

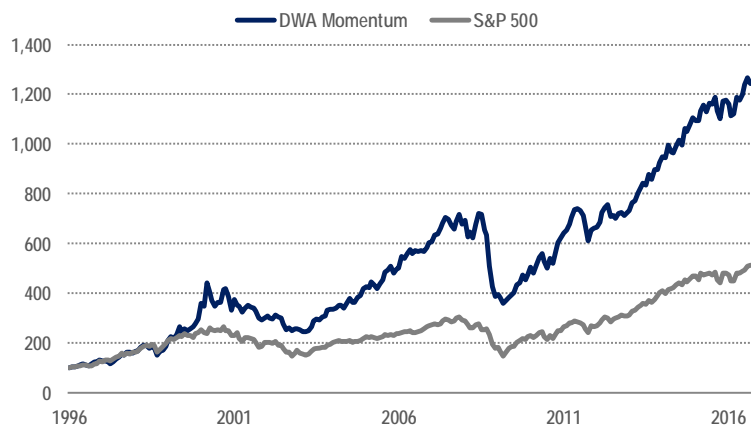
# Special Report

## DWA US Sector Momentum Index

### In this report:

- Momentum-based investing has a long and varied history, but translating a momentum strategy into a rules-based index is challenging. Some methodologies result in dangerous sector concentrations, while others hew so closely to the broad market indices that they don't seem much like momentum strategies at all.
- The Dorsey Wright Associates (DWA) US Sector Momentum Index overcomes these drawbacks by adding a sector overlay to momentum-based stock selection methodology, allowing investors to focus on areas showing recent momentum while maintaining prudent diversification.
- Our analysis of index composition and performance concludes that the DWA US Sector Momentum Index is worthy of investors' consideration as an alternative to more established momentum indices, and may be particularly well suited to an environment where sector leadership persists for some time.

**Figure 1: Performance Returns Since 1995 (rebased)**  
*DWA US Sector Momentum vs. S&P 500*



*Note: Monthly total returns, rebased, 12/31/95 = 100, thru 10/31/2016. Figures subtract expenses of applicable ETF from index data quoted on Bloomberg as follows: DWA Momentum (40bp) and S&P 500 (9.5bp). Returns for the DWA Momentum Index are based on pre-inception performance data as supplied by the index provider.*

**Past performance does not guarantee future results.**

*Source: Bloomberg and AltaVista Research*

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## Factor funds: Not your father's index fund

The growth and popularity of index funds—first index mutual funds and more recently exchange traded funds (ETFs)—have made it easy and cheap to own the market. However, recent innovations mean that investors are no longer limited to funds tracking well-known broad market indices, and some have objectives that are in fact very different. One of the biggest innovations has been the development of *factor-based* indices that combine aspects of stock selection with index investing in an effort to create a “better” index.

Well-established investment factors that these new indices—often referred to as “Smart Beta”—seek to target include quality, value, size and momentum. Investing for quality means a preference for companies with solid earnings growth and healthy balance sheets, etc., while value investing seeks out stocks selling for low valuation multiples. Size is a focus on market cap (i.e., small caps) while momentum focuses on holding stocks that have recently been performing well, and avoiding those that haven't.

One thing all these factors have in common is that there are no hard rules on exactly which stocks qualify as meeting a particular factor. Opinions are what make a market, and one investor's value stock is another investor's “value trap.”

### Translating a factor-based strategy into a rules-based index is challenging

An active manager may use skill and intuition from years of experience to screen and select stocks that qualify for the particular factor being sought. However, translating a factor-based strategy into a rules-based index is challenging. The index provider must codify a methodology describing how stocks are selected, weighted and periodically rebalanced.

Differences in methodology for constructing portfolios based on the same factor can result in dramatically different index compositions. This paper examines three different momentum indices, and looks at how differences in methodology result in very diverse outcomes in terms of allocation, fundamentals, valuations and, of course, performance.

## Foundations: Index Construction Methodologies

Because an index is based on a set of rules that determine its makeup, understanding these rules is key for investors in selecting the funds most suitable to their needs. Seemingly minor differences in universe, selection criteria and weighting can significantly alter the composition of an index and therefore its overall investment potential.

Before proceeding we define these key terms. Universe means the entire population of stocks eligible for inclusion in an index. It can be as wide as all the stocks in the world, but typically is a smaller set such as “U.S. large caps.” Selection criteria determine which stocks from the broad universe are to be included in the index, and weighting determines the importance of each component in the overall index.

