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## Market sentiment and mutual fund trading strategies

### Abstract

Based on a sample of the US equity funds, this paper investigates the performance of both follow-the-leader (momentum) and follow-the-loser (contrarian) trading strategies. We find that similar fund styles tend to be the biggest winners and the biggest losers, and that the follow-the-leader strategy outperforms the follow-the-loser strategy. However, the follow-the-loser strategy beats both the market and the follow-the-leader strategy in major down markets. Using a piecewise linear regression, we also document a relationship between the market and our two trading strategies. Our study suggests that behavioral factors play an important role for funds with extreme performance.

**Keywords:** fund performance, trading strategy, pattern, behavioral factors.

**JEL Classification:** G10, G14.

### Introduction

Whether investors overreact to news has been a controversial issue in stock market research. Constructing loser and winner portfolios, Debondt and Thaler (1985) find a performance reversal during the three year test period immediately following a major market move, suggesting that the stock market overacts. In fact, Debondt and Thaler's contrarian investment strategy earned 25% abnormal returns on average, a finding that has attracted tremendous attention. For example, Chan (1988) concludes that the contrarian strategy earns insignificant abnormal returns after adjusting for time varying beta risk. Brown and Harlow (1988) examine whether investors overreact to dramatic events and find that investors responds to events differ in both intensity and magnitude.

Overall, the evidence on the overreaction hypothesis is mild based on positive news events, while the evidence on short-term corrections to negative events corresponds more strongly. Lo and Mackinlay (1990) conclude that the profitability of contrarian investment strategies does not need to be the result of stock market overreaction, and find overreaction as the primary source of contrarian profits.

Jegadeesh, Narasimhan, and Titman (1993) document that strategies that buy stocks of past winners and sell stocks of the past losers generate significant positive returns over 3 to 12 months holding periods. Cooper, Gutierrez, and Hameed (2004) test overreaction theories of short-run momentum and long-run reversal in the cross section of stock returns and find that momentum profits depend on the state of the market. From 1929 to 1995, the mean monthly profit following positive market returns is 0.93%, whereas the mean profit following negative market returns is -0.37%.

The overreaction hypothesis has also been tested from different perspectives by researchers. Goetzmann and

Ibbotson (1994) investigate whether positive mutual fund performance persists, and find that mutual fund winners tend to repeat from year to year. They use bootstrapping tests to show that fund performance persistence exists on a monthly level as well as at multiple-year horizons. Grinblatt, Titman, and Wermers (1995) analyze the extent to which mutual funds purchase stocks based on their past returns, and find that on average, momentum trades realized significantly better performance. After examining the behavioral models proposing that momentum profits are due to delayed overreactions, Narasimhan and Titman (2001) provide support for the behavioral models. Their evidence indicates that momentum profits were not a product of data snooping bias.

Our research contributes to the overreaction hypothesis in several ways. First, we believe that an investor's reaction is contingent not only on mutual fund performance but also on macroeconomic conditions. Cooper, Gutierrez, and Hameed (2004) find that stock returns based on a momentum strategy depend on the state of the market. We agree and believe that because mutual fund investors tend to overreact when they sense that a prolonged bearish market is imminent, we study the overreaction hypothesis in the context of the ongoing market states. Second, our sample period covers a period with both strong and weak markets and therefore, can test an investors' reaction in a dynamic way. Third, our sample is constructed to minimize biases that tend to creep into mutual fund studies and can potentially distort results. We use Morningstar data as our only source of data, thus removing potential data inconsistencies. Moreover, by analyzing rolling quarterly data (rather than a single cumulative data sample), we can capture the dynamics of performance over time as well as an investor's response. Last is the length of the investment horizon: we argue that speculators are opportunists and adopt a short rather than long investment horizon. Following Hedricks, Patel, and Zeckhauser (1993), who find that mutual fund performance tends to persist from 3 to 12

months, we use a 3-month investment horizon to evaluate the performance of both a follow-the-leader (momentum) strategy and a follow-the-loser (contrarian) strategy.

This paper is organized as follows. Section 1 describes our data and methodology. In section 2 we examine the interrelationship between the performance of the follow-the-leader strategy, the performance of the follow-the-loser strategy, and market states. The final section summarizes the study.

