Daily Stock Returns: Momentum, Reversal, or Both

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Abstract

Much attention has been given to the momentum and reversal of individual security returns; however, relatively little research has focused on any comparable effect for overall markets. In a similar fashion, many existing studies examine short-term movements over, for example, weekly or monthly periods, yet comparatively little is known about extremely short periods (e.g., returns for a single day following a significant market move). We fill these gaps, finding that returns on days subsequent to extreme downward market-wide moves (below -1%) tend to exhibit return reversal; whereas, days following large upward moves (above 1%) generally continue with the momentum, although to a lesser degree. Thus, for the entire market over extremely short time periods, the evidence is less consistent than prior studies suggest and actually appears to indicate that market participants, contrary to popular opinion, respond favorably to extreme movements (positive or negative) in overall market returns.

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1. Introduction

Until recently, the prevailing notion, both in research and practitioner circles, has been that stock returns exhibit overreaction, followed by a subsequent return reversal. For example, Daniel and Titman (2006) suggest that traders overreact to implicit news, while Lehmann (1990) and Jegadeesh (1990) find that stocks with the lowest returns in a given week (or month) outperform stocks with the highest return over the subsequent week (or month). In a similar fashion, DeBondt and Thaler (1985) document a reversal pattern in longer-term returns (e.g., 3-5 years) as well.

Likewise, a common Wall Street mantra is to "buy the dips." In fact, this terminology is so prevalent that the term is defined on *www.investopedia.com* as, "A slang phrase regarding the practice of purchasing stocks following a decline in prices. After a significant dip in the price of a security or stock index, investors should increase positions or purchase different stocks to capitalize on what is seen as an eventual upswing." Obviously, the implication is that short-term overreaction on the downside creates a buying opportunity for active traders.

Although the findings (and practitioner beliefs) related to overreaction and subsequent reversals seem rather significant and robust, more recent evidence suggests that the return reversal may be of less importance than the momentum effect, particularly over shorter time periods. For example, Gutierrez and Kelley (2008) find that weekly returns are actually positively correlated to subsequent one-year performance, suggesting that momentum offsets any reversal.[1] Specifically, they find a one-year abnormal return of 3% from following an ongoing strategy of buying weekly "winners" and selling weekly "losers."

From a practitioner standpoint, for every trader who buys on the dips, it may be just as easy to find one who "rides the winning horse." More literally, these momentum traders believe short-term patterns may reflect longer-term trends and, as such, are more prone to add money to positions that are increasing in value and cut losses in (or avoid) those that are falling, particularly during relatively short time intervals. Thus, the conflicting evidence and beliefs raises the question, "do returns exhibit momentum or reversal?" As we discuss below, the answer appears to simply be "Yes."

While prior studies attempt to answer this question by evaluating groups of individual securities segmented by returns (i.e., high versus low), we are unaware of any research examining this question at the overall market level. Further, most studies concentrate on weekly, monthly, and yearly returns; however, many active traders are more focused on daily price fluctuations. Our contribution is to fill these gaps, as we examine whether overall market returns display reversion or momentum subsequent to abnormally large (positive or negative) daily price movements.

We find, similar to the longer time periods examined in previous research, that the overall market exhibits significant movement subsequent to days on which the market as a whole moves to a large degree, which we define as greater than 1% or lower than -1%. Interestingly, however, we find that whether the subsequent movement is associated with momentum or reversal depends on the

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[1] Jegadeesh and Titman (1993) find that momentum also exists in longer-term returns.

direction of the initial market move. Specifically, we find that large down days are followed, on average, by significant upward movements in both shorter (one, three, and five trading-days) and longer (month and year) periods. Further, we find that this result is most pronounced during bull markets, which is consistent with the fact that the "buy the dip" mantra is likely to be most prevalent during upward moving markets.

