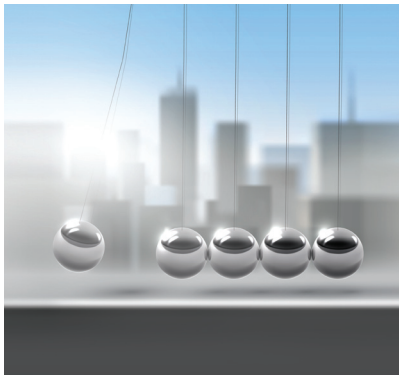
Momentum's Role as a Driver of Stock Prices

By Charles Rotblut

Article Highlights

- The concept of momentum is based on relative price strength, which compares the return of an asset to a benchmark such as the S&P 500 index or all stocks.
- Stocks with high levels of relative strength have been shown to continue outperforming, though there isn't a consensus as to whether this reflects investor behavior or perceived company risk.
- Diversification benefits can be realized by combining momentum with value strategies; doing so can reduce both volatility and portfolio turnover.



The momentum factor is based on the price change of a stock over a specified period relative to all other stocks.

It is considered to be an anomaly or a risk factor in the analysis of stock returns because stocks with high relative levels of momentum tend to continue to outperform, while stocks with low relative levels of momentum tend to continue underperforming. Momentum can have higher levels of turnover and, like other anomaly-based strategies, have periods of underperformance.

In this article, I discuss the research on momentum and its long-term record of performance. Included in this discussion is why momentum is not merely for those who rely on technical analysis and why, as well as when, momentum strategies can crash. I then discuss why it makes sense to pair momentum with valuation in a strategy.

While some of the discussion may come across as being academic in nature, it will help you to have a better understanding of what momentum is, how researchers look at it and the role it can play in a portfolio. It will also help you better assess whether or not you want to incorporate momentum into your own stock investing strategy.

Relative Price Strength

The concept of momentum rests on relative price strength. Relative price strength (also referred to as relative strength) is the return of an asset relative to another asset or group of assets. If shares of Acme Inc. appreciate by 10% and shares of Gizmo rise by 8% over the same period, Acme will have better relative strength. Its stock performed better than Gizmo's stock did.

Relative strength indicators don't just compare the returns of two stocks, but the performance of a security or fund against an index of its peers. AAII's *Stock Investor Pro* fundamental stock screening and research database program (www.aaii.com/stock-investor-pro) calculates relative strength two ways: compared to the S&P 500 and compared to all stocks. It shows relative strength as the percentage change in a stock's price and as a rank. The stocks with lowest relative strength will have a rank of 0% and those with the highest relative strength will be assigned a rank of 100%.

Relative strength reveals nothing about the direction of a stock's price; a stock can decline in price and still have a high relative strength score. At the end of February 2009, there were many stocks in the top quartile of the best 26-week relative strength with a negative six-month return.

How was this possible? Let's take another look at the definition of relative strength. Relative strength compares the price performance of one asset to another or to a group of assets over a period of time. It calculates whether or not a specific asset performed better or worse than the chosen benchmark. Because it looks at relative performance, a stock (or any other asset) can have a good relative strength score and a declining price over the measured period of time if the benchmark fared worse.

Similarly, a stock could have a rising price and weak

relative strength. Acme's 10% return isn't very good if the market gained 20% over the same time period. Yes, the stock rose in price, but in comparison to the broader market, it did not fare so well. Relative strength looks to see how a stock performed relative to a benchmark—not the direction of its price movement.

The Momentum Factor

The identification of momentum, measured by relative strength, as a driver of price returns is credited in academic circles to Narasimhan Jegadeesh and Sheridan Titman. I bring this up because to understand momentum's role in a stock investing strategy it is useful to understand the broader scope of existing theory regarding stock price returns.

