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Is momentum investing a viable strategy for individual investors?

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Abstract

Momentum investing is the practice of investing in securities that have substantially outperformed the market in recent periods. This paper examines the stock selections of two groups of investors, professional analysts and individual investors, made in the well-researched dartboard contest conducted by the *Wall Street Journal*. We find that both groups exhibit a strong tendency to select momentum securities, with the individual investors concentrating on securities with extreme momentum. The professional analysts are successful with the momentum strategy but the individual investors are not. We conclude that momentum investing is not a viable strategy for individual investors.

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1. Introduction

A momentum investment strategy involves the purchase of equities that have recently outperformed the market on the expectation that this momentum will continue. Chan, Jegadeesh and Lakonishok (1996) assert that ". . . momentum investing constitutes a distinct well-recognized style of investment in the United States and other equity markets." Both the practitioner and academic literature discuss momentum investing. To date, however, neither

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set has examined the stock selections of a group of investors to test for the existence and profitability of momentum investing.

This paper examines the security selections of two groups of investors, professional analysts and individual investors, participating in the *Wall Street Journal's* Dartboard Column. Because these contestants are judged on the basis of returns over the six-month period following the announcement of their picks, they have an incentive to pick short-term winners. Given the well-established empirical finding that winners from a given six-month period continue to be winners in the next six-month period, these contestants may be well served by a momentum strategy. We examine and compare the selection of both groups of investors to determine if they appear to engage in momentum investing and if their investment strategies appear profitable.

The results indicate that both individual investors and professional analysts show evidence of momentum investing. We find that individual investors generally earn lower returns than the market and that professional analysts generally earn higher returns than the market. Overall, the professionals earned significantly higher market-adjusted returns than did the individual investors. Thus, the results argue against the practice of momentum investing on the part of individual investors.

In the next section, we briefly discuss the extant literature on momentum investing divided into segments based on the practitioner and academic literature. In Section 3, we discuss the stock selection samples that are used in our analysis. In Section 4, we report our test methodology and empirical findings. This discussion is followed by a conclusion.

2. Momentum investing and momentum securities

2.1. The practitioner literature: momentum investing, causes and results

The practitioner literature describes the existence of momentum investing and has identified this behavior as the cause of the technology stock crash of March 2000. For instance, Burton Malkiel (2000), writing in the *Wall Street Journal*, defines momentum investing as the practice of buying stocks that have recently experienced large gains relative to the market. Malkiel identifies this tendency as the cause of the spectacular rise in Nasdaq stocks from October 1998 to March 2000 and as the cause of the consequent crash. Jacobs (2000) argues that individual investors participating in momentum investing believe that the market provides upside potential in "high-flying" stocks with limited risk since a loss limit is available merely by selling if prices begin to fall. Jacobs also asserts that this strategy led to the rapid increase in prices of technology stocks and to the bursting of the bubble in March 2000 when price declines led to an avalanche of sell orders and margin calls.[1] More recently McKay (2005), referring to recent momentum in energy stocks, argues that individual investors are slow to "catch the train" when stock sectors exhibit momentum, purchasing stocks only after professional investors have already made their purchases. Thus, the practitioner literature argues that momentum investing can be unhealthy for the market as a whole but is particularly likely to have adverse effects for individual investors.

2.2. The academic literature: momentum securities, evidence and explanations

For momentum investing to be successful, securities must display positive auto-correlation (return momentum) over the investing period. Academic studies have found auto-correlation in security returns over a variety of investing periods. For instance, the overreaction literature suggests that momentum investing would not be profitable over an extended time period. DeBondt and Thaler (1985, 1987) find that in three-year and five-year holding periods winners become losers in subsequent holding periods and vice versa. Recent literature, however, finds that within intermediate periods, securities display positive auto-correlation suggesting the possibility of profitable application of momentum strategies.

In their seminal study in this area, Jegadeesh and Titman (1993) show that, for a sample of U.S. equity securities, positive auto-correlation exists for intermediate periods. Securities identified as winners in samples of from three to twelve months continue to be winning securities in the following corresponding period. Rouwenhorst (1998) and Griffin, Ji and Martin (2005) provide evidence of similar momentum patterns in international markets. Thus, the academic literature indicates the existence of positive auto-correlation that would allow for profitable momentum investing, but also identifies longer-term negative auto-correlation in returns that emphasizes the dangers in momentum investing. These studies, among others, find that creating a zero-investment portfolio by going long in the winners and shorting the losers earns significantly positive returns over postselection investment periods.