On the other hand, for days subsequent to a large positive market move, overall returns tend to be driven more by momentum rather than reversal; however, the level of significance is much less. Similar to negative days, we do find the significance is again dependent on the type of market (i.e., bull versus bear). For example, it appears that large positive returns are more likely to be realized following positive days (i.e., momentum) in a bull market cycle. Thus, our overall results suggest that both momentum and reversal exist, where the one that occurs is not only dependent on the direction of the prior move, but also on the general nature of the market at that point in time. We further explore these issues in the remainder of the paper, which proceeds as follows: Section II defines our data and variables of interest, Section III provides our primary results, and Section IV concludes.

2. Data and Variable Description

The literature examining momentum and reversal can be traced to DeBondt and Thaler (1985). At the time of that study, however, there were very few choices for easily trading the market via a single investment. Thus, most studies, DeBont and Thaler included, concentrate on baskets of individual securities, buying those with the highest returns and selling those with the lowest, or vice versa. In practice, however, this approach may be prohibitive as the trading costs associated with such a strategy are excessive. Further, it is generally the case that when the market as a whole is up (or down) to a large degree, most underlying securities follow suit. Thus, since we examine days when the overall market has moved significantly, the same approach (i.e., examining baskets of "winners" and "losers") may be less relevant.

With the creation of exchange traded funds (ETFs) in the early 1990s, trading the overall market in a single transaction became feasible for the "average" investor.[2] Thus, since the movement in the overall market is our focus, we begin our data collection with the advent of the S&P500 ETF (the ticker symbol is currently SPY), which started trading on January 29, 1993. Our sample ends December 31, 2007. We collect daily prices for this security using the Center for Research in Security Prices (CRSP) database. We then calculate percentage returns for each trading day, subsequently segmenting days based on their returns, using category increments of 1%. We also calculate cumulative returns (and differences) over ensuing periods (daily, weekly, monthly and yearly) to each event day. Specifically, we compute the following variables, and report the results in Table 1:

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[2] Prior to the development of ETFs, investors desiring a full market position could use futures contracts; however, practically speaking, the use of such investments would be limited to more sophisticated investors.

HPR	=	return for the given trading day (i.e., event day)
NextHPR	=	return on the single trading day following the event day
HPRDiff	=	difference between the returns of the following trading day and the event day
GR3	=	cumulative (geometric) return over the 3 trading days following the event day
GR5	=	cumulative (geometric) return over the 5 trading days (or approximately one week) following the event day
GR21	=	cumulative (geometric) return over the 21 trading days (or approximately one month) following the event day
GR250	=	cumulative (geometric) return over the 250 trading days (or approximately one year) following the event day

Table 1: Summary Stats

The following table presents summary statistics for the entire sample, segmented by the holding period return for each trading day. Returns are calculated as the percentage difference between the current day closing price and the closing price of the previous trading day. *NextHPR* is the holding period return on the following trading day. *HPRDiff* is the difference between the returns of the following day and the event day, calculated as $HPR_{t+1} - HPR_t$. *GR3* is the cumulative geometric return over the three trading days following the event day. *GR5* is the cumulative geometric return over the five trading days following the event day. *GR21* is the cumulative geometric return over the twenty-one trading days (or approximately one month) following the event day. *GR250* is the cumulative geometric return over the two hundred and fifty trading days (or approximately one year) following the event day. Data come from the CRSP database over the period January 29, 1993 to December 31, 2007.

	Total	> 2%	1.01% to 2%	0% to 1%	0% to -1%	-1.01% to -2%	<-2%
N	3,703	116	400	1,255	1,467	329	136
NextHPR	.04	.12	.03	.01	.02	.16	.31
HPRDiff	-.00	-2.75	-1.34	.42	-.41	1.56	2.99
GR3	.13	.14	-.03	.12	.08	.37	.66
GR5	.22	.43	.02	.21	.12	.54	1.09
GR21	.91	1.93	1.05	.88	.66	1.07	2.90
GR250	11.77	8.47	11.02	11.89	12.47	10.36	10.07