By examining the construction methodologies of a representative index in each category we can shed some light on its investment characteristics. In general what we find in the analysis that follows is that stock-selection strategies exhibit momentum qualities as advertised, but they can also have risky concentrations that reduce the diversification benefit of index investing. Weighting strategies, on the other hand, may not be sufficiently different from the cap-weighted indices from which they are drawn, thus lacking the momentum characteristics investors expect. In contrast, the sector overlay strategy delivers an index with distinct momentum qualities while also maintaining prudent levels of diversification.

Thus differing strategies can have a major impact on overall composition and performance, both past and potential. Below, we examine three different approaches to momentum-based indices in detail.

**Differing strategies have a major impact on overall index composition and performance**

## Momentum Indices: Three Approaches

Although there are more than a dozen momentum-based indices published in the U.S. (we counted eighteen), each with their own variations on the concept, we examined three that broadly characterize the different approaches to constructing a momentum index (Table 1). Throughout this study we use the S&P 500 as a benchmark for comparison.

The **MSCI USA Momentum Index** uses stock selection as the primary index construction criteria, while the **S&P 1500 Positive Momentum Tilt Index**, makes stock weighting the primary focus of the index rules. The new **DWA US Sector Momentum Index** takes a third approach by applying a sector overlay to its stock selection criteria. Exchange Traded Funds are available tracking each of these indices, giving investors an easy way to implement any of the strategies.

**Table 1: Momentum Index Strategies**

| Strategy | Stock Selection         | Stock Weighting                       | Sector Overlay               |
|----------|-------------------------|---------------------------------------|------------------------------|
| Index    | MSCI USA Momentum Index | S&P 1500 Positive Momentum Tilt Index | DWA US Sector Momentum Index |

*Note: For brevity and readability, in the text we may refer to an index by the index provider and the word “Momentum.” For example, “DWA Momentum” refers to the DWA US Sector Momentum Index.*

*Source: AltaVista Research as of 12/31/17.*

### Stock Selection: MSCI USA Momentum

MSCI’s entry into the momentum index space is the MSCI USA Momentum Index, which draws constituents from the MSCI USA Index, a broad, cap-weighted index consisting of about 630 stocks and covering approximately 85% of U.S. market capitalization.

Stock selection is the primary criteria in constructing the index. All stocks in the broad MSCI USA Index are ranked according to the average of their six- and twelve-month risk-adjusted returns, as measured one month prior to the rebalancing date. This means that the most recent returns—and any new information they might contain—are not considered.

**Properties at a Glance:  
MSCI Momentum Index**

- **High conviction**
- **May be concentrated**
- **Momentum data may be stale at rebalancing**

Those stocks with the highest rankings are then selected as constituents for inclusion in the Momentum index, according to a flow chart described in MSCI index documentation that currently sets the cutoff at 125 constituents. Weighting is based on market capitalization but adjusted by each constituent’s momentum score within the index, with a 5% cap per security.

Index rebalancing and reconstitution takes place semi-annually, although provisions exist for monthly ad-hoc rebalancing should the market experience exceptional volatility. Unlike other factors such as value, which are considered long-term investment strategies, momentum in many stocks and sectors can change quickly. As a result, momentum is generally considered to be a more short-term investment strategy, and investors may wonder if semi-annual rebalancing is sufficient.

Naturally, an index based on stock selection criteria can be viewed as “high conviction” since it excludes any stock not meeting the selection criteria. The drawback to this approach however—one which is not unique to momentum indices—is that it can become concentrated in just one or a few sectors, as we’ll demonstrate later, thereby diminishing the diversification benefit that is one of the hallmarks of index investing.

## Stock Weighting: S&P 1500 Positive Momentum Tilt

In contrast to MSCI's approach in which stock selection is the main determinant of index composition, the S&P 1500 Positive Momentum Tilt actually has no selection criteria; all stocks in the S&P 1500 Index are also included in S&P Momentum index. The S&P 1500 itself is comprised of the widely-followed S&P 500 index of large-cap stocks; the S&P Mid Cap 400 and S&P Small Cap 600 Indices.