Analysis of momentum securities has resulted in a plausible explanation for momentum patterns in individual securities. Both Chan et al. (1996) and Hong, Lim and Stein (2000) find a tendency for momentum in securities to result from the market's under-reaction to positive earnings announcements. Further, Hong and Stein (1999) provide a rationale for a momentum pattern in stock returns following positive earning announcements by postulating two sets of investors: "newswatchers" and "momentum traders."[2]

To compare, the practitioner literature, which emphasizes the existence of irrational momentum investors, posits irrational market swings providing a high-risk investment environment especially for individual investors. In contrast, the academic literature describes patterns in security returns consistent with momentum investing in an investment environment with imperfect realization of information flows. This investment environment suggests the plausible utilization of momentum patterns in an investment strategy. Indeed, Griffin et al (2005, p. 38) state: "Our findings suggest that momentum is worth the serious consideration of active portfolio managers." On the other hand, other researchers (Korajczyk & Sadka, 2004; Lesmond, Shill & Zhou, 2004) argue that potential profits from momentum strategies are illusionary because of micro market considerations. In addition to these concerns, the profitability of a momentum strategy for an investor with budget constraints will be influenced by the risk of adverse selection among momentum securities.

To date, no study has examined investor choices to search for the risk of adverse selection in momentum investing. In this paper we examine the impact of adverse selection risk among the selections of a group of investors participating in an investment contest that encourages momentum investing. We examine the investment behavior of a group of individual investors and a group of professional analysts, searching for the existence and measuring the

success of momentum investing. We conduct this analysis with the goal of making a judgment as to the viability of momentum investing for individual investors.

3. Sample data

We analyze and compare the security selections of a group of individual investors (readers) and of a group of professional analysts (pros) made during participation in the *Wall Street Journal's* highly researched feature, the Dartboard Column, over the period May 1999 through March 2002. The *Journal* began this contest October 1988[3] and the final contest selections were made March 2002. These contests pitted the performance of stocks chosen by professional analysts against the performance of the Dow Jones Industrial Average Index and against securities selected at random by the throw of darts. Performance was measured by determining the percentage return for the six-month period following the *Wall Street Journal* edition announcing the picks. Toward the end of the contests, May 1999, the *Wall Street Journal* provided an innovation that allowed individual investors to participate in the contest by submitting stock picks *via* e-mail. From these submissions, each month the *Wall Street Journal* randomly selected the stock picks of four readers to be included in the monthly contest. As argued above, given the short-term nature of the contest, participants would be encouraged to pick short-term winners, encouraging the selection of momentum securities.

From each of the Dartboard Column issues, we identify the selections made by the pros and the readers. To investigate the existence of momentum investing on the part of these participants[4] we gather daily returns for the 125 trading days[5] before the announcement for each pick from the CRSP daily stock database. We use these returns to determine cumulative returns for the selected securities for the period before the stock's selection. To be included in the sample we require that the security have data for at least 50 trading days before the selection announcement. We also require that the recommendation made by the stock picker suggests going long in the stock.[6] The resulting sample of preselection securities includes 138 securities selected by the pros and 133 securities selected by the readers. To judge the success of the stock pickers we gather returns for the six-month period following the stock's selection. For both the pros and the readers we are able to gather complete data sets in the postselection period for all of the securities included in our preselection sample.

4. Empirical investigation

4.1. Empirical results: overview

We examine two basic questions in this section: Do the pros and readers engage in momentum investing? And, to the extent that these two groups engage in momentum investing how successful are they? We conclude that both readers and pros engage in momentum investing based on three findings. First, a large number of their selections involve securities that earned in excess of 100% in the previous six months. Second, the average

Table 1A Evidence of momentum investing in the cumulative and market-adjusted returns of the *Wall Street Journal*'s pros' and readers' stock selections: prior returns

	Average	Maximum	Minimum	Observations
Pros	30.27%	959.37%	−79.58%	138
Readers	29.19%	454.65%	−92.37%	133

Returns are determined on a daily basis for each security and then cumulated over the 125 trading days before the announcement of the security's selection or for the available days before the selection if there are at least 50 observations.

market-adjusted return is significantly greater than zero. Third, the percentages of their selections that are made from the top deciles of securities ranked on the basis of the previous six-month return significantly exceed the percentages expected by chance. Also we find that the pros performed significantly better than the readers and that the pros "beat the market." The pros' superior performance is because of their momentum selections alone. For both the readers and the pros, momentum picks outperformed other picks.

4.2. Selection of momentum securities: extreme selections

We begin by examining the extent to which the pros and readers engage in momentum investing and the difference in momentum investing across these two groups. Definitions of momentum investing, such as the one cited above by Malkiel (2000), indicate that momentum investors purchase securities that have outperformed the market in a recent time period in the expectation that this superior performance will continue. However, no generally recognized definition exists to indicate the degree to which a security must exceed market returns to be considered a momentum security. Thus, we begin analysis of the pros' and readers' picks with a very broad examination of the level of the six-month cumulative prior (preselection) returns achieved by the selected securities.