3. Results

3a. Summary Results

As would be expected, the bulk of the observations (2,722 / 3,703 = 74%) fall within the +/-1% range, with fewer observations in the tail ends of the distribution. Given our focus (as well as the lack of variability in the center categories), we concentrate on trading days where the return is considerably higher or lower than average. Examining days where the return is in the range of -1.01% to -2%, it appears the market, on average, tends to experience a reversal, as the subsequent trading day is typically positive and is higher than the return on an average day (i.e., 0.16% vs. 0.04%). This relation is also exhibited by the positive value on *HPRDiff*. It appears that this reversal continues for the next month, as subsequent returns (i.e., *GR3*, *GR5*, and *GR21*) are all positive and

above the market average. For the year following the event day, the relation is less consistent, as the returns appear to be positive (indicating a continuation of the reversal); however, the return is lower than the market over the same period, which suggests a slight momentum effect in that the low daily return is positively correlated to relative one-year performance. These findings are even more pronounced for periods following days where the return is below -2%.

Our results for periods following significantly negative return days are consistent with the findings of Gutierrez and Kelley (2008), who note that weekly returns revert for a short time, prior to resuming a more momentum-based relation. Thus, stopping here would produce no significant contribution to the existing literature; however, when we examine the positive return days, the exact opposite relation exists. Specifically, returns following extreme up days (particularly above 2%) appear to exhibit momentum, as the subsequent return is higher than the market average for the next trading day (0.12% vs. 0.04%), as well as for *GR3*, *GR5*, and *GR21*. The returns, however, appear to revert for the full year, as *GR250* is lower than the market average. Thus, whether markets exhibit momentum or reversal appears to be dependent on the initial direction of the market, which is a relation that, to our knowledge, has yet to be documented in the existing literature.

3b. Difference Tests

To further examine the significance of the relationships identified above, we conduct difference tests for the variables of interest and report our findings (including *p*-values) in Table 2. We segment the results by those with highly positive (Panel A) and negative (Panel B) initial return days. The results of this analysis seem to provide some insight into the contrasting results we find relative to Gutierrez and Kelley (2008). Specifically, the reversal in the one month period following negative days is highly significant, with most at the 1 percent level. For the one-year period, returns are lower (relative to average) following highly negative days, although we find the difference to be only moderately significant for the <-1% return days and insignificant for the <-2% return days. This relation, however, does suggest that momentum (i.e., continuation of the downward trend) resurfaces in the longer term, which is consistent with the findings of Gutierrez and Kelley.

The conflict seems to occur in the periods following positive return days. Specifically, although the averages appear to exhibit a momentum effect on days following extreme positive returns (i.e., >2%), the differences are insignificant at any conventional level. Thus, the apparent conflict to Gutierrez and Kelley (2008) seems to be driven by the fact that the significance of reversion following negative days is stronger than the apparent momentum following positive days. Thus, the overall results of Gutierrez and Kelley likely reflect this dominance. Moreover, aggregating the results appears to overshadow the significant impact that the direction of the initial movement has on subsequent returns. This decomposition is a primary contribution of our study.

Table 2: Univariate Analyses

The following table presents summary statistics segmented by extreme levels of daily returns, including associated difference test results (i.e., *p*-values). Panel A (Panel B) reports results for periods following highly positive (negative) return days. All variables are as defined in Table 1. Data come from the CRSP database over the period January 29, 1993 to December 31, 2007.

Panel A: Positive Returns

	> 1%	Not	*p-val*	> 2%	Not	*p-val*
N	516	3,242		116	3,642	
NextHPR	.05	.04	.8564	.12	.04	.5079
HPRDiff	-1.66	.26	.0000	-2.75	.09	.0000
GR3	.01	.15	.1259	.14	.13	.9650
GR5	.11	.24	.2671	.43	.21	.4263
GR21	1.08	.88	.3363	1.93	.90	.5410
GR250	10.42	11.99	.0716	8.47	11.88	.0561

Panel B: Negative Returns

	< -1%	Not	*p-val*	< -2%	Not	*p-val*
N	465	3,293		136	3,622	
NextHPR	.20	.02	.0076	.31	.03	.0621
HPRDiff	1.98	-.28	.0000	2.99	-.11	.0000
GR3	.46	.09	.0012	.66	.11	.0275
GR5	.70	.15	.0001	1.09	.19	.0042
GR21	1.61	.81	.0028	2.90	.83	.0004
GR250	10.28	11.98	.0656	10.07	11.83	.3308

3c. Market Types

To more fully examine this issue, we consider two extreme market types: bull and bear. Specifically, we hypothesize, based on common practitioner sentiment, that security traders will follow different mantras given the nature of the market. For example, traders may be more likely to "buy the dips" during periods of general market increases (i.e., bull markets). Similarly, we also expect momentum following market rises to be more significant during bull markets, particularly considering that the prevailing mantra during bear markets may be "sell the rally."

