of growth stocks exceed abnormal returns of fund holdings of value stocks for two of the five size portfolios.

Panel C shows the returns for the third month after holdings dates. Abnormal returns are even smaller, and are statistically significant for only the stocks in the smallest size quintile and lowest book-to-market quintile. Among the smallest quintile, abnormal returns of value stocks remain significantly larger than abnormal returns of growth stocks.

So, funds earn abnormal returns on their stock picks immediately following the holding date, but the abnormal returns deteriorate quickly over time. This confirms that abnormal returns of fund holdings are due to stock picking ability, and not to some omitted risk factor - unless we want to believe that fund holdings are only riskier just after the holding dates. That abnormal returns are concentrated near the holding date also suggests that they cannot be used to provide a trading rule for other investors. Mutual funds can earn abnormal returns on their investments because they do the heavy lifting of fundamental security analysis. Investors cannot earn abnormal returns through the easy strategy of copying funds because most of the abnormal returns are gone when the holdings are revealed.

4.4 Abnormal returns on mutual fund trades

An alternative approach is to see whether the stocks funds purchase earn higher returns than the stocks they sell. To test this, I form a portfolio of purchased stocks for each of the 125 characteristic portfolios each month. For each fund, I calculate the dollar value of each stock in the characteristic portfolio that appears in the fund holdings that month but is not in the holdings as of the previous reporting date. I then form a portfolio of purchased stocks by weighting each of the stocks in the characteristic portfolio by the total dollar value of the increases in their positions.

I form a similar portfolio of sold stocks for each characteristic portfolio each month by calculating the dollar value of securities that were in a fund on its previous reporting date but are no longer included in the portfolio. I then calculate the difference between the return of the portfolio of purchased stocks and the return of the portfolio of sold stocks for the succeeding one to three months. A simple average of the returns across months is then calculated. T-statistics for the mean differences in returns are calculated using the standard deviation of monthly return differences.

It is likely that this understates the returns that funds earn on their trades. Stocks are likely to have been bought or sold weeks in advance of the end of the holding period. So, if funds are successful at picking stocks, much of the abnormal returns earned on their trades are likely to occur before my data shows them to have been bought or sold.

Panel A of Table 10 reports mean differences in returns between purchased stocks and sold stocks for the month after the holding date for stocks in the largest size quintile. Even among the largest quintile, stocks purchased by funds outperform stocks sold by funds - if the stocks are growth stocks. The stocks that funds purchase outperform the stocks they sell by 1.66% over the next month for stocks in the largest size quintile, lowest book-to-market quintile, and highest quintile of past returns. Panel B reports the mean differences for stocks in the second largest size quintile, Panel C reports mean differences for stocks in the medium size quintile, and Panels D and E report results for fund trades of stocks in the second smallest and smallest size quintile. Examination of Table 10 reveals several patterns that are consistent with the earlier findings on returns of fund holdings. First, the difference in returns between purchased and sold stocks generally increases as the stock size diminishes. Returns of purchased stocks exceed returns of sold stocks by 50 basis points for six of the 25 characteristic portfolios of large size quintile stocks in Panel A. For the stocks in the smallest size quintile in Panel E, returns of purchased stocks exceed returns of sold stocks by at least 50 basis points for 21 of the 25 characteristic portfolios. Table 10 also reveals that within a size quintile, the difference between returns of purchased stocks and sold stocks is generally increases as book-to-market ratios decline. Finally, holding size and book-to-market quintiles constant, the difference in return between purchased and sold stocks is typically larger for stocks with positive momentum than for stocks that were losers over the prior year.

The results in Table 10 are an additional argument that the abnormal returns earned by mutual fund investments are not due to poor risk adjustment. It is implausible that funds are selling safer stocks and buying riskier stocks and doing it month after month.

Table 11 replicates Table 10, but reports monthly differences in returns between stocks purchased and sold by funds for three months following the holding date rather than one month. Return differences are typically smaller in this table than in Table10, indicating that most of the difference in returns between purchased and sold stocks occurs in the first month. Other results are similar. Differences in returns between purchased and sold stocks are generally larger for growth stocks, for small firms, and for prior year winners.

As a whole, the results on the differences in returns between stocks that funds purchase and stocks that funds sell confirm the results on the returns of fund holdings. Mutual funds have the most success in finding mispriced securities among small stocks, growth stocks, and prior year winners. Put another way, the evidence from returns of mutual fund trades, like the evidence from mutual fund holdings, indicates that the market is less efficient for small stocks, for growth stocks, and for stocks that have performed well in the prior year.

Conclusions

It is often thought that the mispricing of securities or market inefficiency lies outside the realm of rational economics, and can only be explained by resorting to psychology or behavioral economics. This paper examines the rational explanation for mispricing of securities advanced by Grossman and Stiglitz (1980) - that there must be enough inefficiency in the stock market to compensate smart investors for the costs of becoming informed and the costs of exploiting mispricings. Differences in these costs across securities implies that different categories of stocks should have different levels of inefficiency. As predicted, I find that mispricings are not random, but are systematic and consistent with predictions of rational economics.

It is difficult to determine the equilibrium amount of inefficiency for any specific type of stock. The amount of mispricing required to compensate active investors for their analysis depends on many things - the cost and difficulty of obtaining information, the expertise required

to analyze the securities, the costs of trading, the liquidity of the stocks, the difficulty of shorting the securities, and the risks entailed by large positions in the stocks. Nevertheless, it is possible to make some general statements about how stock characteristics should affect efficiency.