The contestants selected securities with truly remarkable six-month prior returns. As shown in Table 1A, one stock selected by a pro had a rather astounding prior six-month return of 959% and one security selected by a reader had a prior six-month return of 455%. A total of 12 selections made by the pros had prior returns of over 100% and the readers selected 20 securities with a prior return greater than 100%. To place these numbers in perspective of the total sample, we determine that 15.04% of the selections (20 out of 133) made by the readers had prior returns greater than 100% and that 8.70% of the selections (12 out of 138) made by the pros had prior returns greater than 100%. Certainly a substantial proportion of the picks by both groups appear to have been securities that had experienced extreme momentum in the period before selection.

4.3. Selection of momentum securities: average cumulative returns

Consistent with picking some securities with extremely high prior returns, as shown in Table 1A, the average prior returns for both groups' selections are quite large relative to historic standards for equity returns. The pros, on average, selected securities that had earned

an impressive 30.27% return for the six-month period before the contest. The readers were not far behind with an average prior return of 29.19%. Both the pros and the readers selected securities with annualized returns greater than 65%, well above historical averages of approximately 14% for small-firm securities and 10% for large-firm securities.[7]

A necessary but not sufficient condition to establish momentum investing among the pros and readers is that the observed average selection returns are significantly greater than average market returns. For each of the selections, we determine the market-adjusted return (security return minus the CRSP NYSE-AMEX-Nasdaq value-weighted index return) on a daily basis and then cumulate these returns over the 125 trading days before the announcement of the security's selection or for the available days before the selection if there are at least 50 observations. The average market-adjusted prior returns are reported in Table 1B, separately for the pros and the readers. For both groups the returns are positive and significantly different from zero with extremely low p-values. Although statistical proof that the selections of the pros and the readers have, on average, a positive market-adjusted prior return is not sufficient to prove momentum investing, the magnitude of the average market-adjusted prior returns and the substantial proportion of extremely high prior returns in the selection sample provide a strong suggestion of momentum investing. As reported, the average market-adjusted prior return for the pros is slightly higher than for the readers but this difference is not statistically significant. Thus, on this basis of average market-adjusted prior returns, we cannot assert that either group of investors is more inclined to participate in momentum investing than the other.

4.4. Selection of momentum securities: decile selections

To provide a stronger test for the existence of momentum investing among the dartboard contestants, we borrow the classification scheme commonly used in the academic literature to identify winners and losers in creating a momentum portfolio. In his survey paper, Swinkels (2004) identifies three standards used in the literature to identify winners and losers: the use of the top and bottom deciles, the use of the top two and bottom two deciles and the use of the top three and bottom three deciles. Thus, we use the top decile to identify momentum securities (we label this decile as Decile 1) and then we use the top three deciles (adding Decile 2 and Decile 3) for a less restrictive definition of momentum investing. The use of the two different definitions of momentum securities reveals important differences between the selections of the pros and the readers.

For each of the dartboard contests, we determine the six-month return for every security in the CRSP NYSE-AMEX-Nasdaq database that has data for the entire six-month period before the month of the contests. Forming deciles based on those prior returns, we examine alternatively the propensity of the pros and the readers to concentrate their selections in Decile 1 and then the propensity of each group to concentrate their selections in Deciles 1 through 3. Table 2 presents the percentage of selections by the pros and the readers that come from Decile 1. We examine the null hypothesis that the selections by the readers and the pros are not concentrated in Decile 1. The alternative hypothesis states that the participants are momentum investors, that is, these groups are more likely to make selections from Decile 1 than is suggested by chance.

Table 1B Evidence of momentum investing in the cumulative and market-adjusted returns of the *Wall Street Journal*'s pros' and readers' stock selections: average market-adjusted prior returns

Pros	Readers	Pros-readers
29.37%	27.81%	1.56%
(2.98)	(3.71)	(0.13)
[0.0017]	[0.0002]	[0.1258]
n = 138	n = 133	n = 138, 133

Market-adjusted returns (security return minus the CRSP value-weighted index return) are determined on a daily basis for each security and then cumulated over the 125 trading days before the announcement of the security's selection or for the available days before the selection if there are at least 50 observations. The t-value ( ) in the first two columns results from a standard paired t-test comparing security and market returns. The p-value [ ] associates with a one-tail test, given the alternative hypothesis that the participants are momentum investors. The t-statistic ( ) in the third column results from a standard two-population test. The p-value [ ] results from a two-tail test, because there is no a priori judgment concerning the relative tendency for momentum investing between the two groups.