Both academics and practitioners have sought to identify what drives a stock's price, particularly what causes a stock's price to vary from what would be explained by the capital asset pricing model (CAPM). The CAPM holds that expected returns are the premium over a risk-free rate and a stock's volatility. Among the most-cited studies on the subject are "The Cross-Section of Expected Stock Returns," published by Nobel laureate Eugene Fama and Kenneth French in The Journal of Finance in June 1992 and their subsequent "Common Risk Factors in the Returns on Stocks and Bonds," published in The Journal of Financial Economics in January 1993. The 1993 paper introduced a three-factor model. The model held that valuation, market capitalization and market risk "do a good job of explaining the cross-section of average stock returns." In 2014, Fama and French expanded their model to include profitability and company investment patterns ("A Five-Factor Asset Pricing Model," published in the April 2015 issue of the Journal of Financial Economics).

The idea is that there are specific drivers of stock price returns, or risk factors, beyond just the stock market's return and a stock's beta (a measure of its volatility relative to the market). Stocks with lower valuations—as a group—tend to outperform stocks with higher valuations, for instance. By exploiting the various risk factors, higher portfolio returns can be achieved. This approach is the basis of smart beta strategies, which select and allocate stocks based on one or more risk factors.

Soon after Fama and French published their papers, Jegadeesh and Titman introduced momentum as a risk factor with their paper, "Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency" (The Journal of Finance, March 1993). Jegadeesh and Titman wrote, "Our analysis of NYSE and Amex stocks documents significant profits in the 1965 to 1989 sample period for each of the relative strength strategies examined." They then added, "The results of these tests are not due to the systematic risk of the trading strategies."

The observations were key in the world of investment theory. Jegadeesh and Titman concluded that not only was there an observable pattern of returns related to relative price performance, but also that the performance could not be explained by volatility. They further ruled out size as a factor, finding the success of relative strength strategies not being "confined to any particular subsample of stocks." In other words, the link between relative strength and stock price returns could not be explained by the Fama-French model. More so, it was another identifiable anomaly to the CAPM.

Four years later, Mark Carhart expanded on Jegadeesh and Titman's work. In "On Persistence in Mutual Fund Performance" (Journal of Finance, March 1997), he introduced a four-factor model that assigned the proportion of average return attributable to volatility (high- versus low-beta stocks), size (large versus small capitalizations), valuation (value versus growth) and momentum (one-year momentum versus contrarian stocks). Put another way, he expanded Fama and French's model to include momentum.

Carhart argued that his four-factor model explained most of the difference in returns among mutual funds. He specifically found that the capitalization of the companies and the one-year price momentum of the stocks invested in by a fund could mostly explain its performance. Twelve-month momentum alone accounted for nearly half of the difference in monthly returns between the best-performing 10% of mutual funds and the worst-performing 10% of mutual funds.

While chartists may have previously long looked at momentum, the work of Jegadeesh and Titman and, later,

Calculating Relative Strength

The most basic means of calculating relative strength is by dividing the percentage price change of a stock over some time period by the percentage change of a market index over the same period. Using a four-week trading period as an example, the four-week relative strength calculation in *Stock Investor Pro,* AAII's fundamental stock screening and research database program, uses the percentage change in the stock price and the S&P 500 index between the latest (Friday) close and the Friday close 20 trading days prior (assuming no holidays).