For purposes of the analysis, we define a bull (bear) market as a rolling twelve-month period in which market returns, as measured by the S&P500, are greater (less) than 15% (-15%). While standard convention suggests a 20% move from peak to trough (or vice versa), our definition provides for a similar result in a more defined time period. Following this definition, we categorize the periods of May 1994 to November 1999 and April 2003 to June 2004 as bull markets, and March 2000 to March 2003 as a bear market. We report the results for the bull markets in Table 3 and bear market in Table 4.[3] For each, we continue to segment results for extreme positive initial return days in Panel A and extreme negative initial return days in Panel B.

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[3] Given the proximity of the time periods, GR250 is essentially irrelevant, as GR250 for initial return days in 2000 would span the bear market year of 2001. So, we can draw no conclusions from a comparison of GR250 between our bull and bear segments and therefore eliminate the variable from Tables 3 and 4.

Table 3: Univariate Analyses – Bull Markets

The following table presents summary statistics for bull markets (May 1994 to November 1999 and April 2003 to June 2004), segmented by extreme levels of daily returns. Panel A (Panel B) reports results for periods following highly positive (negative) return days. All variables are as defined in Table 1. Data come from the CRSP database.

Panel A: Positive Return

	> 1%	Not	*p-val*	> 2%	Not	*p-val*
N	250	1,476		47	1,679	
NextHPR	.13	.09	.4821	.19	.10	.5842
HPRDiff	-1.48	.25	.0000	-2.65	.07	.0000
GR3	.20	.29	.4087	.09	.28	.3586
GR5	.26	.49	.1116	.49	.46	.9331
GR21	1.89	1.90	.9750	2.75	1.87	.1356

Panel B: Negative Returns

	< -1%	Not	*p-val*	< -2%	Not	*p-val*
N	177	1,549		42	1,684	
NextHPR	.37	.06	.0010	.71	.08	.0112
HPRDiff	2.10	-.24	.0000	3.52	-.09	.0000
GR3	.66	.23	.0091	1.12	.26	.1727
GR5	1.18	.37	.0000	1.45	.44	.0119
GR21	2.76	1.80	.0068	4.53	1.83	.0003

Table 4: Univariate Analyses -- Bear Markets

The following table presents summary statistics for a bear market (March 2000 to March 2003, segmented by abnormal levels of daily returns. Panel A (Panel B) reports results for periods following highly positive (negative) return days. All variables are as defined in Table 1. Data come from the CRSP database.

Panel A: Positive Return

	> 1%	Not	*p-val*	> 2%	Not	*p-val*
N	160	613		58	715	
NextHPR	-.01	-.06	.7042	.02	-.06	.2340
HPRDiff	-2.04	.53	.0000	-2.86	.23	.0000
GR3	-.25	-.10	.5417	.22	-.16	.3670
GR5	-.08	-.26	.5200	.41	-.27	.1614
GR21	-.15	-1.24	.0307	.01	-1.10	.1742

Panel B: Negative Return

	< -1%	Not	*p-val*	< -2%	Not	*p-val*
N	186	587		73	700	
NextHPR	.07	-.08	.3072	-.02	-.05	.7660
HPRDiff	2.00	-.63	.0000	2.67	-.28	.0000
GR3	.32	-.28	.0109	.36	-.19	.0223
GR5	.36	-.41	.0114	.93	-.34	.0426
GR21	.46	-1.48	.0005	2.08	-1.34	.0032

Consistent with our expectations, we find that investors do appear to be more prone to buy the dips during bull markets. Specifically, the return on the day following highly negative (i.e., below -2%) initial return days is positive during the bull market and negative during the bear market (0.71% vs. -0.02%). Further, the significance level of the difference is much higher during the bull market, and this relation continues for *GR3*, *GR5*, and *GR21*.