The pros make 18.12% of their selections from Decile 1 and the readers make 24.81% of their selections from Decile 1. In both cases application of a standard binomial test finds these percentages significantly higher than the 10% expected by chance. Likewise, the percentage of the selections that both groups make from the top three deciles is greater than expected by chance. Using this broader definition, the pros, which make 42.75% of their selections from the top three deciles, are more likely to be momentum investors than the readers who make 36.84% of their selections from the top three deciles. Thus, we classify both pros and readers as momentum investors when momentum investing is defined as selecting those securities whose cumulative returns place them in the top decile or top three deciles of prior returns.[8] In neither comparison is the difference in selection rates significantly different between the readers and the pros.

Comparisons of the two percentages (Decile 1 vs. Deciles 1–3) reported in Table 2 show that 24.63% of the selections made by the pros come from Deciles 2 and 3, while only 12.03% of the readers' choices come from these two deciles. The tendency for the readers' picks to be more concentrated in Decile 1 out of the top three deciles[9] than the pros' picks may be indicative of a tendency for readers to acquire momentum securities later in their growth period as suggested by McKay (2005).[10] By picking securities that have been winners for a relatively short time period, momentum literature suggests that the pros' selections will remain winners in the next time period. If individual investors are selecting longer-term winners, they may find that winners become losers, as shown by DeBondt and Thaler (1985, 1987). We examine these possibilities in the next section where we compare the performance of the selections made by the pros and the readers.

4.5. Performance of selected securities: overall performance

Table 3 presents the average market-adjusted return of the securities selected by the pros and the readers for the six-month period after the contest announcement. On average, the market-adjusted return for the pros' selections over the six-month period after the announce-

Table 2 Evidence of momentum investing in the decile classification of the *Wall Street Journal*'s pros' and readers' stock selections: percentage of selections in top decile/top 3 deciles

	Decile 1	Deciles 1–3
Pros	18.12%	42.75%
	(2.48)	(3.03)
	[0.0067]	[0.0012]
	$n = 25$	$n = 59$
Readers	24.81%	36.84%
	(3.95)	(1.64)
	[0.0000]	[0.0509]
	$n = 33$	$n = 49$
Pros-readers	−6.69%	5.91%
	(−1.34)	(1.00)
	[0.1785]	[0.3193]
	$n = 25, 33$	$n = 59, 49$

The deciles are created from the six-month pre-selection returns for every security in the CRSP NYSE-AMEX-Nasdaq database for the corresponding period. The first column determines the percentage of average prior returns of the securities selected by the pros and the readers that fall into Decile 1 (highest 10% of returns). The second column determines the percentage of average prior returns of the securities selected by the pros and the readers that fall into Deciles 1 to 3 (highest 30% of returns). The *Z*-score ( ) and *p*-value [ ] for the pros and readers individually are provided by a standard binomial test of the null hypothesis that no more than 10% (Decile 1) or 30% (Deciles 1–3) of the selections come from the top decile or top three deciles against the alternate hypothesis that the pros and readers are more likely to make selections from these deciles than is suggested by chance. For the pros-readers, the *Z*-score ( ) and *p*-value [ ] are provided by a two-population proportion test of the null hypothesis that neither pros nor readers are more likely than the other group to select securities falling in the top decile or the top three deciles. The *p*-value represents a two-tail test since there is no a priori judgment concerning the relative tendency for momentum investing between the two groups.

ment, including the announcement day, is a substantial 8.28%. This value is significantly greater than zero, suggesting that, in agreement with the assessment made by the *Wall Street Journal,* the pros "beat the market."[11] On an annualized basis, the pros over this period bested the market by 17.2%. The average performance of the readers is a market-adjusted return of −3.78%. The readers slightly underperform the market but the difference is not statistically significant. The difference in the return performance between the pros and the readers is statistically significant. Based on overall performance, given the tendency of both groups to select momentum securities, we have empirical evidence to suggest the individual investors should not engage in momentum investing. Additional analysis of this data, however, is required before providing a definitive conclusion.

The literature on the Dartboard column suggests that the pros' selections benefit from a herding impact (Barber & Loeffler, 1993).[12] Investors may buy the stocks selected by the pros on the assumption that the selections reveal inside information. This herding activity is found to occur primarily on the day of the announcement and the following day. A similar reaction is not likely to follow from the announcement that a reader has selected a particular stock. The superior performance of the pros relative to the readers may stem from the performance of the pros benefiting from herding by vigilant investors rather than from the pros' superior ability to conduct momentum investing. Thus, we

Table 3 Contest performance average market-adjusted returns by evaluation period and group