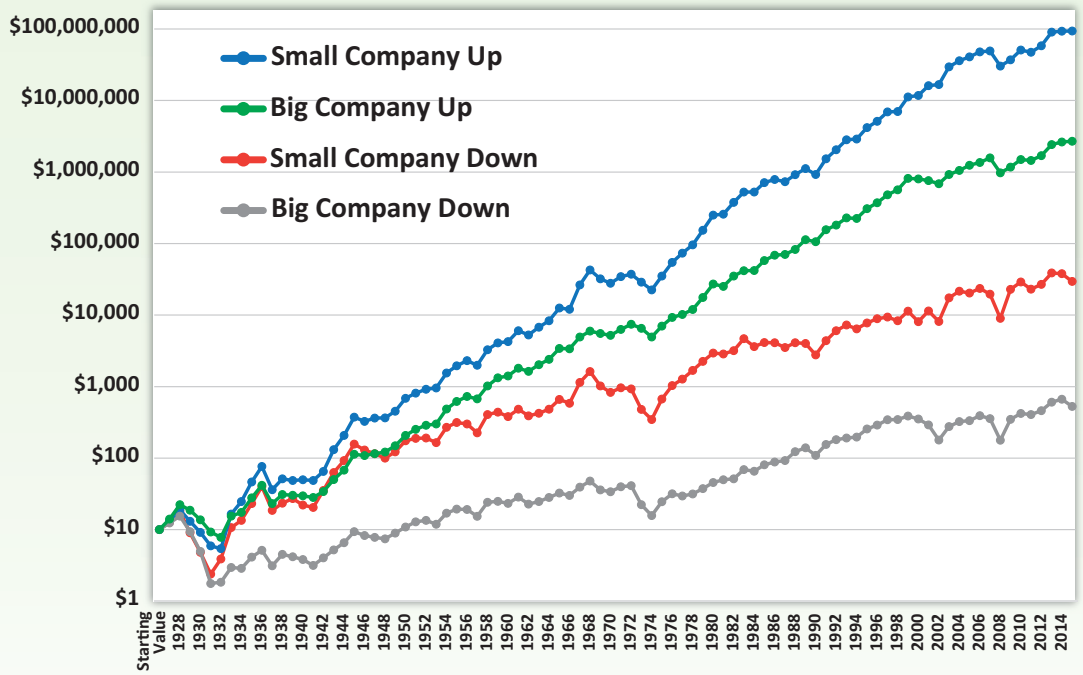
Relative strength may be reported with a base level of zero or one; the base level represents stock price performance equal to the index. Numbers above the base level reflect stock performance above the index, while below-market performance is portrayed by figures below the base level.

Another way relative strength is communicated in *Stock Investor Pro* is through percentile ranks. Percentile rank shows you how a particular company compares to all the companies in the database.

To learn more about relative strength measures, see John Bajkowski's AAII Blog post, "A Look at Relative Strength Measures," at blog.aaii.com/a-look-at-relative-strength-measures.

Carhart confirmed its existence in academic circles. The implication of their research is that momentum is as important a characteristic to seek in a stock as value, size or volatility are. In other words, momentum is not merely for short-term traders and those who rely on technical analysis, but also for those who focus on fundamental analysis.

Figure 1. Long-Term Performance of Momentum (1927–2015)



This chart shows the performance of portfolios tracking both small and large companies. The portfolios are formed monthly based on the relative performance for stocks over the period of 12 months prior through two months prior. The Up portfolios contain stocks whose relative price performance ranks in the top 30% based on NYSE percentiles, and the Down portfolios contain stocks whose relative price performance ranks in the bottom 30%. The monthly size breakpoint is the median NYSE market equity.

Source: Kenneth French Data Library.

Why Does Momentum Work?

Though the concept of momentum is accepted in academic and practitioner circles, there is not an agreement as to why momentum works.

Some research has linked it to earnings news. Jegadeesh and Titman estimated that the periods around earnings announcements accounted for about 25% of portfolio returns over their holding period. Such an influence could occur if a company issues better- or worse-than-expected results. Investors anchor their opinions to past expectations and are often slow to adjust their opinions to the new evidence. This lag is evident in strategies incorporating earnings estimate revisions. As analysts adjust their profit forecasts, stock prices will rise or fall. The reaction can last several quarters.

Scott Bennett, the director of equity strategy and research at Russell Investments, theorized that momentum reflects herding behavior on his company's blog ("Momentum Strategies: Knowing When to Leave the Party," October 2015). He said investors with limited information will favor what's popular and what's outperformed recently. This fits within the theory of investors preferring winners over losers, as well as behavioral tendencies such as recency bias, which is the tendency to think current trends will continue into the future.

Cliff Asness, Andrea Frazzini, Ronen Israel and Tobias Moskowitz had a different take, saying "the jury is still out on whether momentum is a behavioral or risk-based factor" ("Fact, Fiction, and Momentum Investing," Journal of Portfolio Management, Special 40th Anniversary Issue, 2014). They argue that both theories provide good reasons why the premiums should exist. Behavior would be a reason if there was an underreaction, a delayed overreaction or both to new information. I would add that risk would be a reason if investors believed momentum stocks face greater cash flow risk or incur a higher cost of capital. Risk would also arguably be a reason if the higher valuations and/or price momentum increased expectations for good future results, creating a greater opportunity for the company to disappoint.