We would expect the market for small stocks to be less efficient than the market for large stocks. Small stocks are less liquid and more costly to trade than large stocks. In many cases, they are difficult or costly to short. It may also be difficult to obtain information on small stocks. All of these factors point to greater inefficiency and larger returns to smart investors in small stocks. I find that abnormal returns of stocks held by mutual funds are much larger for small stocks than large stocks.

We would also expect the market for growth stocks to be less efficient than the market for value stocks. The value of growth stocks is derived from cash flows in the distant future. This makes growth stocks costly and difficult to analyze. Technical expertise may be required to understand a growth stock's business and prospects. Growth stocks may also be difficult to short and large bets on growth stock mispricing are likely to be involve very risky positions. Hence my finding that growth stocks are mispriced more than value stocks, as evidenced by mutual fund returns, is consistent with expectations.

A third finding of this paper was not anticipated. For the most part, mutual funds seem to earn especially large returns on their investments in stocks with positive momentum over the prior year. This result is not quite as clear as the others though. Among smaller stocks, funds also seem to do very well on their investments in the quintile of stocks with the lowest prior year return. It is possible that stocks with very large or very small prior year returns are stocks with a great deal of uncertainty about their prospects and which are therefore difficult to analyze.

The primary contribution of this paper is the use of abnormal returns of mutual fund holdings as a measure of the efficiency of a market segment. Examining abnormal returns of mutual funds, hedge funds, or other smart investors could be a way to examine the effects of securities regulations, accounting rules, and other factors on market efficiency.

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Figure 1. The relation between market frictions and firm size and book-to-market

Table 1
Summary statistics for size, book-to-market, and momentum quintiles.
Each month from June 1980 through September 2006, mean sizes, book-to-market ratios, and prior year returns are calculated for stocks in each quintile. Time series means of the monthly cross-sectional averages are reported.
Panel A. Size, book-to-market, and momentum quintiles

Average Market Capitalizations ($ millions)				
Large Firms	2	3	4	Small Firms
14,842.24	2,125.51	860.19	377.68	90.46
Average Book-to-Market Ratios				
Value	2	3	4	Growth
1.46	0.83	0.58	0.37	0.12
Average Returns Last 12 Months				
Winners	2	3	4	Losers
105.2%	41.7%	19.0%	-0.1%	-27.0%
Average Number of Stocks per Characteristic Portfolio				
Large Firms	2	3	4	Small Firms
11.8	13.7	17.3	24.8	74.2

Panel B. Average sizes ($ Million's) for size and book-to-market portfolios

	Large	2	3	4	Small
Value	9,400.3	2,118.9	864.2	369.9	68.9
2	13,036.3	2,105.7	863.5	376.1	79.6
3	15,207.5	2,119.5	858.4	378.2	93.5
4	18,312.1	2,158.2	860.1	382.3	102.6
Growth	18,244.2	2,125.5	854.9	382.0	107.7

Panel C. Average book-to-market values for size and book-to-market portfolios

	Large	2	3	4	Small
Value	1.107	1.234	1.234	1.276	1.682
2	0.677	0.733	0.716	0.734	0.933
3	0.472	0.518	0.500	0.520	0.654
4	0.313	0.332	0.319	0.332	0.420
Growth	0.156	0.130	0.105	0.114	0.109

Table 2.
Proportion of Fund Investments by Size, Book-to-Market, and Momentum Quintiles
Each month from July 1980 through September 2006, I calculate the proportion of all fund investments in stocks in size, book-to-market, and momentum quintiles. I then calculate a time series average across months of the proportions of stocks in different size, book-to-market, and momentum quintiles.

Panel A. Mean Number of Funds Per Month

Aggressive Growth	Growth	Growth and Income
110	551	193

Panel B. Proportion of Fund Holdings by Characteristic Quintile

Size Quintile				
Large	2	3	4	Small
0.6648	0.1750	0.0874	0.0496	0.0232
Book-to-Market Quintiles				
Value	2	3	4	Growth
0.1545	0.1773	0.1996	0.2228	0.2458
Momentum Quintiles				
Winners	2	3	4	Losers
0.1965	0.1982	0.2323	0.1936	0.1793

Table 3.
Fund Abnormal Returns by Size, Book-to-Market, and Momentum Quintiles
Abnormal returns are calculated for each stock over each month by subtracting the return of one of 125 characteristic portfolio, matched on size, book-to-market, and returns over the previous 12 months from the return of the stock. Abnormal returns for a particular month are obtained by taking a value-weighted average of the abnormal returns of each stock, where the weights are the total amounts owned by mutual funds. I then calculate a time series average across months of abnormal returns of stocks in different size, book-to-market, and momentum quintiles.