Instead, S&P's approach is to "tilt" the existing S&P 1500 index towards momentum by simply adjusting each stock's market cap weight for its recent momentum, as measured by its 11-month total returns. Stocks with more momentum are over-weighted relative to their market cap weights in the parent S&P 1500, while stocks with less momentum (i.e., below-average returns) are under-weighted relative to their market capitalization, with quarterly rebalancing.

Since the index includes every stock in the parent index, with only their weightings adjusted to supply the tilt towards momentum, investors may rightly question whether they're getting enough of a tilt. As we'll demonstrate later, the S&P Momentum Index differs little from the S&P 500 in terms of sector balance and market cap allocation, and as a result performance has been highly correlated to the S&P 500.

In contrast to the high-conviction index that results from a stock selection-based approach, the S&P Momentum index may be said to be low conviction, since it still includes hundreds of stocks that do not have momentum characteristics (or have momentum in the wrong direction). As we'll demonstrate later, this approach does not suffer the drawback of sector concentration, but instead may mirror the broader market too closely, resulting in performance that can be highly correlated to the market and denying investors the momentum characteristics they may desire.

### Properties at a Glance: S&P Momentum Index

- **Low conviction**
- **Well balanced**
- **May too closely resemble market portfolio**

## Sector Overlay: DWA US Sector Momentum Index

Like MSCI's momentum index, the DWA US Sector Momentum Index selects a limited number of constituents from a broad universe to construct an index with true momentum characteristics, but also utilizes a sector overlay to address the shortcomings that single-factor indices often face. Dorsey Wright & Associates ("DWA") determines the methodology and maintains the index.

Drawn from the NASDAQ US Large Mid-Cap Index (which includes stocks listed on the New York Stock Exchange as well as NASDAQ), there is considerable overlap with the broad MSCI USA Index from which MSCI draws the constituents for its momentum index. However, the method for measuring momentum is different, and a smaller number of only 50 stocks are selected for inclusion in the DWA Momentum Index (versus about 125 for MSCI).

### Properties at a Glance: DWA Momentum Index

- **High conviction**
- **Sector overlay prevents concentration**
- **Relative Strength screen quickly reflects changes in momentum**

To measure momentum, DWA calculates relative strength—the ratio of a stock's price to the benchmark's price (i.e.,  $\text{Stock A} \div \text{Index Price}$ )—for each stock in the NASDAQ universe on a daily basis. These are then plotted on a "Point and Figure Relative Strength Chart" which removes time from the equation and instead focuses on volatility (more on the methodology is available on Dorsey Wright's website). Point and Figure charts have been around since at least 1901, and their primary purpose is to remove daily "noise" from the picture and identify clear buy and sell signals.

DWA's daily updating of these charts makes them quicker to identify reversals in momentum. For example, consider a stock which had been outperforming the broader market over the past six months, cumulatively racking up gains of 20% in excess of the market. Then all of a sudden, the company misses earnings estimates and the stock drops 10% in one day. Clearly, momentum has changed and is no longer in the stock's favor. The point and figure chart would reflect this almost immediately, whereas just measuring the relative performance over a pre-determined period of time would show the stock as still having positive momentum, though less than before. As a result, at each quarterly reconstitution, the DWA Momentum Index reflects the very latest changes in momentum.

Perhaps one of the most important differentiators is the methodology employed by DWA to add a sector overlay. The sector overlay determines and balances the DWA Momentum Index's overall sector allocation, the purpose of which is to correct for the tendency sometimes seen in other high-conviction indices towards sector concentration.

Each of ten broad sectors<sup>1</sup> are themselves ranked based on Relative Strength and the three highest ranking sectors are each assigned a 20% "bucket" in the index while the next four sectors are each allotted 10% buckets. The bottom three sectors therefore have no allocation in the DWA Momentum Index

The buckets are then filled with the highest ranking stocks in each sector as follows: 10 stocks go into each of the three large buckets, while five stocks fill up the four smaller buckets, for a total of 50 stocks. Each is added at an equal weight of 2%. Since each stock must also meet a minimum threshold for relative strength, if the number of stocks meeting the basic requirements are insufficient to fill a particular sector bucket, other sectors will be increased above their overlay target weights and stocks from those sectors added accordingly.

<sup>1</sup> DWA uses proprietary sector classifications that sometimes differ from the widely-used Global Industry Classification Standard ("GICS") maintained by MSCI and Standard & Poor's. DWA also considers Real Estate an industry within Financials rather than a stand-alone sector as with GICS. As a result, the sector breakdowns shown in this paper, which are according to GICS, may not reflect the 20% and 10% tiers (or "buckets") as stated by DWA.