## 1. Data and methodology

Our fund sample is composed of quarterly Morningstar Principia CDs covering October 1998 through December 2005. This time period encapsulates 29 quarters as our sole data source. Our data is constructed to minimize both survivorship bias and backfilling bias by including all funds available to investors in each quarter. Because mutual fund companies report data to Morningstar, our data represent the opportunity set of funds so that we are in a better position to capture an investor's reaction to extreme fund performances. In addition, Morningstar updates fund style and size quarterly based upon fund composition, thus eliminating style shifting. All together, our tests provide a more realistic assessment of an investor's response to fund performance.

We use a quarterly rebalancing approach to test the overreaction hypothesis of mutual fund investors in a short investment horizon. We first rank funds according to their prior 3-month return, defining the top ten funds as leaders and the bottom ten funds as losers. We then use \$1 to invest in the top ten and bottom ten funds in the following quarter, and repeat this strategy in each and every quarter during the sample period, comparing the performance of leaders versus losers. Since the return is based on a \$1 initial investment, a \$1 ending value would represent a 0% return.

We also build portfolios of "extreme performance" based upon top ten and bottom ten performers over the previous quarter, and we examine the performance of leaders and losers in the context of the market returns. We run this analysis on the full sample and separately for large blend funds, large growth funds, large value funds, and specialty funds. In this way we can capture the difference in performance and its relation with market states across different fund styles.

## 2. Performance of momentum and contrarian strategies

Table 1 reports a performance summary of the returns earned by the biggest winners and losers, by the next biggest winners and losers, and so on through the top 10 and bottom 10 funds. We can see that ranking is not maintained as there is not a monotonic decrease (or increase) in the raw returns earned by rank. However,

when we evaluate the average return of the top-10-fund portfolio against that of the bottom-10-fund portfolio, we can see that the former outperformed the latter based on the whole fund sample, large growth funds, large value funds, and specialty funds. The only exception is the top fund portfolio for large blend funds, which slightly underperformed the bottom performing fund portfolio.

Table 1. Ranked leader and loser performance summary

Panel A reports the ending value of a \$1 initial investment in the top 10 funds and the top-10 fund portfolio, Panel B reports the ending value of a \$1 initial investment the bottom 10 funds and the bottom-10 fund portfolio. In each quarter funds are ranked according to their prior 3-month return. Investment is then made into the top 10 and bottom 10 funds in the following quarter. This strategy is repeated in each and every quarter during the sample period. The sample period is from October 1998 to December 2005.

Panel A: Ending value of top 10 funds and top-10-fund portfolio (In dollars)					
Rank	All funds	Large blend funds	Large growth funds	Large value funds	Specialty funds
1	0.1737	0.4535	3.5508	1.6559	1.6039
2	0.7386	0.2715	1.4477	1.3913	1.2654
3	0.9198	0.5790	1.1953	1.9049	2.1895
4	0.9649	0.6903	0.6092	1.2838	6.6743
5	0.4416	0.7039	1.3857	1.5599	2.0014
6	1.1214	1.8177	1.2870	1.4768	4.4781
7	1.6262	0.9364	1.5621	1.3383	2.2788
8	5.5387	1.9015	2.071	1.6538	0.8573
9	1.3108	1.5450	1.6358	1.1768	1.7275
10	0.7390	1.2696	1.3304	0.9947	1.2631
Top 10 portfolio	1.3574	1.0169	1.6075	1.4435	2.4339
Panel B: Ending of bottom 10 funds and bottom-10-fund portfolio (In dollars)					
Rank	All funds	Large blend funds	Large growth funds	Large value funds	Specialty funds
1	0.4815	0.5981	0.0654	0.7143	1.4390
2	1.0017	0.3463	0.1173	1.208	0.2334
3	0.3443	1.0665	0.376	1.4593	0.1398
4	0.3696	1.9560	0.3050	0.9539	0.1856
5	1.5194	1.2143	0.6259	1.5151	0.978
6	0.4398	1.1382	1.0092	1.3247	0.8241
7	0.3196	1.4362	0.5935	1.0392	0.7808
8	1.1990	1.6305	0.3330	0.8457	2.1376
9	0.8151	0.9866	0.3050	1.0127	1.3517
10	0.8055	1.0440	0.3176	0.6923	0.4309
Bottom 10 portfolio	0.7295	1.1416	0.4048	1.0758	0.8501

The distribution of leading and losing fund portfolios by fund styles is shown in Figures 1 and 2. We can see that technology funds, precious metal funds, and large growth funds are the most frequent top performers, while technology funds, large growth funds, and small growth funds tend to be losers. It is interesting to note that in some cases similar fund styles tend to make both lists, meaning that the same

funds tend to be both big winners and big losers. We also see that utility funds and value funds are less likely to be the extreme performers. Figure 3 compares the quarterly returns earned and finds that while follow-the-leader and follow-the-loser used to

work in opposite directions, they have since 2002 charted the same course.