Large	2	3	4	Small
0.0007	0.0015	0.0016	0.0022	0.0033
(2.54)	(4.04)	(3.69)	(4.36)	(3.03)

Value	2	3	4	Growth
0.0005	0.0003	0.0008	0.0012	0.0017
(1.47)	(0.79)	(2.83)	(3.91)	(3.72)

Winners	2	3	4	Losers
0.0022	0.0008	0.0007	0.0005	0.0006
(5.18)	(2.57)	(2.25)	(1.74)	(1.81)

Table 4
Abnormal returns of mutual funds for 25 size and book-to-market based portfolios.
Abnormal returns are calculated for each stock over each month by subtracting the return of one of 125 characteristic portfolio, matched on size, book-to-market, and returns over the previous 12 months from the return of the stock. Abnormal returns for a particular month are obtained by taking a value-weighted average of the abnormal returns of each stock, where the weights are the total amounts owned by mutual funds. I then calculate a time series average across months of abnormal returns of stocks in combinations of size and book-to-market quintiles.
Panel A. 1980 - 2006

	Large	2	3	4	Small	Small - Large
Value	0.0005	0.0009	-0.0002	-0.0002	0.0019	0.0014
	(1.34)	(1.63)	(-0.36)	(-0.34)	**(2.53)**	(1.83)
2	0.0001	0.0004	0.0012	0.0004	0.0007	0.0006
	(0.16)	(1.03)	**(2.07)**	(0.57)	(0.93)	(0.86)
3	0.0007	0.0010	0.0016	0.0015	0.0026	0.0020
	(1.93)	**(2.37)**	**(2.39)**	**(2.18)**	**(3.38)**	**(2.49)**
4	0.0011	0.0015	0.0013	0.0025	0.0023	0.0012
	(3.10)	**(3.07)**	**(2.06)**	**(3.74)**	**(2.60)**	(1.41)
Growth	0.0009	0.0027	0.0033	**0.0054**	**0.0076**	**0.0067**
	(1.97)	**(3.78)**	**(4.11)**	**(6.05)**	**(2.52)**	**(2.29)**
Growth - Value	0.0004	0.0018	0.0036	**0.0056**	**0.0057**	
	(0.88)	**(2.25)**	**(3.75)**	**(5.40)**	(1.96)	

Panel B. 1980 - 1993

	Large	2	3	4	Small	Small - Large
Value	0.0002	0.0010	-0.0006	-0.0003	0.0016	0.0015
	(0.41)	(1.09)	(-0.62)	(-0.28)	(1.53)	(1.28)
2	-0.0004	0.0007	0.0015	0.0002	0.0012	0.0015
	(-0.70)	(1.05)	(1.60)	(0.18)	(1.11)	(1.40)
3	0.0004	0.0011	0.0009	0.0011	0.0024	0.0020
	(0.75)	(1.89)	(0.92)	(1.11)	**(2.45)**	(1.94)
4	0.0011	0.0007	0.0005	0.0013	0.0011	-0.0002
	(2.29)	(1.05)	(0.59)	(1.48)	(1.12)	(-0.21)
Growth	0.0001	0.0008	0.0019	0.0040	0.0036	0.0036
	(0.17)	(1.08)	**(2.23)**	**(4.12)**	**(2.86)**	**(2.79)**
Growth - Value	-0.0003	-0.0003	0.0024	0.0043	0.0020	
	(-0.20)	(-0.31)	**(2.07)**	**(3.40)**	(1.29)	

Panel C. 1994-2006

	Large	2	3	4	Small	Small - Large
Value	0.0008	0.0007	0.0003	-0.0001	0.0021	0.0014
	(1.73)	(1.15)	(0.36)	(-0.09)	(1.92)	(1.31)
2	0.0005	0.0001	0.0009	0.0008	0.0003	-0.0003
	(1.18)	(0.25)	(1.26)	(0.90)	(0.25)	(-0.31)
3	0.0010	0.0009	0.0025	0.0020	0.0029	0.0019
	(2.27)	(1.43)	**(2.72)**	**(2.04)**	**(2.41)**	(1.60)
4	0.0010	0.0024	0.0020	0.0039	0.0037	0.0028
	(2.00)	**(3.43)**	**(2.24)**	**(3.79)**	**(2.48)**	(1.94)
Growth	0.0019	0.0047	0.0049	**0.0070**	**0.0117**	**0.0101**
	(2.42)	**(3.93)**	**(3.50)**	**(4.67)**	(1.92)	(1.70)
Growth - Value	0.0011	0.0040	0.0048	**0.0070**	**0.0098**	
	(1.44)	**(3.30)**	**(3.15)**	**(4.19)**	(1.67)	

Table 5.
Abnormal Return for Fund Investments by Characteristic Portfolio
Period is June 1980 - September 2006. Abnormal returns for investments in each characteristic portfolio each month are obtained by subtracting value-weighted mean characteristic portfolio returns from returns of portfolio of characteristic stocks with weighted proportional to fund holdings. Stocks under five dollars are omitted. Book-to-market values are obtained by dividing most recent book value at least six months old by current market value. Momentum portfolios are formed based on returns over the twelve months ending one month before the portfolio formation. Size is calculated at the time of the portfolio formation.

Panel A. Large Stocks

	Winners	2	3	4	Losers
Value	0.0013	-0.0002	-0.0001	-0.0001	0.0006
	(2.02)	(-0.27)	(-0.09)	(-0.08)	(0.88)
2	0.0007	-0.0001	0.0007	-0.0013	-0.0003
	(0.96)	(-0.13)	(1.15)	(-1.93)	(-0.47)
3	0.0002	0.0012	0.0015	0.0002	0.0002
	(0.33)	**(2.02)**	**(2.52)**	(0.25)	(0.19)
4	0.0023	0.0015	-0.0001	0.0008	0.0009
	(2.78)	**(2.38)**	(-0.16)	(1.21)	(1.23)
Growth	0.0041	-0.0007	0.0005	0.0008	0.0002
	(3.27)	(-0.83)	(0.81)	(1.18)	(0.26)

