

BRC Investment Management LLC

Research Spotlight

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CONCEPTS

Momentum Returns Repeat Predictable Pattern

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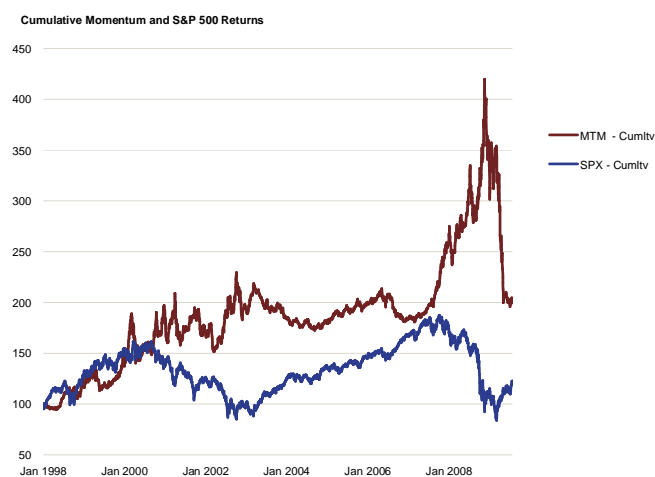
Historical Momentum Returns

To better understand the driving forces behind stock market returns, we have developed a proprietary database of quantitative factor returns which allows us to evaluate the types of stocks that investors prefer during various market environments. We keep track of dozens of different fundamental and quantitative factors for which we have calculated daily returns going back to 1998. For this research we are focusing on the returns to our Medium-term Momentum model (MTM). To calculate an individual stock's MTM score, we compare the historical price change for each stock in our large cap research universe to the S&P 500's price change over a period that begins 26 weeks prior to the analysis date and ends 4 weeks prior to the analysis date (we exclude the most recent 4 weeks of price return data in order to exclude shorter-term momentum effects). After calculating each stock's raw MTM score, we transform the result into a percentile rank that is calculated on an sector neutralized basis. Each day, we calculate the difference in average return between the 10% of stocks with the highest MTM ranks and the 10% with the lowest MTM ranks.

Since January 1998, we have found a slight positive

return bias toward stocks with high MTM scores. On an annualized basis, stocks in the highest MTM decile have outperformed the lowest decile by 6.2% per year. In other words, for over the past 11 ½ years, stocks whose prices have moved higher than their economic sector peers over the past six months, excluding the most recent month, have tended to continue outperforming by a significant margin before

Chart I: S&P 500 and MTM Returns - 1998 to 2009



	Total Return	Annual Return	Annual Std Dev
Momentum (D1 v D10)	99.4	6.2	18.0
S&P 500	21.9	1.7	21.9

transaction costs. (Our findings regarding positive medium-term momentum returns are consistent with various academic research efforts investigating similar phenomenon). Unfortunately, the small amount of outperformance for high momentum stocks is volatile. As shown on Chart I, the returns to our decile 1 versus decile 10 momentum portfolio are almost as volatile as the S&P 500 Index itself. Of the many factor portfolios we monitor, our MTM model returns are among the least stable.

Due to the widely observed long-term positive return bias enjoyed by high momentum stocks, some institutional managers have explicitly augmented their stock selection process in a way that increases the attractiveness of a stock as its momentum characteristics become more pronounced. During time periods when momentum is rewarded, this strategy can greatly enhance returns. When momentum is out of favor, however, the extreme volatility of the strategy can contribute to strongly negative relative returns. At BRC, a stock's momentum ranking is not included in any of our quantitative alpha models. However, our portfolio does tend to favor higher momentum stocks due to the nature of our analyst behavior prediction models. If our behavior models are performing well, we will be invested in stocks where security analysts are revising earnings upward. If investors respond to these revisions, our holdings will tend to outperform their peers and, as a mathematical consequence, our portfolio will tend to exhibit modest momentum exposures. Because of this incidental exposure to momentum, we have become interested in comprehensively understanding the returns to this factor.