Figure 1 reports the distribution of leading fund portfolios by fund styles. The sample period is from October 1998 to December 2005.

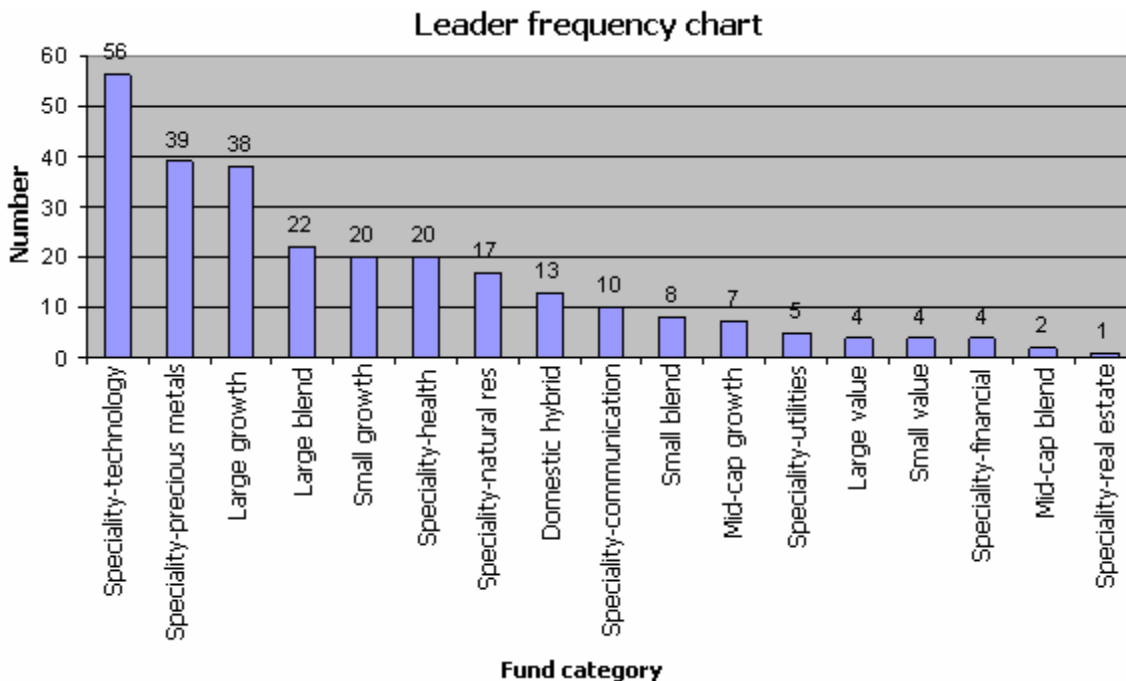


Fig. 1. Distribution of leader categories in the sample period

Figure 2 reports the distribution of losing fund portfolios by fund styles. The sample period is from October 1998 to December 2005.