Panel B. Second Largest Size Quintile

	Winners	2	3	4	Losers
Value	0.0021	0.0008	0.0005	0.0002	0.0002
	(2.23)	(0.79)	(0.51)	(0.25)	(0.17)
2	-0.0002	0.0011	0.0008	0.0001	0.0006
	(-0.23)	(1.29)	(1.07)	(0.12)	(0.60)
3	0.0019	0.0013	0.0008	0.0005	0.0002
	(2.21)	(1.47)	(1.07)	(0.63)	(0.18)
4	0.0028	0.0010	0.0007	0.0004	0.0029
	(2.85)	(1.24)	(0.87)	(0.40)	**(2.96)**
Growth	0.0047	0.0026	0.0026	0.0017	0.0006
	(3.46)	**(2.31)**	**(2.62)**	(1.48)	(0.51)

Panel C. Medium Size Quintile

	Winners	2	3	4	Losers
Value	-0.0004	-0.0012	-0.0001	-0.0002	0.0003
	(-0.37)	(-1.20)	(-0.10)	(-0.15)	(0.19)
2	0.0010	0.0031	0.0023	-0.0003	0.0004
	(0.89)	**(3.19)**	**(2.24)**	(-0.35)	(0.36)
3	0.0015	0.0022	0.0018	0.0018	0.0006
	(1.29)	**(2.07)**	**(2.01)**	(1.67)	(0.40)
4	0.0026	0.0027	0.0003	0.0005	0.0013
	(2.13)	**(2.97)**	(0.34)	(0.43)	(0.99)
Growth	**0.0073**	0.0040	0.0008	0.0017	0.0020
	(4.60)	**(3.12)**	(0.81)	(1.38)	(1.44)

Panel D. Second-Smallest Size Quintile

	Winners	2	3	4	Losers
Value	0.0008	-0.0009	-0.0009	-0.0005	0.0008
	(0.71)	(-0.86)	(-0.95)	(-0.41)	(0.54)
2	0.0002	0.0008	-0.0010	-0.0007	0.0037
	(0.17)	(0.80)	(-0.94)	(-0.53)	**(2.77)**
3	0.0023	0.0014	0.0012	0.0008	0.0024
	(1.91)	(1.17)	(1.07)	(0.78)	(1.77)
4	0.0039	0.0024	0.0015	0.0020	0.0037
	(3.03)	**(2.48)**	(1.49)	(1.48)	**(2.38)**
Growth	**0.0080**	**0.0064**	0.0043	0.0044	0.0045
	(4.85)	**(4.50)**	**(3.28)**	**(3.08)**	**(2.67)**

Panel E. Smallest Size Quintile

	Winners	2	3	4	Losers
Value	0.0023	0.0002	-0.0002	0.0007	**0.0053**
	(1.77)	(0.13)	(-0.20)	(0.52)	**(3.32)**
2	-0.0002	0.0005	-0.0009	0.0005	0.0019
	(-0.19)	(0.34)	(-0.70)	(0.41)	(1.44)
3	0.0036	0.0019	0.0019	0.0016	**0.0051**
	(2.14)	(1.62)	(1.47)	(1.26)	**(3.61)**
4	0.0025	0.0016	0.0021	0.0035	0.0019
	(1.62)	(1.13)	(1.63)	**(2.03)**	(1.28)
Growth	**0.0093**	**0.0071**	**0.0097**	**0.0053**	**0.0055**
	(3.62)	**(4.21)**	(1.23)	**(3.01)**	**(2.91)**

Table 6
Abnormal Returns for Stocks Not Held by Funds
Period is June 1980 - September 2006. Stocks are classified as not held by funds tf no funds have reported the stock among their holdings in the last three months. Abnormal returns for the not held stocks each month are obtained by subtracting returns from the value-weighted portfolio of not-held stocks from returns of portfolio of characteristic stock portfolios. Stocks under five dollars are omitted. Book-to-market values are obtained by dividing most recent book value at least six months old by current market value. Momentum portfolios are formed based on returns over the twelve months ending one month before the portfolio formation. Size is calculated at the time of the portfolio formation.

Panel A. Second smallest quintile

	Winners	2	3	4	Losers
Value	**-0.0115**	-0.0026	0.0013	0.0005	**-0.0093**
	(-1.77)	(-0.61)	(0.20)	(0.08)	(-1.57)
2	*0.0072*	-0.0025	-0.0038	-0.0021	0.0025
	(1.07)	(-0.62)	(-0.86)	(-0.43)	(0.30)
3	-0.0016	**-0.0098**	-0.0017	0.0001	0.0045
	(-0.38)	(-1.26)	(-0.29)	(0.01)	(0.34)
4	0.0034	0.0038	**-0.0064**	NA	NA
	(0.23)	(0.64)	(-0.40)		
Growth	**-0.0142**	**-0.0305**	**-0.0126**	0.0037	**-0.0137**
	(-0.91)	**(-2.06)**	(-0.66)	(0.32)	(-1.89)

Panel B. Small firm quintile

	Winners	2	3	4	Losers
Value	0.0000	0.0017	0.0026	-0.0013	0.0024
	(0.01)	(0.95)	(1.34)	(-0.52)	(0.75)
2	0.0006	-0.0013	0.0005	-0.0013	**-0.0057**
	(0.34)	(-0.90)	(0.37)	(-0.70)	(-1.99)
3	-0.0025	0.0007	-0.0013	-0.0001	-0.0046
	(-1.41)	(0.43)	(-0.81)	(-0.03)	(-1.74)
4	-0.0003	-0.0020	0.0001	-0.0014	**-0.0079**
	(-0.13)	(-1.00)	(0.06)	(-0.73)	**(-3.03)**
Growth	**-0.0083**	**-0.0086**	**-0.0067**	-0.0015	**-0.0062**
	(-2.71)	**(-3.65)**	**(-2.82)**	(-0.58)	**(-2.34)**