	Day 0 through Day +125	Day +2 through Day +125
Pros	8.28%	6.10%
	(2.10)	(1.59)
	[0.0186]	[0.0573]
	n = 138	n = 138
Readers	−3.78%	−4.35%
	(−0.85)	(−0.98)
	[0.3967]	[0.3292]
	n = 133	n = 133
Pros-readers	12.06%	10.45%
	(2.03)	(1.78)
	[0.0216]	[0.0382]
	n = 138, 133	n = 138, 133

Market-adjusted returns (security return minus the CRSP value-weighted index return) are determined on a daily basis for each security and cumulated over the 125 trading days after the announcement, including the announcement day. The average market-adjusted return is determined for the pros' selections and the readers' selections. The t-value ( ) in the first two rows results from a standard paired t-test comparing security and market returns. The p-value [ ] for the pros associates with a one-tail test, given the alternative hypothesis that the pros have the experience to provide winning investment choices. The p-value [ ] for the readers associates with a two-tail test, since there is no a priori judgment concerning the success of the readers in selecting winning investment choices. The t-statistic ( ) in the third row is the result of a standard two-population test. The p-value [ ] results from a one-tail test, under the a priori judgment that the pros have the experience to provide better investment choices than the readers.

repeat our comparisons of the selections made by the pros and the readers omitting the announcement day return and the return of the following day.

As reported in Table 3, the comparative returns of the readers and the pros are changed by the elimination of the trading days that would likely show a herding impact. The difference in the average market-adjusted returns decreases from 12.06% to 10.45%. However, the average market-adjusted returns of the selections made by the pros continue to be significantly greater than the average market-adjusted returns of the readers' selections. Our results argue for superior momentum investing ability on the part of the pros without the influence of a herding impact.[13]

4.6. Performance of selected securities: momentum selections

We have inferred superior momentum investing on the part of the pros based on their superior overall performance and the tendency of both groups to conduct momentum investing. For further analysis of the relative ability of both groups to conduct momentum investing we examine the performance of only the momentum selections of both groups. Table 4 shows the performance results from the top three deciles and then separated into two groupings: Decile 1 and Deciles 2 and 3 combined.

Considering selections from Deciles 1 through 3, the pros show a strong superiority in conducting momentum investing. The average market-adjusted, six-month return for the pros

in selecting momentum securities is 25.23%. This value is significantly greater than zero. The selections made by the readers earn a modest but positive average market-adjusted return of 2.40%, (this average return is not significantly different from zero). The difference between the performance of the pros and the readers momentum picks of 22.83% is significantly different from zero.

In our previous discussion we observe a tendency among readers to concentrate their momentum picks in Decile 1, while, in contrast, the pros spread their picks relatively evenly over the top three deciles. Based on this observation, we posed the question: Do the readers pick momentum securities that have exhausted their momentum at the time of the pick and, therefore, experience declines in the period immediately following their selection? We provide inference for this question by comparing returns between readers and pros with momentum picks divided into Decile 1 picks alone and Deciles 2 and 3 picks.

The readers appear to have a comparative advantage in selecting securities from Decile 1. The picks that the readers make from Decile 1 have an average market-adjusted return of 4.02%,[14] which is higher than the average market-adjusted returns for picks they make from Deciles 2 and 3. The picks that the pros make from Decile 1 have lower average market-adjusted returns than the picks they make from Deciles 2 and 3. Still, the pros' average market-adjusted return for Decile 1 selections is 10.91% higher than the average market-adjusted return for the readers from the top decile. This difference, however, is not statistically significant. Neither the pros nor the readers have average market-adjusted returns for Decile 1 that are significantly greater than zero.

The readers' top decile picks mitigate their poor relative performance to the pros, in part exonerating their tendency to concentrate their selections in the top decile. On the other hand, the relative six-month performance of the pros clearly benefits from judicious picks of momentum securities in Deciles 2 and 3. The average six-month market-adjusted return for picks from Deciles 2 and 3 made by the pros is a staggering 32.81%. This average return is significantly greater than zero and is significantly greater than the negative average market-adjusted return earned by the readers in these deciles. The readers are not good at picking securities that will continue to exhibit momentum, but they appear particularly inept at picking securities with continuing momentum when they make less extreme picks (Deciles 2 and 3). Our conclusion becomes that on a comparative basis momentum investing is not a viable strategy for individual investors.

We note, however, that individual investors have higher average market-adjusted returns for their momentum selections than for the total selections. Perhaps individual investors are not as good at momentum investing as are the pros, but perhaps this is their best strategy. To investigate this possibility in greater depth we compare performance by both the readers and the pros with selections divided between momentum, neutral and contrarian securities.