How Well Does Momentum Work?

One of the advantages of having momentum recognized as a risk factor is that it is now being tracked. It is among the factors Kenneth French maintains long-term return data for on his website at mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html. All of his data can be downloaded for free.

Figure 1 shows the long-term performance of momentum. It tracks four portfolios: small company up and

down and large cap up and down. The Up portfolios contain stocks whose 12-month returns rank in the top three deciles (top 70% and higher), while the Down portfolios contain stocks whose returns rank in the bottom three deciles (bottom 30% and lower). All portfolios are equally weighted, meaning large companies do not have any more influence on the returns than their smaller peers do. The data uses annual returns for the period of 1927 through 2015.

As Figure 1 shows, there is significant differential in returns. Small Company Up returned 19.8% on an annualized basis versus 9.4% for Small Company Down. Large Company Up returned 15.1% on an annualized basis versus 4.6% for Large Company Down. The use of "up" and "down" comes from academic research, which often calculates the return differential from momentum as up minus down, or simply UMD. (It is also common to see winners minus losers as WML for momentum, small minus big as SMB for company size, and high minus low as HML for valuation. HML uses book value to market value, which is the inverse of the price-to-book ratio, so a low HML number implies a lower valuation.)

Those who question the use of nearly 80 years of return data to show the efficacy of momentum can download the spreadsheets and select any time period they prefer. The numbers will still favor momentum over long periods. For example, restricting the data to the post–World War II era shows a UMD advantage for small-company stocks of 11.6% (19.4% versus 7.8%) and a UMD advantage for large-company stocks of 9.6% (15.5% versus 5.9%).

Keep in mind that these are averages. Some stocks with good momentum have lagged or will lag in the future. Similarly, some stocks with bad momentum have done well or will do well in the future.

It's also worth noting how momentum is calculated in academic studies. A one-month lag is used by many. French's data uses an 11-month window, from two to 12 months prior with the last month skipped. In the details accompanying his data, French wrote, "To be included in a portfolio for month t (formed at the end of month t–1), a stock must have a price for the end of month t–13 and a good return for t–2." In an email, he further explained, "We use an 11-month window, from –2 to –12 months."

Jegadeesh and Titman used a smaller lag of one week. Their rationale for doing so was to avoid issues involving bid-ask spreads, pricing pressures and lagged reaction effects.

The rationale for excluding the most recent month comes from Jegadeesh. In "Evidence of Predictable Behavior of Security Returns" (The Journal of Finance, July 1990), he found a reversal in prices occurred at one-month intervals. Over the longer periods such as 12 months, the trend is likely to be continued with a change bigger than regression (a form of statistical analysis) would imply. Some other researchers have noted that a one-month lag also eliminates errors related to the bid-ask spread, though Jegadeesh did not find the bid-ask spread to have a significant influence on his findings.

In "What Works on Wall Street" (McGraw-Hill, 2011), James O'Shaughnessy calculated returns without incorporating a lag. His findings show a performance advantage to using both six-month and 12-month relative strength. In both cases, stocks whose relative strength rank was in the top 50% outperformed the all-stock universe. Stocks with relative strength in the top 30% or higher had annualized returns of approximately 12% or higher versus 10.5% for his all-stock universe. O'Shaughnessy's data is for the period of 1927 through 2009.

Momentum's Use in AAII Stock Screens

Several of more than 60 stock screens on AAII incorporate momentum through the inclusion of relative strength as an indicator. Here is a sampling of AAII screens that use momentum and that also rank among the top screens in terms of annualized return since inception (as of March 31, 2016).