Table 7. Characteristics of Fund Holdings and Matching Stocks.
Each month, a matching stock is selected for each stock held by funds. Matches are selected to minimize the sum of the squared percentage differences in size, book-to-market, and prior year return across the two stocks. Characteristics are calculated monthly, and the averages across he months from July 1980 through September 2006 are shown in the table.
Panel A. Second Smallest Quintile

	Winners		2		3		4		Losers	
	Holdings	Matches	Holdings	Matches	Holdings	Matches	Holdings	Matches	Holdings	Matches
Value: Size	394.7	393.2	402.1	402.0	392.1	393.0	391.4	390.4	390.4	387.6
Book-to-Market	1.208	1.096	1.203	1.134	1.274	1.184	1.300	1.231	1.470	1.407
Prior Year Return	0.506	0.493	0.172	0.173	0.025	0.025	-0.118	-0.120	-0.352	-0.345
2: Size	400.9	400.0	397.0	398.3	402.3	403.4	401.9	402.7	391.2	388.8
Book-to-Market	0.728	0.719	0.734	0.733	0.737	0.740	0.738	0.741	0.739	0.742
Prior Year Return	0.632	0.618	0.276	0.277	0.120	0.121	-0.027	-0.027	-0.275	-0.271
3: Size	399.7	398.9	406.3	405.4	406.9	408.8	405.5	407.4	393.7	393.6
Book-to-Market	0.510	0.509	0.518	0.524	0.523	0.532	0.523	0.534	0.522	0.533
Prior Year Return	0.812	0.784	0.361	0.361	0.176	0.177	-0.002	-0.002	-0.268	-0.264
4: Size	405.5	406.2	411.6	411.9	413.4	414.4	405.9	410.3	400.5	401.9
Book-to-Market	0.319	0.320	0.328	0.333	0.333	0.340	0.336	0.347	0.338	0.351
Prior Year Return	1.158	1.130	0.520	0.520	0.263	0.265	0.044	0.045	-0.231	-0.228
Growth: Size	408.3	410.1	415.6	418.5	415.8	422.4	412.8	419.2	410.0	408.7
Book-to-Market	0.113	0.119	0.140	0.144	0.145	0.149	0.128	0.138	0.095	0.115
Prior Year Return	2.166	1.995	0.928	0.930	0.508	0.518	0.209	0.220	-0.125	-0.116

Panel B. Smallest Quintile of Stocks

	Winners		2		3		4		Losers	
	Holdings	Matches	Holdings	Matches	Holdings	Matches	Holdings	Matches	Holdings	Matches
Value: Size	125.6	124.8	129.5	131.1	132.3	134.3	131.7	132.1	129.9	130.3
Book-to-Market	1.614	1.464	1.571	1.462	1.660	1.507	1.710	1.565	1.831	1.692
Prior Year Return	0.486	0.465	0.134	0.135	-0.017	-0.018	-0.161	-0.165	-0.406	-0.399
2: Size	138.4	137.6	141.5	142.4	141.5	141.5	145.0	145.6	143.1	143.2
Book-to-Market	0.916	0.901	0.931	0.926	0.935	0.931	0.938	0.940	0.937	0.937
Prior Year Return	0.606	0.591	0.233	0.234	0.074	0.075	-0.082	-0.082	-0.344	-0.340
3: Size	149.0	149.7	148.3	149.2	153.1	154.3	154.2	155.1	150.4	151.0
Book-to-Market	0.646	0.642	0.654	0.657	0.654	0.660	0.657	0.666	0.659	0.665
Prior Year Return	0.774	0.756	0.323	0.324	0.124	0.125	-0.055	-0.055	-0.329	-0.326
4: Size	154.1	154.9	157.7	158.4	159.1	159.8	156.5	157.6	155.8	157.1
Book-to-Market	0.408	0.407	0.416	0.422	0.420	0.430	0.424	0.437	0.425	0.433
Prior Year Return	1.100	1.072	0.469	0.471	0.205	0.205	-0.017	-0.017	-0.302	-0.299
Growth: Size	163.3	165.6	165.2	166.9	166.0	168.8	165.5	170.8	158.6	161.5
Book-to-Market	0.147	0.151	0.172	0.179	0.173	0.184	0.163	0.185	0.116	0.137
Prior Year Return	2.179	2.028	0.848	0.852	0.410	0.421	0.098	0.103	-0.248	-0.239

Table 8. Abnormal returns of mutual fund holdings calculated by subtracting matching stock returns from mutual fund holdings.

Each stock held by a mutual fund is matched with another stock each month. The matching stock is chosen to minimize the sum of the squared percentage differences in size, book-to-market, and prior year returns between the stock and its match. Abnormal returns on each stock held by funds is obtained by subtracting the matching stock return from the stock held by the fund. Each month for each characteristic portfolio, an average abnormal return is computed by taking a weighted average across all fund holdings of portfolio stocks, where the weights are the total amount invested by funds. An equal-weighted average is then calculated across months and reported in the table. T-statistics, show in parentheses, are based on the time-series standard deviations of the monthly average abnormal returns.