4.7. Performance of selected securities: momentum, neutral, and contrarian selections

We have established that the pros are better at momentum investing than are the readers. On this basis one may conclude that individuals should leave momentum investing to the pros, but perhaps the individual investor will still find momentum investing better than other alternatives. Perhaps the comparative disadvantage for the readers is less when considering

Table 4 Overall contest performance average market-adjusted returns

	Deciles 1–3	Decile 1	Deciles 2 and 3
Pros	25.23%	14.93%	32.81%
	(3.57)	(1.27)	(3.69)
	[0.0004]	[0.1080]	[0.0003]
	$n = 59$	$n = 25$	$n = 34$
Readers	2.40%	4.02%	−0.93%
	(0.29)	(0.34)	(−0.15)
	[0.7698]	[0.7359]	[0.8806]
	$n = 49$	$n = 33$	$n = 16$
Pros-readers	22.83%	10.91%	33.74%
	(2.11)	(0.65)	(3.19)
	[0.0185]	[0.2579]	[0.0013]
	$n = 59, 49$	$n = 25, 33$	$n = 34, 16$

Market-adjusted returns (security return minus the CRSP value-weighted index return) are determined on a daily basis for each security and cumulated over the 125 trading days after the announcement, including the announcement day. The average market-adjusted return is determined for the pros' selections and the readers' selections in the preselection top decile, second and third decile, or top three deciles for the total sample period, May 1999 through March 2002. The *t*-value ( ) in the first two rows results from a standard paired *t*-test comparing security and market returns. The *p*-value [ ] for the pros associates with a one-tail test, given the alternative hypothesis that the pros have the experience to provide winning investment choices. The *p*-value [ ] for the readers associates with a two-tail test, because there is no a priori judgment concerning the success of the readers in selecting winning investment choices. The *t*-statistic ( ) in the third row is the result of a standard two-population test. The *p*-value [ ] for the pros minus readers results from a one-tail test, under the a priori judgment that the pros have the experience to provide better investment choices than the readers.

momentum investing than for any of the other strategies. If this is the case, momentum investing may be a viable strategy for individual investors. To study this possibility we examine all of the picks made by the pros and the readers and divide them into categories based on their cumulative prior returns. We identify momentum securities, as defined above, as those securities in the top three deciles of prior returns. We identify contrarian securities as those selections that come from the bottom three deciles of prior returns. Neutral securities are those securities selected from the middle four deciles. We examine the success of the pros and the readers across these three classes of security returns.

Table 5 reports returns across strategies for our sample. The relative return pattern across strategies is remarkably similar for the pros and the readers. Both groups derive the highest return from selecting momentum securities and the lowest return from selecting contrarian securities. For both groups the average market-adjusted return is positive for selecting momentum securities and negative for picks using a neutral or contrarian strategy. For the contrarian strategy the negative average market-adjusted returns appear to be rather substantial.

Although the return pattern across security types is quite similar for both the readers and the pros, the magnitude of the differences in the patterns is not. For the pros the average market-adjusted return for their momentum selections is 29.63% higher than the average return for all other selections combined. This difference is statistically significant with t value equal to 3.68. For the readers the average market-adjusted return for their momentum selections is 9.80% higher than for all other selections combined, which is not statistically

Table 5 Contest performance by investment strategy average market-adjusted returns

	Momentum	Neutral	Contrarian
Pros	25.23%	−2.44%	−6.90%
	(3.57)	(−0.56)	(−1.00)
	[0.0004]	[0.7903]	[0.6631]
	n = 59	n = 44	n = 35
Readers	2.40%	−2.90%	−11.53%
	(0.29)	(−0.42)	(−1.50)
	[0.7698]	[0.6785]	[0.1414]
	n = 49	n = 40	n = 44
Pros-readers	22.83%	0.46%	4.63%
	(2.11)	(0.06)	(0.45)
	[0.0185]	[0.4777]	[0.3271]
	n = 59, 49	n = 44, 40	n = 35, 44

Each of the market-adjusted returns is categorized by investment strategy based upon decile rankings created using the six-month prior returns for every security in the CRSP NYSE-AMEX-Nasdaq database for each selection period. Momentum securities are those securities having an average preselection return in the top three deciles. Neutral securities are those securities having an average preselection return in the middle four deciles. Contrarian securities are those securities having an average preselection return in the bottom three deciles. The average market-adjusted return by strategy is determined for the pros' and the reader's selections for the total sample, May 1999 through March 2002. The t-value ( ) in the first two rows results from a standard paired t-test comparing security and market returns. The p-value [ ] for the pros associates with a one-tail test, given the alternative hypothesis that the pros have the experience to provide winning investment choices. The p-value [ ] for the readers associates with a two-tail test, since there is no a priori judgment concerning the success of the readers in selecting winning investment choices. The t-statistic ( ) in the third row is the result of a standard two-population test. The p-value [ ] for the pros minus readers results from a one-tail test, under the a priori judgment that the pros have the experience to provide better investment choices than the readers.

significant. These differences are supported when we make direct performance comparisons between the readers and the pros across investment categories. As previously reported, the six-month market-adjusted average return for the pros for momentum security selections is 22.83% higher than for the readers. Within the confines of the dartboard contest, professional analysts are significantly better at momentum investing than are individual investors. Similar findings do not apply to the other categories. Although the pros also have a slightly higher average market-adjusted return than readers for neutral picks and contrarian picks, the difference is not statistically significant for either of these two classifications. Readers are at a disadvantage to the pros primarily in terms of momentum investing.