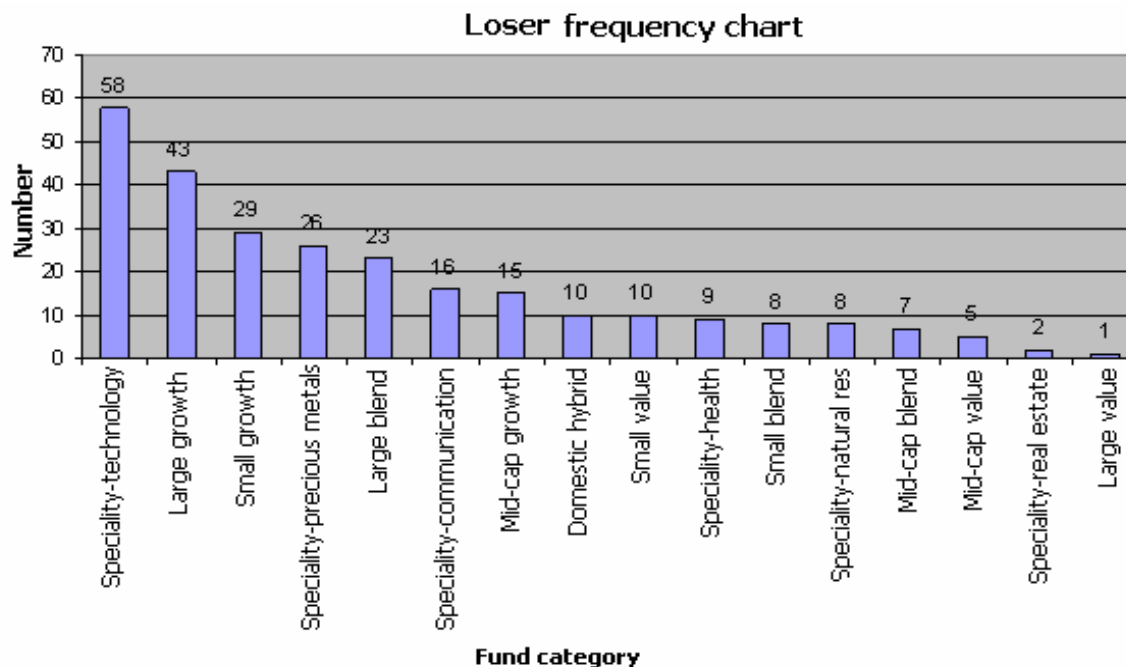


Fig. 2. Distribution of loser categories in the sample period

Figure 3 reports market return (S&P 500), subsequent returns of the top-10 fund portfolio (w) and the bottom-10 fund portfolio (l) during the sample period from October 1998 to December 2005. The return is based on \$1 initial investment, thus \$1 represents zero return.

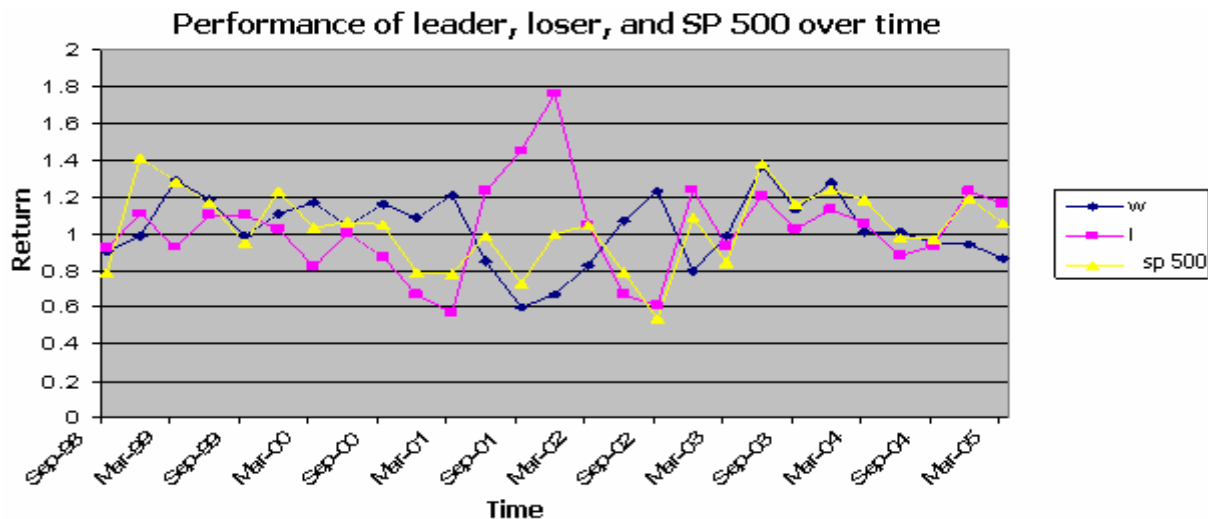


Fig. 3. Performance comparison between the top-10 portfolio, the bottom-10 portfolio, and the market

In order to test the performance of the leader strategy in the context of market states, we next conduct a performance comparison between leaders, losers, and the market (S&P 500). Figures 4 and 5 exhibit interesting patterns. The distribution of the top portfolio returns against the market follows a V shape; the lowest point is where the market return is close to zero, and the performance comparison between the bottom performing portfolio against the market (S&P 500) is an inverse V-shaped curve, with the highest return occurring at the near zero market return.