Also in line with our hypothesis, we find that the momentum following positive return days is more significant during the bull market. For example, following days where the market has a positive return of at least 2%, the subsequent trading day exhibits a 0.19% return in bull markets, but only a 0.02% return during bear markets. This trend, however, is less pronounced for longer time periods following the initial market move, which is again consistent with our previous results.

Thus, our results indicate that beyond the direction of the initial return day, the trend (i.e., reversal or momentum) and significance of the subsequent market return is dependent on the general attitude—bullish or bearish—of the market. More specifically, reversals following negative days seem to be more pronounced in bull markets, as does the momentum following positive return days.

3d. Trading Strategies

The prevailing approach in the literature (and apparently with practitioners) is to go long following significant down days and short following significant up days, which is likely based on the fact that studies have shown reversals prevail in the short-run. Based on our results, however, we suggest that subsequent market movements, even short-term, are dependent on the direction (positive or negative) of the initial return day, implying that shorting following large up days may not significantly add to return. Thus, we propose two potential trading strategies that may improve portfolio performance by increasing return and/or reducing risk, relative to the traditional contrarian approach.

First, since reversals following down days are the most pronounced (as opposed to following up days), we suggest holding investable funds in cash and simply buying the market index at the close of a day on which the market significantly declines (below -1%). We propose holding the index for the following day, then liquidating and returning to cash. We also consider a similar approach, but we hold the index for one month (rather than one day) prior to liquidating the position. During periods when we are in cash, we assume that we will earn the risk-free rate, which we estimate using monthly T-bill returns.[4]

Second, since we identify differing movements (reversal or momentum) based on the initial return day (i.e., positive or negative), we also propose buying following both significant down days (below -1%) and up days (above 1%). Again, we suggest holding the positions for one trading day (or, alternatively, one month) and subsequently selling the position to return to cash. We define each of these strategies as follows, where each position is incepted following a movement of +/- 1% in the S&P500:

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[4] We collect T-bill return data from Ken French's website
(http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html).

Strategy 1   =   Buy following significant down days and short following significant up days (i.e., the traditional reversal approach). Hold position for one trading day.

Strategy 2   =   Buy following significant down days. Hold position for one trading day.

Strategy 3   =   Buy following both significant up and down days. Hold position for one trading day.

Strategy 4   =   Buy following significant down days and short following significant up days (i.e., the traditional reversal approach). Hold position for twenty-one trading days.

Strategy 5   =   Buy following significant down days. Hold position for twenty-one trading days.

Strategy 6   =   Buy following both significant up and down days. Hold position for twenty-one trading days.

We examine the same time period as in our previous analyses (i.e., January 29, 1993 to December 31, 2007), and we report the results of these strategies in Table 5, where we also include comparison values for the S&P500 and a simple risk-free asset. Panel A provides basic statistics for each strategy, and Panel B presents yearly returns and summary performance metrics. The Sharpe ratio, which we provide on both a daily and yearly basis, is the return of the portfolio (less the average risk free rate), divided by the portfolio's standard deviation. For each panel, we also rank the strategies (with 1 being highest) based on their Sharpe ratios. The Treynor ratio is similar, but the denominator is the beta relative to the S&P500. Each ratio measures return per unit of risk, so a higher value represents better risk-adjusted performance.

Beginning with the prevailing approach, Strategy 1 results in a return that is less than that of the overall market; however, as would be expected since the portfolio is held in cash for a large portion of the year, the standard deviation is lower—approximately half that of the market. Standardizing these values, it appears Strategy 1 provides a better risk-adjusted return, as both the Sharpe and Treynor ratios are higher. Further, comparing to the risk-free asset, this simple approach results in a portfolio value that is almost double that of the "cash" account over the period examined. Results for a one-month holding period (i.e., Strategy 4) provide different conclusions, however. This strategy generates lower daily returns and, subsequently, lower ending portfolio values, relative to the S&P 500. In addition, the daily volatility is slightly higher than the market, which results in a lower daily Sharpe ratio.[5] Annually, the risk-adjusted performance of this strategy is essentially equivalent to the market (based upon the annual Sharpe ratio). Thus, it appears this strategy is best suited for active traders who concentrate on extremely short-term periods (i.e., daily holding periods rather than monthly).