The question at hand appears to be why do both sets of contestants do best at momentum investing and worst at contrarian investing? We attribute the success of the momentum picks and the failure of the contrarian picks to the short-term nature of the dartboard contest. The momentum literature shows that securities with high returns for the past six-months will repeat as securities with high returns for the next six months. Likewise, securities with low returns for the past six months will repeat as securities with low returns for the next six months. Consistent with this well-established empirical finding, picks of momentum securities have positive market-adjusted returns and contrarian securities have negative market-adjusted returns in the dartboard contest. This result holds whether the pros or the readers make the picks.

Despite the finding that readers do better with momentum picks than contrarian picks in the dartboard contest, we still assert the validity of McKay's (2005) observation that momentum investing is done better by professional analysts than by individual investors. Clearly the readers were at a comparative disadvantage to the pros in using a momentum strategy during this contest, even though readers do better in this contest using a momentum strategy rather than a contrarian strategy. However, in general the readers did poorly with short-term selections. Although momentum strategies may do better for individual investors than other short-term strategies, it appears that individual investors should concentrate on longer-term strategies.[15]

5. Conclusion

This paper provides inference as to the viability of a momentum investment strategy for individual investors. We compare the investment behavior and performance of a group of individual investors (readers) to a group of professional analysts (pros). Both groups are participants in the *Wall Street Journal's* monthly dartboard contest from May 1999 through March 2002. Examination of the returns of the stocks chosen by the participants in the six-month period before the contest announcement provides strong evidence that both groups engage in momentum investing. Overall, the pros show stronger evidence of momentum investing when momentum is defined either as investing in any stock with a six-month prior return significantly greater than the market or as investing in any stock with a six-month prior return in the top three deciles of all returns for that time period. Only if momentum is very narrowly defined as investing in any stock with a six-month prior return in the top decile of all returns for that time period, do investors show greater propensity for momentum investing. This result may indicate that individual investors are more likely to select stocks that have been long-term winners.

The average market-adjusted returns earned by the selections of the pros and readers tend to confirm this hypothesis. The average market-adjusted return is significantly positive for the securities selected by the professional analysts, while the individual investors experience a negative, but not statistically significant, average market-adjusted return. This difference is especially true when comparing momentum securities. Indeed, there is no significant difference in the market-adjusted return between the pros and the readers for security selections classified as neutral or contrarian. The professional analysts are adept, as McKay (2005) suggests, in finding securities with positive momentum remaining.

We are led to conclude that a momentum strategy is not a viable long-term option for individual investors. Perhaps professional investors may apply a selective momentum strategy that is based on a number of indicators, including the position of the security in the momentum cycle. Individual investors may lack the expertise or the information to successfully mimic these strategies and instead pursue a momentum strategy that relies more exclusively on observed price increases. Such behavior may result in security selections that have experienced longer-term positive momentum and thus are closer to a reversal.[16] Future research may identify selection characteristics that explain the performance difference between the pros' and the readers' momentum selections. Whatever the cause, our sample

suggests that individual investors are much less successful in applying momentum strategies than professional analysts.

Notes

1. For similar views, see Brown (2001), Browning and Ip (2000), and Dennis (2000).
2. The academic literature seldom is without conflicting views on a question of empirical results. Moskowitz and Grinblatt (1999) argue against a micro explanation for security momentum as they document that much of the individual stock momentum anomaly results from industry momentum factors. Daniel, Hirshleifer and Subrahmanyam (1998) provide a behavioral explanation that is more consistent with this finding and with the discussions in the practitioner literature. They argue that investor overconfidence when confirmed by market events leads to medium-term return momentum but longer-term reversal.
3. In the first contest the *Journal* invited Malkiel, a well-known proponent of the efficient market hypothesis and eminently respected academician, to throw darts at the financial pages to select the securities against which the pros would compete. The original contests lasted for a one-month period, but were extended to six-month contests in January of 1990.
4. We do not claim that momentum selections made for this contest represent the general behavior of either group of investors. We do argue, however, that each pick represents the stock which each participant feels will have the highest possible return over the next six months and is likely in his or her portfolio. The professional analyst would certainly submit a selection whose success would exemplify his or her stock-picking prowess.
5. The six-month time period to judge performance corresponds to the holding period for the contest. Although the symmetry in the holding period to measure momentum in selected securities is arbitrary, it is consistent with the current standard in academic studies examining momentum security patterns as shown by Griffin et al (2005). Further, the six-month period is well within the three-month and 12-month holding periods in which Jegadeesh and Titman (1993) first publish evidence of security momentum.
6. For several reasons we eliminate from our sample the five (four from the readers and one from the pros) selections that recommended shorting the stock pick. First, because discussion of momentum investing in both the practitioner literature and academic literature centers on momentum of stocks earning a positive return, there is no clear reason to include the selections that recommended short sales. Second, if we were to include short-sell recommendations, it is not at all clear how we might classify such recommendations. One may argue that those recommendations to short stocks are seeking to purchase stocks that have experienced positive momentum that the short-seller perceives to have run its course. Alternatively, a short-seller may purchase a stock experiencing negative momentum expecting it to continue. Given