Figure 4 reports the performance comparison between top-10 fund portfolio (leader) and market (S&P 500). The vertical axis represents subsequent returns of the top 10 fund portfolio (leader), and the horizontal axis represents market return (S&P 500). The sample period spans from October 1998 to December 2005, and the return is based on \$1 initial investment. Thus, \$1 represents zero return.

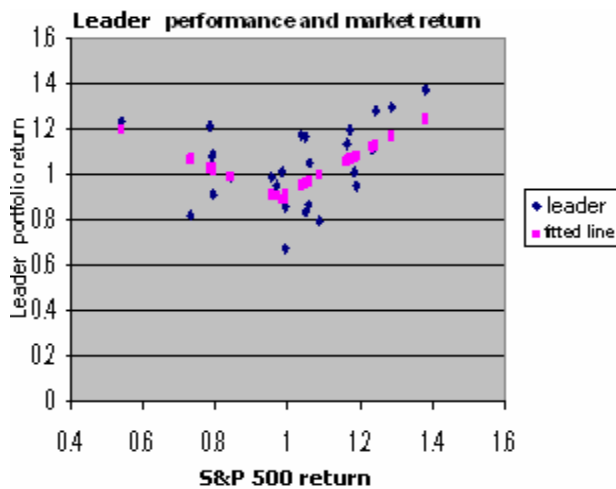


Fig. 4. Performance of the top-10 fund portfolio versus market return

Figure 5 reports the performance comparison between the bottom-10 fund portfolio (loser) and market (S&P

500). The vertical axis represents subsequent returns of the bottom-10 fund portfolio (loser), and the horizontal axis represents market return (S&P 500). The sample period spans from October 1998 to December 2005, and the return is based on \$1 initial investment, thus \$1 ending value represents zero return.

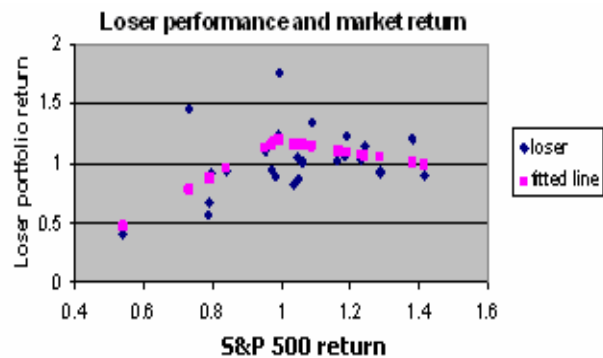


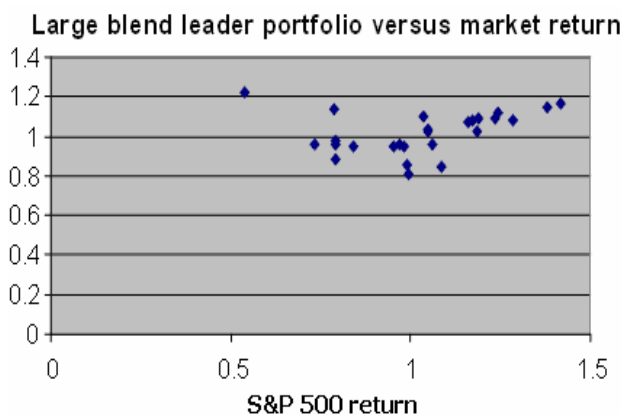
Fig. 5. Performance of the bottom-10 fund portfolio versus market return

Figures 4 and 5 suggest that the response to extreme performance is conditioned by the market. The market tends to overreact to extreme performance most when future market movements are hard to predict. We can see that a zero market return represents a turning point of the performances of both strategies, and that when the market return is around zero, the leader strategy gets the lowest return. When the market performs very well, follow-the-leader strategy takes full advantage of market momentum and shares the best return. On the other hand, the follow-the-loser strategy reaps the best return when the market return hovers around zero.