**Table 2: Momentum Index Construction Methodologies**

| Index                          | MSCI USA Momentum                      | S&P 1500 Positive Momentum Tilt            | DWA US Sector Momentum   |
|--------------------------------|--|--|--|
| <b>Universe</b>                | MSCI USA Index                         | S&P 1500 Index                             | NASDAQ US Large Mid Cap Index  |
| <b>Measurement of momentum</b> | Risk-adjusted 6- and 12-month returns  | 11-month returns                           | Relative Strength (RS), point & figure   |
| <b>Constituent Selection</b>   | Stocks with highest momentum ranking   | None. All stocks in universe are included. | 10 highest RS stocks from each of the top three sectors; 5 stocks from next four sectors |
| <b>Weighting</b>               | Market cap, scaled to momentum ranking | Market cap, scaled to momentum ranking     | Equal  |
| <b>Rebalancing</b>             | Semi-annual & ad-hoc                   | Quarterly                                  | Quarterly  |
| <b>No. of securities</b>       | 125                                    | 1,494                                      | 50   |
| <b>Inception</b>               | 2/15/2013                              | 9/17/2012                                  | 12/9/2016  |
| <b>Index ticker</b>            | M2US000\$                              | SPCPMTUT                                   | DWUSSRT  |

**Source:** MSCI, Standard & Poor's and AltaVista Research as of 12/31/17.

To better analyze the differences between the different index approaches to momentum investing, we have compared each index from a sector, market cap and performance standpoint.

## Sector Exposure

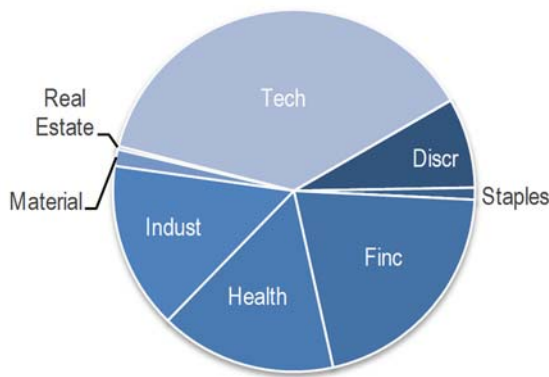
**Single-factor indices can become unintentionally concentrated**

One of the biggest drawbacks to single-factor indices is that without some sort of a strategic overlay to correct for it the index can become unintentionally concentrated in a few sectors. For example, an index that draws constituents based solely on dividend yield is likely to be concentrated in traditionally higher-yielding sectors like Telecommunications and Utilities. That will likely raise the index’s dividend yield above that of the broader market as advertised, but at a substantial cost in terms of diversification and possibly performance.

The MSCI USA Momentum Index appears to exhibit this tendency to a degree. Specifically, it has more than half of assets in just two sectors at present—Technology and Financials—which is nearly 20%-age points more than those two sectors’ already sizeable representation in the S&P 500 (Figure 2). This presents two risks to investors: 1) it crowds out other sectors leaving less exposure to others that may do well—six sectors have little to no exposure at all—and 2) it leaves the index vulnerable to sudden and sharp drawdowns when the fortunes of a favored sector change for the worse.

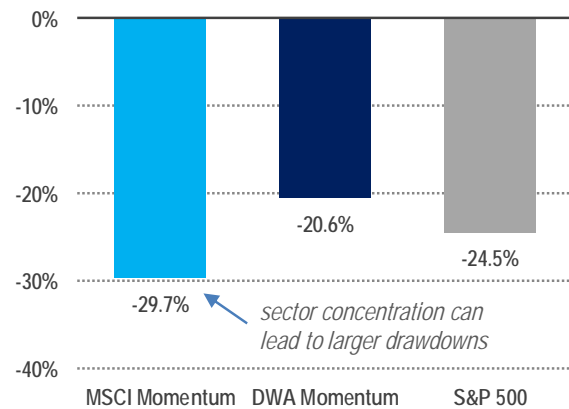
The classic example of this phenomenon is when the S&P 500 sold off following the bursting of the Tech bubble from August 2000 through August 2001 (the market continued to fall after this, but more in reaction to the September 2001 terrorist attacks). During that period, the MSCI Momentum Index declined 29.7%, compared with 24.5% for the S&P 500 and just 20.6% for the DWA Momentum Index, where the Tech sector had been reduced ahead of time to just 12% of the index as of June 30, 2000. (Back-test history for the S&P Momentum Index does not extend back this far).