Panel A. Second smallest stock quintile

	Winners	2	3	4	Losers
Value	0.0041	-0.0011	-0.0013	-0.0006	**-0.0051**
	(2.36)	(-0.69)	(-0.77)	(-0.29)	**(-2.12)**
2	0.0019	0.0012	-0.0014	-0.0010	0.0007
	(1.00)	(0.69)	(-0.84)	(-0.53)	(0.32)
3	0.0028	-0.0004	0.0043	-0.0007	0.0021
	(1.35)	(-0.17)	**(2.41)**	(-0.41)	(0.96)
4	0.0040	0.0049	-0.0011	0.0011	0.0042
	(1.88)	**(2.41)**	(-0.64)	(0.53)	(1.55)
Growth	**0.0075**	**0.0069**	0.0034	0.0006	**0.0067**
	(2.97)	**(3.14)**	(1.62)	(0.26)	**(2.43)**

Panel B. Smallest stock quintile

	Winners	2	3	4	Losers
Value	0.0013	0.0027	0.0009	-0.0019	**0.0083**
	(0.62)	(1.47)	(0.46)	(-0.87)	**(3.32)**
2	-0.0020	0.0000	-0.0022	-0.0011	0.0021
	(-1.08)	(0.01)	(-1.28)	(-0.58)	(1.08)
3	**0.0052**	0.0016	0.0039	0.0021	0.0046
	(2.22)	(0.91)	**(2.25)**	(1.27)	**(2.00)**
4	0.0044	0.0027	0.0028	0.0024	0.0028
	(2.04)	(1.32)	(1.53)	(1.13)	(1.25)
Growth	**0.0141**	**0.0061**	0.0121	**0.0052**	0.0027
	(3.91)	**(2.61)**	(1.40)	**(2.23)**	(1.01)

Table 9
Abnormal returns of fund holdings by month after the holding date.
Period is June 1980 - September 2006. Abnormal returns for investments in each characteristic portfolio each month are obtained by subtracting value-weighted mean characteristic portfolio returns from returns of portfolio of characteristic stocks with weights proportional to fund holdings. Stocks under five dollars are omitted. Book-to-market values are obtained by dividing most recent book value at least six months old by current market value. Momentum portfolios are formed based on returns over the twelve months ending one month before the portfolio formation. Size is calculated at the time of the portfolio formation. For reporting purposes, characteristic portfolios from different momentum quintiles are combined into 25 size and book-to-market portfolios. Simple time-series means of monthly abnormal returns are reported below. T-statistics, in parentheses, are based on the time series standard deviation of monthly returns. Mean monthly returns greater than 50 basis points are shown in bold, as are t-statistics greater than 2.
Panel A. First month after holding date.

	Large	2	3	4	Small	Large - Small
Value	0.0020	0.0035	0.0034	**0.0073**	**0.0148**	0.0137
	(3.10)	**(3.79)**	**(2.37)**	**(3.69)**	**(6.19)**	(5.49)
2	0.0019	0.0043	**0.0076**	**0.0094**	**0.0111**	**0.0093**
	(3.23)	**(3.99)**	**(5.17)**	**(5.03)**	**(5.46)**	**(4.63)**
3	0.0024	0.0022	**0.0059**	**0.0069**	**0.0119**	**0.0097**
	(3.63)	**(2.57)**	**(3.49)**	**(4.51)**	**(4.77)**	**(3.75)**
4	0.0025	**0.0067**	**0.0068**	**0.0109**	**0.0125**	**0.0099**
	(4.11)	**(6.04)**	**(3.36)**	**(5.86)**	**(5.97)**	**(4.65)**
Growth	0.0043	**0.0086**	**0.0113**	**0.0148**	**0.0186**	**0.0138**
	(6.29)	**(7.25)**	**(6.71)**	**(7.84)**	**(6.97)**	**(5.37)**
Growth	0.0024	**0.0051**	**0.0079**	**0.0082**	0.0034	
- Value	(2.96)	**(3.65)**	**(3.71)**	**(3.31)**	(1.14)	

Panel B. Second month after holding date

	Large	2	3	4	Small	Small - Large
Value	0.0017	0.0024	0.0011	**0.0063**	0.0035	0.0012
	(2.51)	**(2.87)**	(0.76)	**(3.04)**	(1.36)	(0.46)
2	0.0001	0.0024	0.0042	0.0028	0.0033	0.0031
	(0.22)	**(2.36)**	**(2.75)**	(1.67)	(1.73)	(1.60)
3	0.0013	0.0024	0.0032	0.0021	**0.0080**	0.0067
	(2.16)	**(2.71)**	(1.95)	(1.12)	**(3.51)**	(3.00)
4	0.0009	0.0041	**0.0066**	**0.0066**	**0.0058**	0.0047
	(1.55)	**(3.19)**	**(3.51)**	**(3.90)**	**(2.60)**	**(2.17)**
Growth	0.0018	0.0046	**0.0057**	**0.0113**	**0.0110**	**0.0095**
	(2.39)	**(4.00)**	**(3.39)**	**(6.50)**	**(3.20)**	**(2.75)**
Growth - Value	0.0001	0.0022	0.0046	**0.0050**	**0.0078**	
	(0.15)	(1.59)	**(2.20)**	**(2.00)**	**(1.77)**	

Panel C. Third month after holding date.