To examine whether return distribution patterns of leader and loser portfolios hold across other fund styles, we repeat the same procedure for large blend funds and specialty funds. These results are reported separately in Figures 6, 7, 8, and 9, respectively. From Figure 6 and Figure 8 we can see that the

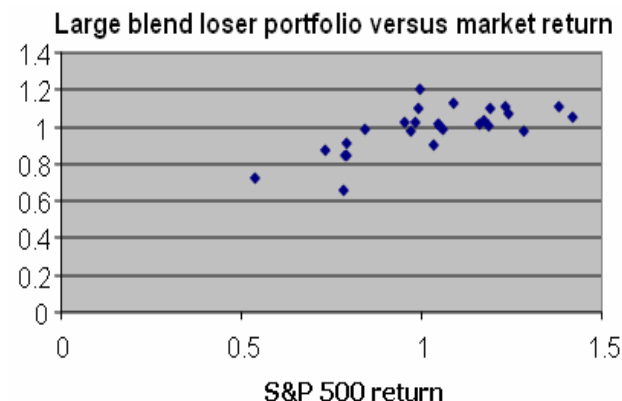
leader portfolio tends to provide the lowest return when the market return is close to zero. From Figure 7 and Figure 9 we can see that the loser portfolio tends to provide the highest return when the market return is close to zero.

Figure 6 reports the performance comparison between top-10 portfolio (w) and market (S&P 500). The vertical axis represents subsequent returns of the top 10 fund portfolio (leader), and the horizontal axis represents market return (S&P 500). The sample period spans from October 1998 to December 2005, and the return is based on \$1 initial investment, thus \$1 represents zero return.



**Fig. 6. Performance of large blend fund top-10 portfolio versus market return**

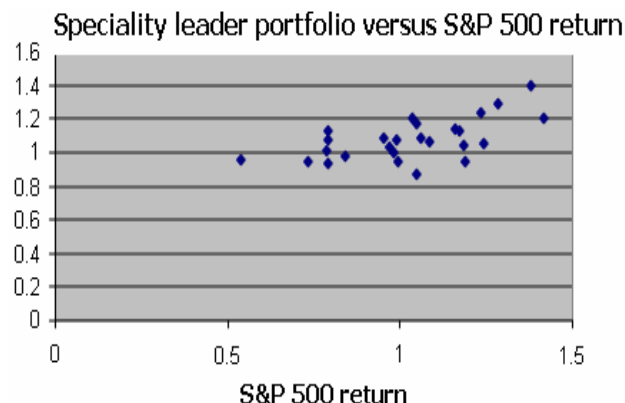
Figure 7 reports the performance comparison between bottom-10 portfolio and market (S&P 500). The vertical axis represents subsequent returns of the bottom-10 fund portfolio (loser), and the horizontal axis represents market return (S&P 500). The sample period spans from October 1998 to December 2005, and the return is based on \$1 initial investment, thus \$1 represents zero return.



**Fig. 7. Performance of large blend fund bottom-10 portfolio versus market return**

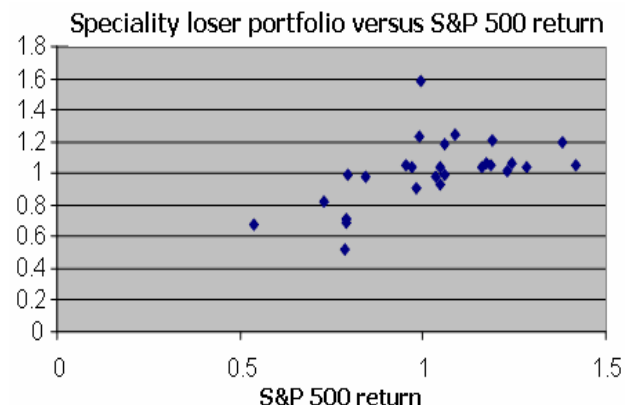
Figure 8 reports the performance comparison between top-10 portfolio and market (S&P 500). The vertical axis represents subsequent returns of the top 10 fund portfolio, and the horizontal axis represents market return (S&P 500). The sample period spans from October 1998 to December 2005, and the return is based on \$1 initial investment, thus \$1 represents zero return.

from October 1998 to December 2005, and the return is based on \$1 initial investment, thus \$1 represents zero return.



**Fig. 8. Performance of speciality fund top-10 portfolio versus market return**

Figure 9 reports the performance comparison between bottom-10 portfolio and market (S&P 500). The vertical axis represents subsequent returns of the bottom-10 fund portfolio, and the horizontal axis represents market return (S&P 500). The sample period spans from October 1998 to December 2005, and the return is based on \$1 initial investment, thus \$1 represents zero return.