- **O'Shaughnessy Tiny Titans**
  Requires 52-week relative strength rank of at least 85%, along with a price-sales ratio below 1.0 and a market capitalization between 25 and 250 million.
- **O'Neil's CAN SLIM**
  Requires 52-week relative strength rank of at least 70%, a share price within 10% of the 52-week high and earnings growth for each of the past four years.
- **Stock Market Winners**
  Requires four-week relative strength rank of at least 70%, a share price within 15% of the two-year high, recent quarterly earnings growth profitable on a pretax basis, and a price-to-book ratio no higher than 1.5.
- **Value on the Move—PEG with Estimated Growth**
  Requires 26-week relative strength rank of at least 70%, price-earnings to five-year estimated growth (PEG) ratio between 0.2 and 1.0, profitable for each of the past five years and recent earnings growth.

Duration and Turnover Are Concerns

Though momentum has been shown to lead to good returns, it's not appropriate for every strategy. Its downsides can give investors reason for pause.

Momentum does not have staying power on an aggregate basis. While some stocks can retain high levels of relative strength for an extended period of time, relative outperformance is fleeting for others. Both Jegadeesh and Titman, as

well as Carhart, found momentum's advantage to wane after a period of one year for the average stock.

Due to the lack of staying power, turnover can be high. Gregg Fisher estimated a holding period of about four months for stocks held in a monthly rebalanced, long-only stock portfolio ("The Trouble With Momentum and What to Do About It," Gernstein-Fisher Viewpoints, September 2015). This equates to about 300% turnover annually.

Others have also noted high rates of turnover. Research Affiliates warned "turnover of close to 100% is required" to "squeeze the highest performance out of a momentum strategy" ("How NOT to Wipe Out With Momentum," Research Affiliates Fundamentals, September 2015). Even Jegadeesh and Titman found the most successful momentum strategy involved holding stocks for just three months.

In "Fact, Fiction, and Momentum Investing," Asness et al. point to studies showing momentum having "five to six times the annual turnover as value." They then counter that momentum still has a similar tax burden as value. The reason has to do with what momentum favors: losers are sold, while winners are held. To the extent that short-term losses are captured and long-term capital gains are realized, the tax impact of higher turnover is reduced. Further, their analysis did not consider any smart-trading strategies, which can reduce the impact of taxes further.

Momentum Strategies Can Crash

A far bigger concern with momentum is the potential for the risk factor to backfire or "crash." This occurs when stocks with the worst past relative performance (e.g., over the past 12 months) outperform those with the best relative performance. Returns are adversely affected by buying winners and selling or avoiding losers.

In their working paper, "Momentum Crashes" (National Bureau of Economic Research, August 2014), Kent Daniel and Tobias Moskowitz said there have been "a number of long periods" where momentum not only didn't work, but it underperformed in a significant manner. They specifically found such occurrences following a significant reversal in market direction. "Fourteen of the 15 worst returns occur when the lagged two-year market return is negative. All occur in months where the market rose contemporaneously, often in a dramatic fashion," observed Daniel and Moskowitz.

Specific examples are June 1932 through December 30, 1939, and March 2009 through March 2013. In both periods, the markets rebounded off of what had been dramatic declines. The former was the 1929 crash and its aftermath (which included the Great Depression) and the latter was the 2007–2009 financial crisis.

Momentum crashes are caused by a shift in sentiment. The past losers rise at a faster pace than the past winners do. Put another way, the losers experience more volatility—with the volatility oriented toward the upside. (Volatility is the variance around an average number or trend, not the direction of the variance, as is often mistakenly perceived.) Daniel and Moskowitz refer to this as losers "crashing up." This crashing up results in underperformance for past winners and negative returns for a portfolio that is long past winners and short past losers.

Combine Value With Momentum

One way to mitigate the downsides of momentum is to combine it with value. This diversifies the portfolio by risk factor or, more intuitively, by style.

Momentum can be fast-moving. As has been discussed throughout this article, it seeks out stocks that are currently doing well from a return standpoint. A stock that is outperforming the market can be reflective of an expectation that the business is doing well and/or may improve in the foreseeable future. Investors may be attracted to such stocks because of the good returns. As such, valuations tend to be higher.

Value, in contrast, can be slow-moving. It seeks out stocks whose valuations are below the market's average. The lower valuations can reflect concern about the business not doing well or unlikely to realize better-than-forecast rates of return. Such stocks may be overlooked as investors fret about whether the valuation is cheap for a reason or if these stocks are more risky. As such, the relative strength can be lower.