	Large	2	3	4	Small	Small - Large
Value	-0.0000	-0.0008	-0.0018	0.0006	-0.0010	-0.0009
	(-0.06)	(-0.76)	(-1.51)	(0.39)	(-0.43)	(-0.40)
2	-0.0001	-0.0012	0.0009	-0.0007	0.0009	0.0010
	(-0.18)	(-1.46)	(0.61)	(-0.39)	(0.36)	(0.42)
3	-0.0004	0.0006	-0.0002	0.0022	-0.0018	-0.0014
	(-0.74)	(0.65)	(-0.09)	(1.35)	(-0.89)	(-0.69)
4	0.0005	0.0013	0.0008	0.0000	-0.0013	-0.0019
	(0.87)	(1.36)	(0.63)	(0.02)	(-0.70)	(-0.97)
Growth	0.0012	0.0009	0.0014	0.0014	**0.0091**	0.0079
	(1.99)	(0.73)	(0.82)	(0.73)	**(2.23)**	(1.95)
Growth - Value	0.0013	0.0016	0.0032	0.0008	**0.0098**	
	(1.54)	(1.10)	(1.72)	(0.34)	**(2.10)**	

Table 10.

Monthly differences between the returns of purchased stocks and sold stocks.

At each quarterly or semi-annual holding date, funds holdings are compared with holdings from the previous report. Stock that are included in the holdings but not in holdings as of the previous date are defined as purchased stocks. Stocks that were included in the fund's holdings on the last holding date but are no longer in the funds holdings are defined as sold stocks. For each characteristic portfolio each month, a portfolio of purchased stocks is assembled by combining purchases by all funds in proportion to the total dollar amounts purchased of each stock. A portfolio of sold stocks is formed by combining all sold stocks in proportion to the total dollar value of the stock that was sold. The difference between the return of the portfolio of purchased stocks and the portfolio of sold stocks is calculated for each characteristic portfolio each month. The table shows time-series means of the difference in returns. T- statistics, shown in parentheses, are based on the time-series standard deviation of return differences.

Panel A. Largest Size Quintile

	Winners	2	3	4	Losers
Value	0.0026	-0.0005	0.0008	0.0034	-0.0000
	(0.79)	(-0.19)	(0.34)	(1.18)	(-0.01)
2	0.0037	**0.0056**	-0.0010	-0.0008	0.0019
	(1.29)	**(2.17)**	(-0.46)	(-0.38)	(0.62)
3	-0.0015	0.0027	0.0018	**0.0073**	0.0001
	(-0.52)	(1.05)	(0.74)	(2.64)	(0.04)
4	**0.0065**	0.0018	0.0013	-0.0019	0.0010
	(1.83)	(0.57)	(0.47)	(-0.71)	(0.31)
Growth	**0.0166**	**0.0081**	**0.0069**	0.0022	-0.0067
	(3.33)	**(2.29)**	**(2.37)**	(0.69)	(-1.76)

Panel B. Second Largest Size Quintile

	Winners	2	3	4	Losers
Value	**0.0071**	**0.0072**	0.0028	**0.0084**	0.0005
	(2.00)	**(2.36)**	(0.73)	**(2.42)**	(0.10)
2	0.0031	0.0026	0.0007	0.0043	0.0041
	(1.02)	(0.75)	(0.27)	(1.36)	(1.13)
3	0.0029	-0.0013	-0.0012	*-0.0067*	0.0018
	(0.73)	(-0.43)	(-0.33)	*(-2.02)*	(0.48)
4	**0.0141**	**0.0076**	0.0034	**0.0056**	0.0015
	(3.34)	**(2.02)**	(0.95)	(1.56)	(0.34)
Growth	**0.0144**	**0.0079**	**0.0112**	**0.0086**	-0.0022
	(2.61)	(1.79)	**(2.82)**	(1.82)	(-0.45)

Panel C. Medium Size Quintile

	Winners	2	3	4	Losers
Value	0.0044	-0.0038	0.0023	0.0045	0.0049
	(1.07)	(-0.98)	(0.52)	(1.08)	(0.99)
2	**0.0067**	0.0042	0.0038	**0.0074**	-0.0038
	(1.61)	(1.01)	(1.07)	(1.85)	(-0.70)
3	0.0040	**0.0113**	-0.0018	0.0003	*-0.0050*
	(1.02)	**(2.94)**	(-0.48)	(0.08)	(-1.02)
4	**0.0093**	-0.0004	*-0.0050*	**0.0058**	-0.0042
	(2.09)	(-0.08)	(-1.08)	(1.30)	(-0.87)
Growth	**0.0158**	**0.0130**	**0.0072**	**0.0119**	-0.0006
	(2.75)	**(2.57)**	(1.52)	(1.73)	(-0.11)

Panel D. Second Smallest Quintile

	Winners	2	3	4	Losers
Value	-0.0021	**0.0069**	0.0031	0.0021	**0.0170**
	(-0.52)	(1.78)	(0.65)	(0.43)	**(2.45)**
2	**0.0106**	**0.0069**	0.0048	**0.0070**	**0.0123**
	(2.31)	(1.45)	(1.06)	(1.34)	**(2.29)**
3	**0.0191**	**0.0084**	0.0016	*-0.0133*	**0.0097**
	(3.93)	(1.90)	(0.39)	*(-2.46)*	(1.96)
4	**0.0190**	**0.0139**	**0.0104**	**0.0080**	0.0011
	(2.94)	**(2.70)**	**(2.00)**	(1.37)	(0.17)
Growth	**0.0109**	**0.0126**	**0.0105**	0.0004	**0.0153**
	(1.65)	**(2.02)**	(1.74)	(0.07)	**(2.07)**