Based on these results, it appears the prevailing wisdom is, to some extent, correct. However, the question we consider is, 'can these results be improved by recognizing differences in momentum and reversal based on the direction of the initial market move?' Reviewing the alternative approaches we suggest, the answer appears to be yes. Specifically, buying following extreme down days (Strategies 2 and 5) *or* buying following both extreme up and down days (Strategies 3 and 6)

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[5] For one-month holding periods, we retain a position until the market experiences another extreme move, at which time we liquidate the existing position and enter another (based on the direction of the market movement).

both appear to dominate a simple S&P500 buy and hold approach, as well as the typical approach of buying following dips and shorting following rallies. For all four recommended strategies, the average return is higher than the overall market, and for the one-day holding periods (i.e., Strategies 2 and 3) the risk is also lower.

In all four cases, the resulting risk adjusted performance dominates the overall market, although it is most pronounced for the short-term holding period (i.e., only a single subsequent trading day). Thus, it appears that investors would be best served to recognize that a difference in market trends (i.e., reversal or momentum) may exist depending on the direction of the initial price movement and thus modify trading strategies accordingly.

Table 5: Portfolio Strategies

The following table presents results from mock trading strategies. Strategy 1 involves buying at close on days with <-1% returns and short selling on days with >1% returns, subsequently holding the portfolio for one trading day. Strategy 2 buys following only extreme down days; whereas, Strategy 3 involves buying following both extreme up and down days. Strategies 4-6 are similar to Strategies 1-3, respectively; however, we hold the portfolio for 21 trading days (i.e., one month) rather than one day. The risk-free rate is based on one month T-bills. Thus, when not in either a long or short position, the account is earning the risk-free rate. Panel A presents summary statistics, while Panel B presents annual returns. Data come from the CRSP database over the period January 29, 1993 to December 31, 2007.

Panel A: Summary

	Strategy 1	**Strategy 2**	**Strategy 3**	**Strategy 4**	**Strategy 5**	**Strategy 6**	**S&P500**	**Risk-Free Portfolio**
Average Daily Return (%)	.033	.043	.047	.021	.041	.046	.037	.017
Cumulative Return (%)	218.04	376.51	444.74	76.85	282.11	353.82	234.65	89.68
FV of $5,000 ($)	15,902	23,825	27,237	8,843	19,106	22,691	16,732	9,484
Average Daily Portfolio Value ($)	8,997	12,399	14,530	6,058	11,679	13,617	11,510	7,205
Daily volatility (%)	.650	.504	.652	1.058	1.026	1.051	1.024	.006
Sharpe Ratio	.025	.052	.046	.004	.023	.028	.020	
Sharpe Ratio Ranking	4	1	2	7	5	3	6	

Panel B: Yearly Returns

	Strategy 1	Strategy 2	Strategy 3	Strategy 4	Strategy 5	Strategy 6	S&P500
1993	3.49	4.67	5.26	5.18	7.55	4.92	6.31
1994	7.03	7.68	7.65	8.38	1.52	3.73	-1.54
1995	4.75	6.87	8.26	5.18	17.33	28.58	34.11
1996	.93	8.18	14.60	6.36	21.68	23.52	20.26
1997	10.82	25.49	38.29	19.21	36.47	43.95	31.01
1998	20.09	26.34	29.43	16.18	24.11	28.66	26.67
1999	4.17	11.29	15.88	4.99	16.47	20.37	19.53
2000	15.12	13.40	8.47	4.37	-3.62	-9.78	-10.14
2001	3.59	1.21	-4.12	-5.03	-12.07	-12.07	-13.04
2002	3.84	9.67	11.59	.25	-21.58	-21.58	-23.37
2003	23.67	29.38	32.57	6.76	27.90	28.18	26.38
2004	-.35	.10	-.48	5.17	9.97	10.69	8.99
2005	7.70	7.13	5.83	5.17	11.89	8.61	3.00
2006	-1.50	2.05	5.05	5.86	7.89	11.71	13.62
2007	21.03	16.29	9.75	10.89	10.12	9.98	3.53
Average	8.29	11.32	12.54	6.59	10.38	11.96	9.69
Standard Deviation	8.07	9.27	12.05	5.76	15.13	17.64	17.04
Sharpe Ratio	.485	.750	.678	.385	.397	.430	.312
Sharpe Ratio Ranking	3	1	2	6	5	4	7
Beta to S&P	.09	.24	.43	.21	.83	1.01	1.00
Treynor Ratio	36.56	26.33	17.53	7.57	6.48	6.89	4.69