**Fig. 9. Performance of specialty fund bottom-10 portfolio versus market return**

In summary, our analysis suggests that when the market return is close to zero, the momentum strategy exhibits the worst performance, while the contrarian strategy exhibits the best performance. Since a zero market return indicates a state of high uncertainty, we believe this is due to the overreaction of investors when the market is trending. If a zero market return is the critical point to the return distribution of the leader portfolio and loser portfolio, we next test a piecewise regression with zero market return as the kinked point for further examination.

Let X denote the quarterly return of S&P500 and let Y denote the quarterly return of leader and

loser portfolio. For any fixed value  $X_0$ , we define a new independent variable as  $(X-X_0) = 0$  if  $X < X_0$ ; and  $(X-X_0) = X_0$  if  $X \geq 0$ . Thus, we have  $Y = b_0 + b_1X$ , if  $X < X_0 = 1$ ; and  $Y = b_0 + b_1X + b_2(X-1)$ , if  $X \geq X_0 = 1$ . Zero market return is represented by  $X_0 = 1$ .

Table 2 reports the results of a piecewise regression using a zero market return as the kinked point. Panel A reports the test results of the leader portfolio for the whole fund sample, for large blend funds, and for specialty funds. We see that for the whole fund sample and the large blend funds, both  $b_1$  and  $b_2$  are statistically significant at the 5% level, while for specialty funds, only  $b_2$  is significant. Panel B reports similar test results for the loser portfolio. We can see that the loadings on  $b_1$  and  $b_2$  are statistically significant for all three cases. Table 2 demonstrates that a zero market return has tremendous impact on the return distribution for both follow-the-leader strategy and follow-the-loser strategy, and this impact is universal across fund styles.

Table 2 reports the results of a piecewise regression using a zero market return as the kinked point. For any fixed value  $X_0$ , we define a new independent variable as  $(X-X_0) = 0$ , if  $X < X_0$ ; and  $(X-X_0) = X_0$  if  $X \geq 0$ . Thus, we have  $Y = b_0 + b_1X$ , if  $X < X_0 = 1$ ; and  $Y = b_0 + b_1X + b_2(X-1)$ , if  $X \geq X_0 = 1$ . A zero market return is represented by  $X_0 = 1$ . Panel A reports the test results of the leader portfolio for the whole fund sample, large blend funds, and specialty funds. The dependent variable is the quarterly return of the leader portfolio. Panel B reports similar test results with quarterly return of the loser portfolio as the dependent variable. The sample period spans from October 1998 to December 2005.

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Table 2. Piecewise linear regression summary

Panel A: Piecewise linear regression of leader portfolio			
	All funds	Large blend funds	Specialty funds
Intercept	1.4384 (5.73)**	1.3576 (10.86)**	0.9739 (5.93)**
b1	-0.5187 (-1.86)*	-0.4383 (-3.15)**	0.0344 (0.19)
b2	1.3493 (2.91)**	1.1088 (4.81)**	0.6604 (2.18)*
Panel B: Piecewise linear regression of loser portfolio			
	All funds	Large blend funds	Specialty funds
Intercept	-0.1794 (-0.44)	0.2587 (1.95)	-0.1452 (-0.55)
b1	1.3092 (2.87)*	0.7759 (5.24)**	1.2459 (4.23)**
b2	-1.5772 (-2.08)*	-0.6989 (-2.84)**	-1.3058 (-2.67)*

Notes: \* Significant at 5% level. \*\* Significant at 1% level.

## Conclusion

We investigate US equity fund performance for both follow-the-leader and follow-the-loser trading strategies. Test results show that the follow-the-leader strategy outperforms the follow-the-loser strategy during the sample period. On the other hand, the follow-the-loser strategy beats both the market and follow-the-leader strategy when the market was down. This indicates that market sentiment is relevant in the performance of trading strategies. Moreover, there exists a significant and interesting relationship between market states and our two proposed trading strategies. Specifically, a zero market return seems to play an important role in the behavior of investors, and market sentiment is most volatile around a zero market return. These findings not only provide further evidence to the overreaction hypothesis but they are useful in the management of fund portfolios. By means of the piecewise regression, we pinpoint the kinked point of market sentiment for the first time, demonstrating that a zero market return is a crucial point for momentum trading strategies.

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