Panel E. Smallest Quintile

	Winners	2	3	4	Losers
Value	**0.0091**	**0.0061**	**0.0092**	0.0049	**0.0185**
	(1.43)	(1.17)	(1.70)	(0.73)	**(2.60)**
2	**0.0116**	**0.0070**	**0.0066**	**0.0053**	**0.0123**
	(2.05)	(1.57)	(1.26)	(0.99)	**(2.01)**
3	**0.0103**	**0.0099**	**0.0064**	-0.0006	**0.0056**
	(1.81)	(1.93)	(1.29)	(-0.10)	(0.76)
4	**0.0204**	**0.0111**	**0.0069**	0.0028	**0.0078**
	(3.05)	**(2.25)**	(1.27)	(0.42)	(1.21)
Growth	**0.0190**	**0.0219**	**0.0158**	**0.0185**	0.0032
	(2.46)	**(3.52)**	**(2.74)**	**(2.62)**	(0.41)

Table 11.
Returns of stocks added holdings in the prior three months minus returns of stocks dropped from holdings in the prior three months.

Panel A. Largest Size Quintile

	Winners	2	3	4	Losers
Value	0.0013	-0.0009	0.0001	0.0016	-0.0011
	(0.55)	(-0.54)	(0.06)	(0.71)	(-0.41)
2	-0.0006	-0.0009	0.0001	-0.0002	-0.0023
	(-0.26)	(-0.49)	(0.06)	(-0.12)	(-0.95)
3	0.0017	0.0008	-0.0010	0.0005	-0.0011
	(0.70)	(0.44)	(-0.57)	(0.21)	(-0.44)
4	**0.0063**	0.0006	-0.0004	0.0003	-0.0006
	(2.23)	(0.27)	(-0.20)	(0.13)	(-0.24)
Growth	**0.0094**	0.0015	**0.0052**	0.0008	-0.0044
	(2.37)	(0.55)	**(2.22)**	(0.32)	(-1.49)

Panel B. Second Largest Size Quintile

	Winners	2	3	4	Losers
Value	**0.0069**	0.0030	-0.0015	0.0015	-0.0004
	(2.77)	(1.41)	(-0.71)	(0.65)	(-0.11)
2	0.0002	0.0008	0.0024	0.0021	0.0005
	(0.07)	(0.34)	(1.23)	(0.96)	(0.18)
3	0.0006	-0.0007	-0.0008	-0.0028	*-0.0051*
	(0.23)	(-0.32)	(-0.44)	(-1.35)	(-1.84)
4	0.0042	0.0013	0.0029	0.0023	-0.0041
	(1.36)	(0.53)	(1.33)	(0.97)	(-1.45)
Growth	**0.0143**	0.0011	0.0020	0.0022	*-0.0054*
	(3.34)	(0.36)	(0.67)	(0.73)	(-1.52)

	Winners	2	3	4	Losers
Value	**0.0081**	-0.0001	-0.0019	0.0024	*-0.0082*
	(2.96)	(-0.06)	(-0.81)	(0.98)	*(-2.58)*
2	0.0011	0.0035	0.0022	-0.0003	0.0004
	(0.43)	(1.77)	(1.11)	(-0.15)	(0.15)
3	0.0034	0.0027	-0.0001	-0.0014	*-0.0052*
	(1.18)	(1.16)	(-0.07)	(-0.55)	(-1.71)
4	0.0035	0.0037	-0.0021	0.0022	-0.0047
	(1.05)	(1.38)	(-0.88)	(0.86)	(-1.53)
Growth	**0.0087**	0.0044	0.0023	0.0030	-0.0040
	(2.24)	(1.44)	(0.78)	(1.00)	(-1.14)

Second Smallest Quintile

	Winners	2	3	4	Losers
Value	0.0045	0.0038	-0.0003	0.0022	-0.0018
	(1.82)	(1.74)	(-0.14)	(0.89)	(-0.50)
2	0.0000	0.0018	-0.0038	-0.0034	0.0019
	(0.01)	(0.81)	(-1.78)	(-1.26)	(0.62)
3	**0.0065**	0.0042	-0.0000	-0.0037	-0.0034
	(2.48)	(1.78)	(-0.01)	(-1.47)	(-1.14)
4	**0.0072**	0.0031	0.0011	0.0042	*-0.0083*
	(2.19)	(1.23)	(0.45)	(1.53)	*(-2.68)*
Growth	**0.0110**	**0.0101**	**0.0161**	0.0037	*-0.0054*
	(3.21)	**(3.18)**	(1.54)	(1.27)	(-1.57)

Smallest Quintile

	Winners	2	3	4	Losers
Value	0.0020 (0.65)	0.0012 (0.54)	0.0035 (1.56)	0.0021 (0.76)	0.0009 (0.29)
2	**0.0065** **(2.54)**	0.0043 (1.62)	-0.0008 (-0.38)	0.0018 (0.75)	-0.0045 (-1.65)
3	**0.0078** **(2.75)**	0.0002 (0.11)	0.0021 (0.93)	0.0021 (0.90)	-0.0033 (-1.18)
4	**0.0061** (1.89)	0.0039 (1.46)	0.0010 (0.47)	-0.0045 (-1.59)	*-0.0055* *(-2.15)*
Growth	**0.0075** (1.94)	**0.0074** **(2.38)**	**0.0065** **(2.19)**	**0.0059** (1.82)	**0.0050** (1.35)