Given our previous findings regarding the impact of different market cycles (i.e., bull vs. bear), we repeat the analysis of our proposed strategies segmented by bull and bear markets and report the results in Table 6. As before, the existing approach of buying following dips and selling following rallies (i.e., Strategies 1 and 4) appears to outperform the S&P during bear markets. In contrast, the opposite holds during bull markets. However, in both types of markets, we find that our recommended approaches, particularly those concentrated in the very short term (i.e., Strategies 2 and 3) provide positive risk-adjusted returns relative to the overall market. The findings, therefore, indicate that our strategies may be optimal, particularly for the shortest holding periods. This seems especially reasonable for bull and bear markets given that volatility is generally higher during these times, so the risk reduction associated with shorter holding periods is beneficial.

4. Conclusions

Existing studies document momentum and reversal effects embedded in baskets of individual securities, particularly over weekly, monthly, and yearly holding periods. We extend this line of research by considering whether similar movements exist in overall market returns over extremely short holding periods. Consistent with prior studies, we find subsequent return reversals following extreme negative return days; however, we add to the existing literature by documenting contrasting moves following extreme positive days.

Our results point to two possible trading strategies: (1) buying following extreme downward market moves or (2) buying following both extreme downward market moves and extreme upward market moves. Holding these positions for a single trading day (or to a lesser extent one month) then liquidating and remaining in cash for all other days results in a portfolio return that is higher than the broad market (as identified by the S&P500). Moreover, risk is lower, the combination of which results in a more favorable risk-adjusted performance.

We conclude by recognizing that the existing approach of buying following dips and selling following rallies is acceptable, in that it generally outperforms the average market return. However, our results point to the fact that a better approach is to recognize differences in market trends following extreme up and down days, as well as the impact of general market cycles (i.e., bull and bear).

Table 6: Portfolio Strategies: Bull and Bear Years

The following table presents results from the same mock trading strategies as in Table 5; however, we segment results for Bull (Panel A) and Bear (Panel B) markets. Points where cumulative historical SPY returns were consistently above (below) 15% (-15%) define the period as a bull (bear). Data come from the CRSP database over the period January 29, 1993 to December 31, 2007.

Panel A: Bull Years

	Strategy 1	Strategy 2	Strategy 3	Strategy 4	Strategy 5	Strategy 6	S&P 500	Risk-Free Portfolio
Average Daily Return (%)	.034	.056	.072	.003	.081	.098	.087	.0189
Daily volatility (%)	.527	.388	.523	.999	.951	.979	.942	.007
Sharpe Ratio	.029	.096	.102	-.016	.065	.008	.072	
Sharpe Ratio Ranking	5	2	1	7	4	6	3	

Panel B: Bear Years

	Strategy 1	Strategy 2	Strategy 3	Strategy 4	Strategy 5	Strategy 6	S&P 500	Risk-Free Portfolio
Average Daily Return (%)	.026	.029	.048	.024	-.044	-.046	-.050	.014
Daily volatility (%)	1.088	.862	1.505	1.088	1.503	1.505	1.475	.007
Sharpe Ratio	.011	.017	.023	.009	-.039	-.039	-.043	
Sharpe Ratio Ranking	3	2	1	4	5	6	7	

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