**Figure 2: Sector breakdown**  
*MSCI USA Momentum Index*



Source: AltaVista Research as of 12/31/2017.  
**Note: Sector allocations are subject to change.**

**Figure 3: Performance comparison**  
*Returns during Tech meltdown\**



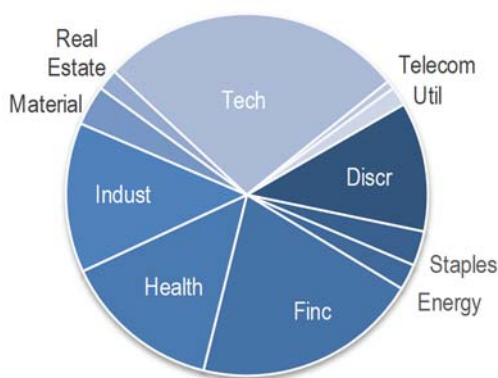
\*Note: Monthly total returns, 8/31/00–8/31/01. Figures subtract expenses of applicable ETF from index data quoted on Bloomberg as follows: MSCI Momentum (15bp); DWA Momentum (40bp) and S&P 500 (9.5bp). Returns for the DWA Momentum Index are based on pre-inception performance data as supplied by the index provider.  
**Past performance does not guarantee future results.**



The S&P 1500 Positive Momentum Tilt Index is also overweight Technology and Financials relative to the S&P 500 currently, but not to the degree of the MSCI USA Momentum Index, and that leaves more room for exposure to other sectors (Figure 4). However, some investors may conclude it suffers from a problem in that it mimics our benchmark too closely, and therefore may not exhibit enough of the momentum characteristics they are looking for.

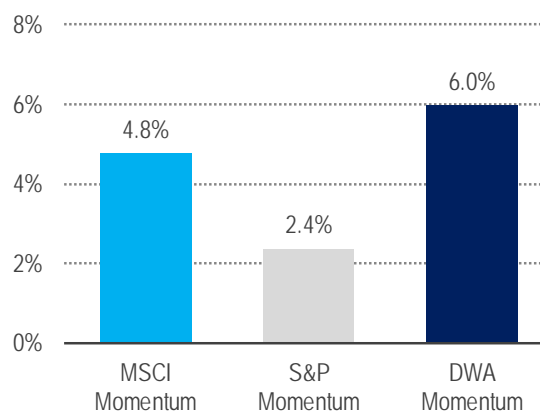
Specifically, Figure 5 shows that the sector “skew”—that is, the average absolute difference in sector allocations—between each of our momentum indices and the S&P 500 is by far the smallest for the S&P Momentum Index, at an average of just  $\pm 2.4\%$ . The skews for our other two momentum indices are considerably larger, meaning that for better or worse they provide exposures that are appreciably different from those of the S&P 500, with the DWA Momentum Index providing the greatest skew.

**Figure 4: Sector breakdown**  
*S&P 1500 Positive Momentum Tilt*



Source: AltaVista Research as of 12/31/2017.  
**Note: Sector allocations are subject to change.**

**Figure 5: Sector skew**  
*Momentum indices vs. S&P500*



Source: AltaVista Research as of 12/31/2017

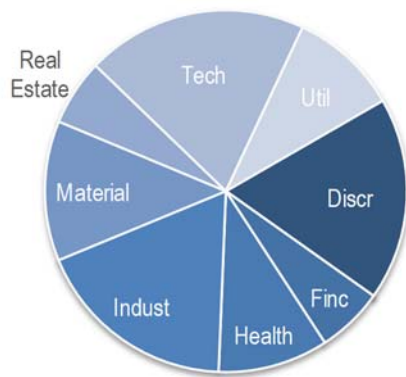
As of December 31, 2017, the three “large bucket” sectors in the DWA Momentum Index were Technology, Consumer Cyclical and Industrials, followed by “small buckets” for Healthcare, Basic Materials, Financials (including Real Estate) and Utilities (Figure 6). Recall however that Dorsey Wright uses proprietary sector definitions rather than the Global Industry Classification Standard (GICS), sectors that we have shown here, as is common practice to facilitate comparisons between indices. In any event the result is an index with significant exposure to high-momentum sectors but without excessive exposure in any one of them. The DWA methodology appears to bridge the sector gap between the other two approaches – offering more conviction than the S&P Momentum Index and better diversification than the MSCI Momentum Index.