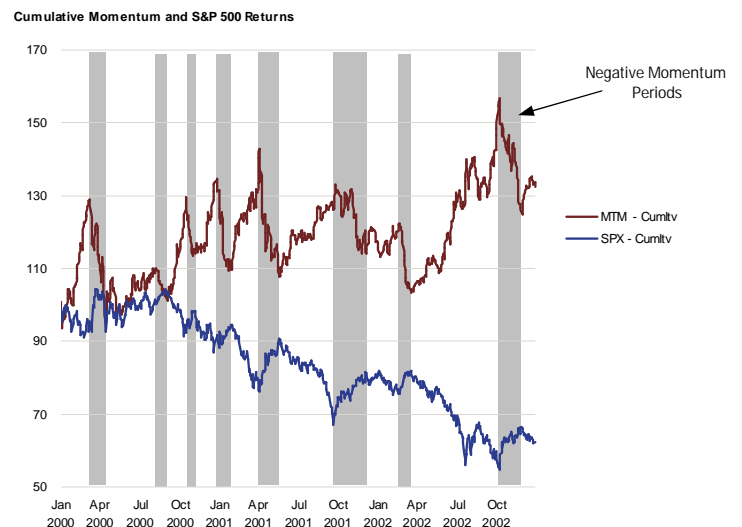
The returns for many stock characteristics (e.g. capitalization, yield, growth, etc.) appear to be mostly random through time. We believe momentum returns are an exception to this general rule. Our research suggests that returns to momentum are strongly influenced by aggregate investor risk preferences. As investors are subjected to the never ending cycles of enthusiasm, greed, fear, and panic, our research shows that investors' propensity to buy (or sell) high momentum stocks changes predictably. If investors are enthusiastic and optimistic about the future, high momentum stocks tend to outperform. Past positive price returns are seen as an indication of a successful stock and investors appear to expect that success to continue. If investors become panicked and pessimistic, high momentum stocks also tend to outperform because investors see past positive price returns (or less negative returns in the case of a collapsing market) as a

sign that a company's stock is holding up relatively well and will be able to weather the gathering storm.

Modestly positive returns to momentum fits well with our behavioral views of how investors extrapolate recent experiences into expected future results. What we find particularly interesting, however, are those periods when high momentum stocks perform poorly. If momentum returns turn negative, the effects can be extreme and managers who have either explicitly or implicitly biased their portfolio toward high momentum stocks can be very negatively affected. As a recent example, from March 6, 2009 through May 11, 2009, the return to our MTM model was -42.1%. In other words, if an investor purchased the top 10% of our large cap research universe based on momentum on March 6 (about 100 stocks) and simultaneously sold short the 10% worst stocks ranked on momentum, that investor would have lost more than 40% of their assets over the next 66 days, even though no market or sector risk was assumed. Considering most active managers attempt to add 2% to 4% of alpha per year, a two month factor return of over 40% could easily swamp any other characteristic a manager is trying to exploit.

Given the large potential impact of negative momentum returns, we have tried to uncover any patterns that may help us avoid, or at least manage, these volatile periods. Our search has led us to conclude that periods of strongly negative momentum returns are not random, but rather, appear to follow a predictable pattern. Chart II shows the returns for momentum and for the S&P 500 during the January 2000 to December 2002 period. During this three year span, we found eight episodes of dramatically negative momentum returns. These episodes are depicted as shaded areas

Chart II: S&P 500 and MTM Returns - 2000 to 2003

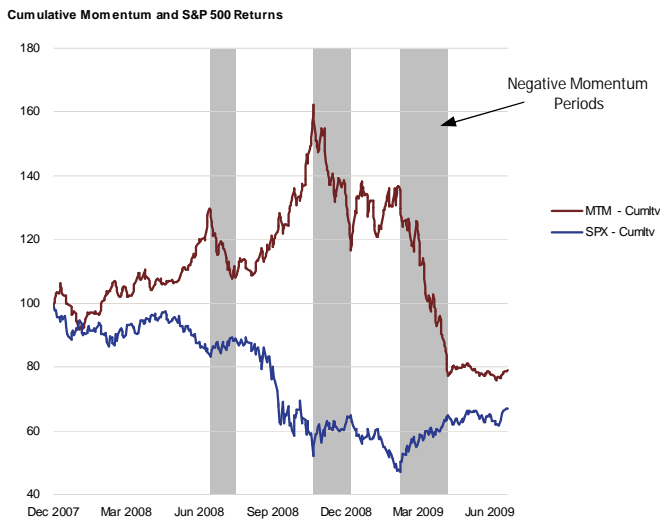


on the chart and even a visual inspection reveals that negative returns to momentum appear to coincide with particular market conditions. For seven of the eight periods, the episodes of negative momentum were immediately preceded by strongly negative market returns and were exactly coincident with a significant market rebound.

Recent Momentum Returns

From 2003 through June 2007 the overall market generally rose and most factor returns were relatively stable. In mid-August 2007, strong signs of financial stress emerged. From July 17, 2007 to August 16, the S&P 500 dropped nearly 9% and the VIX Index rose above 30% for the first time since mid-2003. Throughout the rest of 2007 volatility remained high and the market moved steadily downward. In March 2008, the collapse of Bear Stearns demonstrated dramatically the increasing fragility of our financial markets. Chart III depicts the returns for the S&P 500 and our MTM model over the January 2008 to July 2009 period.

Chart III: S&P 500 and MTM Returns - 2008 to 2009



Over the past 18 months, we have observed three separate negative momentum episodes (shown as shaded areas on the chart). Although the magnitudes of the momentum and market changes have been more extreme than in the past, the same pattern that we observed in the 2000 to 2003 period is clearly visible. Large negative momentum returns were all preceded by sharply declining market returns and were coincident with abrupt upward rebounds in the S&P 500.