From a quantitative standpoint, momentum and value are negatively correlated. Clifford Asness et al. found value to have a –0.4 correlation with momentum. To put this number into perspective, a correlation of 1.0 would imply that the two styles move in lockstep, a correlation of –1.0 would imply they move in opposite directions, and correlation of 0.0 would imply they move independently of each other. The correlation of –0.4 suggests that momentum and value lean towards being independent, but when one zigs, the other may have a tendency to zag.

Due to this lack of correlation, combining momentum with value results in diversification benefits. It not only helps to offset momentum crashes, but it can also reduce both volatility and turnover. Gregg Fisher, Ronnie Shah and Sheridan Titman found portfolios using a 50% value/50% momentum mixture had less volatility and lower turnover then a pure momentum portfolio in their forthcoming Journal of Investment Management article "Combining Value and Momentum." Depending on whether large- or small-cap stocks were held and the buy and sell rules followed, absolute returns and risk-adjusted performance (as measured by the Sharpe ratio) were as good as or better than stand-alone value or momentum strategies.

It should be added that it's more important to incorporate value and momentum strategies rather than to seek the exact optimal mix. While Fisher et al. used a 50/50 mix, Asness et al. looked at a 60/40 value/momentum portfolio. Using French's dataset, they found this mix "effectively eliminated crashes in our long-term sample evidence—and

(continued on page 16)

business quality, financial reports often contain innumerable subtle clues about the sustainability and predictability of earnings growth, cash flows and returns on capital. They also occasionally reveal chicanery, eliminating a company from contention as a quality investment.

A perennial challenge that investors face is earnings management, which a 2012 academic study found is pervasive: one-in-five public companies misrepresent earnings by an average of 10%. Accounting shenanigans can manifest in many ways, including premature revenue recognition, inflated gross margins, improperly capitalized expenses, depleting reserves and manipulating cash flows. Many of these areas include some degree of judgment. However, when these judgments start to move beyond the realms of reasonableness, it is usually a mistake to ignore them: Such accounting red flags can be powerful indicators that the underlying business is also deteriorating.

The Endowment Effect

The quality-investing method of conducting rigorous fundamental analysis and holding for the long term creates one final pool of mistakes arising from what behavioral economists call the endowment effect—an overappreciation of things already owned compared to other opportunities.

Quality investing is particularly susceptible because the considerable upfront research and extensive winnowing increases the endowment effect: The investor's sense of ownership encompasses not just the stock, but also their analysis and judgment. The emotional connection amplifies with time, increasing susceptibility the longer a stock is owned. The endowment effect may manifest itself when an investor continues to own a stock despite a drumbeat of negative events revealing a deterioration of the company's fundamental economic characteristics. One strategy to combat this is to ask whether, with a fresh start, you would still buy the same company today.

As with other sources of challenges and mistakes catalogued in this article, the endowment effect also plays a positive role in quality investing. It strengthens resolve amid relentless but erroneous pressures to sell. The competing factors therefore call for alertness above all.

Conclusion

A long-term strategy must be finely balanced against the recognition that things can, and will, change. All companies evolve to some extent, and closely monitoring such evolution is an essential part of the investment process. ▲

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(continued from page 11)

not just those for momentum, but also the crashes that can occur for value investing."

The French data identifies value as stocks trading at low price-to-book (P/B) ratios, segmenting stocks based on breakpoints for NYSE-listed stocks. An alternative method is to seek out stocks with high levels of shareholder yield and strong price momentum. Shareholder yield is the combination of dividend yield and buyback yield. In "What Works on Wall Street," O'Shaughnessy found this to be an effective strategy.

Conclusion

Regardless of the mix, it is important to realize that no strategy will work 100% of the time. While momentum and value are negatively correlated, during turbulent market conditions, correlations rise. More importantly, during a bear market even stocks with high levels of relative strength can still have negative returns. During such periods, it is useful to realize that over the long term, momentum has been correlated with higher returns. ▲

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