## Market Cap Exposure

We can also look at each index’s market cap allocation to get a sense of market exposure. We’ve classified the segments across our indices as follows: Large Cap (>\$10 billion); Mid Cap (\$2-\$10 billion); and Small Cap (<\$2 billion). As with the sector skew, here too we see that the DWA index has exposures more distinct from the S&P 500 than the other two momentum indices, with reduced exposure to large caps and significantly more to mid-caps (Figure 7).

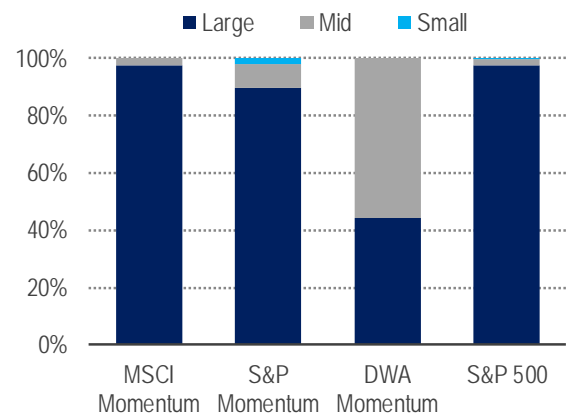
As a result, the DWA index also provides some exposure to a second investment factor: size. Many investors desire exposure to smaller stocks because of the “small cap effect.” Though not undisputed, the well-known small cap effect<sup>2</sup> posits that smaller stocks are likely to outperform their large-cap counterparts over the long term in part because smaller firms simply have more opportunities for growth.

**Figure 6: Sector breakdown**  
*DWA US Sector Momentum*



Source: AltaVista Research as of 12/31/2017.  
**Note: Sector allocations are subject to change.**

**Figure 7: Market cap allocation**  
*Momentum indices and S&P500*



Source: AltaVista Research as of 12/31/2017

<sup>2</sup> The small cap effect is one of the factors in the Fama and French Three Factor Model. Further reading [here](#).  
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## Performance Analysis

Although investors understand that past performance cannot predict future returns, examining past performance can still inform one how an index or investment tends to fare under certain economic conditions as well as how the investment tends to behave in relation to the broader market.

Unfortunately, the history we can show for the MSCI and S&P Momentum indices is limited because their performance histories since inception only date back to February 15, 2013 and September 17, 2012, respectively. The index providers have published back-test histories prior to these inception dates, however financial regulations preclude us from linking back-test and live-performance time series together. Therefore, while we can include a complete back-test for the DWA Index, we've just presented one- and three-year performance metrics for our other two momentum indices and the S&P 500 in Table 3 below.

Later we'll conduct an analysis of just the DWA Momentum index versus the S&P 500 over a much longer time frame afforded by the available history.

The DWA Momentum Index was not the best performer in the one- and three-year periods ending September 30, 2016, that we examined; that honor goes to the MSCI Momentum Index. But even it did not add any value over the most recent one-year period examined, as all three momentum indices lagged the benchmark S&P 500. However, the numbers below also highlight another point we've remarked on before: that the S&P Momentum Index closely resembles the S&P 500, in this case because its price movements were highly correlated to movements in the S&P 500 (technically, they had a coefficient of determination, or "r-squared," above 95%).

**The S&P Momentum Index has been highly correlated to the S&P 500**

In contrast, the MSCI and DWA Momentum indices provided more diversification, with the DWA Momentum Index exhibiting a particularly low r-squared of 66% for the three-year period examined. That implies that the index, if used in a portfolio to supplement exposure to the S&P 500—as opposed to a replacement for the benchmark—could still add value by substantially lowering overall portfolio volatility.