When the market is in the midst of a fear-based decline, investors tend to sell stocks which have already declined the most. During this phase, momentum returns will be strongly positive and will tend to become increasingly positive as the crisis worsens. At some point, however, the freefall of the market and the asymptotic rise in momentum can not be sustained and the market will bounce upward (e.g. November 21, 2008 and March 9, 2009).

Behavioral psychologists have observed that individuals become more risk seeking when they have experienced loss. In the context of the equity market, when investors have suffered dramatic price declines, they become unusually willing to buy risky stocks in an effort to restore their wealth to past levels. This doubling-down mentality leads investors to gamble by purchasing stocks that were hurt the most in the previous decline regardless of underlying fundamentals or quality characteristics. Stocks that crashed the most during the market's decline temporarily appear to be the most attractive vehicles available for regaining lost ground.

Negative Momentum Cycles

Table I describes the character of the most recent nine large negative momentum periods.

Table I: Medium-term Momentum (MTM) Reversal Periods

Start	End	Number of Days	S&P 500 Return	MTM Return	S&P 500 Prior 60 Days	MTM Prior 60 Days	SP 500 vs MTM 20D Correl	
3/9/2000	4/14/2000	36	(3.1)	(25.8)	(2.6)	33.4	(0.02)	
8/11/2000	9/5/2000	25	2.5	(7.5)	2.0	7.3	(0.02)	
10/18/2000	11/2/2000	15	6.5	(12.4)	(9.9)	22.5	(0.08)	
12/27/2000	2/1/2001	36	3.5	(17.8)	(3.5)	13.7	0.31	
4/4/2001	5/22/2001	48	18.9	(24.2)	(18.1)	24.8	(0.64)	
9/27/2001	11/27/2001	61	13.1	(13.9)	(15.3)	12.2	(0.22)	
2/22/2002	3/21/2002	27	6.0	(14.3)	(4.6)	0.7	(0.32)	
10/9/2002	12/2/2002	54	20.6	(20.3)	(14.2)	11.7	(0.78)	
7/14/2008	8/11/2008	28	5.5	(15.6)	(12.5)	21.5	(0.24)	
11/20/2008	1/6/2009	47	16.3	(24.7)	(39.8)	43.5	(0.74)	
3/6/2009	5/11/2009	66	33.8	(42.1)	(26.2)	7.0	(0.92)	
		Average	40	11.2	(19.9)	(13.1)	18.0	(0.33)

From this table, we can see that negative momentum periods are often preceded by several shared conditions:

- *Negative market returns* – the S&P 500 declined an average of -13.1% over the 60 days preceding a negative momentum episode
- *Very positive momentum returns* – sharp market declines induce broad fear which in turn leads investors to sell stocks which they perceive to be the most susceptible to further declines. During this crisis phase, stocks whose prices have dropped the least appear most attractive. Momentum returns for the 60 days preceding a negative momentum event averaged +18.0%

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For over 20 years, the investment professionals at BRC have established a reputation for quality investment counsel and exceptional returns. Through the technological and fundamental expertise of our investment team and staff, BRC will strive to maintain its position at the forefront of quantitative, fundamental and behavioral portfolio management techniques.

- *Increased negative correlation between the S&P 500 and momentum returns* – for the past 12 years the average 20-day rolling correlation between momentum and the market has been almost exactly zero. During periods of crisis and high volatility, stocks become increasingly driven by easily identifiable characteristics such as price momentum. At the onset of the momentum reversal periods we analyzed, the average 20-day correlation between the market and momentum was -0.33

Fortunately, the duration of negative momentum events has never been very long. While investors appear willing to gamble on negative momentum stocks in the very early stages of a market rebound, they appear unwilling to continue buying these types of stocks as the market stabilizes or continues higher. The average duration of the nine negative momentum periods we studied was only 40 days with the longest being 66 days for the most recent period. We believe negative momentum periods are short-lived because ultimately individual and professional investors are not comfortable holding stocks that have struggled in the

recent past. Negative momentum stocks typically have experienced poor price performance for a reason. These companies often have long-term fundamental problems relating to profitability, sales growth, management skill and other factors. Since institutional investors are required to report their holdings to regulatory authorities and their clients at least quarterly, a continual strategy of buying past losers might be awkward to explain to current and prospective clients.

Our research into the behavior of high momentum stocks leads us to conclude that negative momentum returns are not random but are rather indications of changing investor risk appetites. By foreseeing when periods of negative momentum returns are more likely to occur, investors can better manage momentum risks in their portfolios by avoiding stocks with high momentum characteristics. Given how dramatic returns to momentum can be, even small modifications in a portfolio's exposures can have a significant impact on subsequent relative returns.

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