this uncertainty and the lack of discussion in the literature relative to short behavior and stock momentum, we simply exclude these securities from our sample.

7. Ibbotson's and Sinquefield's (2004) *SBBI Yearbook* provides summary statistics, including historical rates of return, for basic asset classes from 1926 to present.
8. In tests not reported here because of space considerations, we show that after the technology crash of March 2000 both the pros and the readers were far less likely to make momentum selections. After March 2000 the percentage of selections made by the pros from the top decile was no longer statistically greater than expected by chance, and the percentage of selections made by the readers from the top three deciles was no longer statistically different than expected by chance. The percentage of selections by the pros from Deciles 2 and 3 did not change. These results are available from the authors.
9. According to a standard two-population proportion test, the concentration of selections by the readers in Decile 1, the top decile among the three top deciles, is significantly higher than that for the pros.
10. To date no study has investigated the aging of momentum securities across periods. The assumption that the decile order of a security return correlates with the age of the momentum period for a security is consistent with McKay's (2005) hypothesis and consistent with technical market timing strategies. Further, the assumption is consistent with the findings that we report later in this paper.
11. The *Wall Street Journal* has argued that the pros beat the market on the basis that the pros earn a higher average six-month return than earned by the market. Academicians have argued that these comparisons do not properly adjust for risk (Wright, 1994). We measure postselection performance adjusting for market return but without adjusting for risk. Traditionally, risk adjustment has been made based upon a security's systematic relation with the market, beta. Momentum securities by definition, however, experience return patterns not reflective of general market movement. Risk for a momentum security, is simply that momentum will cease and possibly reverse. This risk may be associated with large market shifts, but this risk certainly does not associate with the estimate of beta determined in a period when a security is displaying positive momentum. Adjusting for risk based on Fama and French factors becomes even more problematic. Fama and French (1996) find that their three-factor model does not compensate for momentum risk. Hence, we concur with Hong and Stien (1999) who argue that traditional asset-pricing models do not explain the behavior of momentum securities.
12. The Dartboard contest is not the only stock-picking contest where evidence of herding is found. Milevsky and Salisbury (2005) study the *Globe and Mail* annual stock picking contest. They report that the average daily volume for the selections made by the previous year's winners in the day following the selection is five to 10 times normal.
13. The impact on the pros' returns in Day 0 and Day 1 may alternately be interpreted to reflect an announcement effect. This alternative explanation is supported by the fact that the pros' picks continue to significantly outperform the reader's picks utilizing postselection average market-adjusted returns from Day 2 through Day 125.

Thus, in the remaining analysis of postselection returns, we include the entire sample. We do, however, repeat all statistical tests using average market-adjusted returns from Day 2 through Day 125 and find universally comparable results. These test results are available from the authors.

14. In tests not reported here because of space considerations, we show that the success of the readers in selecting securities from Decile 1 is time-dependent. The readers made eight selections of securities from the top deciles whose return results were reported before the technology crash of March 2000. These eight selections had an average six-month market-adjusted return of slightly over 66%. After this time, the average market-adjusted return for the readers picks from the top decile averaged approximately slightly more than −16%. Detail results of time dependent returns for the picks of both the pros and the readers are available from the authors.
15. Consideration of variability across market regimes strengthens the argument against momentum investing for individuals. The market-adjusted returns for the readers' momentum picks are the highest among the three investment strategies but only for those picks whose results were tabulated before the March 2000 technology crash.
16. These inferences are consistent with the findings of Weigand, Belden and Zwirlein (2004) concerning the hypothesis that individual investors could earn excess return by mimicking the selection of mutual fund managers. Their empirical findings show momentum-based selections by mutual fund managers. Further, they show that if individual investors select stocks based upon the reported selections of the fund managers, the individual investors would earn negative market-model adjusted returns.

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