**Table 3: Performance Analysis: Momentum Indices**

| Index                       | MSCI USA Momentum | S&P 1500 Positive Momentum Tilt | DWA US Sector Momentum | S&P 500   |
|-----------------------------|-------------------|---------------------------------|------------------------|-----------|
| Strategy                    | Selection         | Weighting                       | Sector Overlay         | Benchmark |
| Index ticker                | M2US000\$         | SPCPMTUT                        | DWUSSRT                | SPXT      |
| <b>1 YEAR</b>               |                   |                                 |                        |           |
| Total return                | 14.8%             | 13.7%                           | 12.8%                  | 15.3%     |
| Ann. volatility             | 10.6%             | 11.6%                           | 10.8%                  | 12.5%     |
| r-squared (r <sup>2</sup> ) | 85.2%             | 96.7%                           | 84.7%                  | 100.0%    |
| Information ratio           | -0.36             | -2.40                           | -1.78                  | --        |
| <b>3 YEARS</b>              |                   |                                 |                        |           |
| Total return                | 14.2%             | 10.9%                           | 11.5%                  | 11.1%     |
| Ann. volatility             | 10.8%             | 10.7%                           | 10.0%                  | 10.8%     |
| r-squared (r <sup>2</sup> ) | 80.0%             | 95.4%                           | 66.3%                  | 100.0%    |
| Information ratio           | 2.16              | -0.29                           | 0.23                   | --        |
| <b>5 YEARS</b>              |                   |                                 |                        |           |
| Total return                | --                | --                              | 15.3%                  | 16.3%     |
| Ann. volatility             | --                | --                              | 10.0%                  | 11.1%     |
| r-squared (r <sup>2</sup> ) | --                | --                              | 71.1%                  | 100.0%    |
| Information ratio           | --                | --                              | -0.56                  | --        |
| <b>10 YEARS</b>             |                   |                                 |                        |           |
| Total return                | --                | --                              | 8.2%                   | 7.1%      |
| Ann. volatility             | --                | --                              | 15.4%                  | 13.9%     |
| r-squared (r <sup>2</sup> ) | --                | --                              | 66.4%                  | 100.0%    |
| Information ratio           | --                | --                              | 0.40                   | --        |

**Note:** All measurements are based on monthly observations for the period ending September 30, 2016. Three year return figures annualized. Return figures subtract annual expense ratios of the applicable fund from the index data quoted on Bloomberg as follows: MSCI USA Momentum (15bp); S&P 1500 Positive Momentum Tilt (12bp); DWA US Sector Momentum (40bp) and S&P500 (9.5bp). **Returns for the DWA Momentum Index are based on pre-inception performance data as supplied by the index provider.** "R-squared" (r<sup>2</sup>) is a statistical measure of the strength of the relationship between the index being measured and the S&P500 Index. Information ratio is a measure of the risk-adjusted performance of the index being measured versus that of the S&P 500 Index. **Past performance does not guarantee future results.**

**Source:** Bloomberg and AltaVista Research

The above points notwithstanding, a momentum index is unlikely to impress investors if it can't outperform the S&P 500 significantly, at least over a reasonable period of time. To get a sense of how the DWA Momentum Index has performed over the long run, we analyzed back-tested returns for the last 20 years. The results are shown in Table 4.

As is readily observable, the DWA Momentum Index underperformed the S&P 500 for the 1- and 5-year periods ending September 30, 2016, though it did manage to eke out a small advantage of about 0.4% annualized for the 3-year period examined. It is not until we go back 10 years that our momentum index opens up a lead of more than 1.0% annualized over the benchmark; and not until we go back 20 years that the momentum index exhibits substantial value-add in terms of above-average returns (about 4.5% annualized above the S&P 500) and an information ratio above 1.0.

**Table 4: Performance Analysis: DWA Momentum vs. S&P 500**

| Index                            | 1 YR  | 3 YR  | 5 YR  | 10 YR | 20 YR |
|----------------------------------|-------|-------|-------|-------|-------|
| <b>DWA US Sector Momentum</b>    |       |       |       |       |       |
| <b>Total return</b>              | 12.8% | 11.5% | 15.3% | 8.2%  | 12.3% |
| <b>Ann. volatility</b>           | 10.8% | 10.0% | 10.0% | 15.4% | 19.3% |
| <b>r-squared (r<sup>2</sup>)</b> | 84.7% | 66.3% | 71.1% | 66.4% | 49.6% |
| <b>Information ratio</b>         | -1.78 | 0.23  | -0.56 | 0.40  | 1.13  |
| <b>S&amp;P 500</b>               |       |       |       |       |       |
| <b>Total return</b>              | 15.3% | 11.1% | 16.3% | 7.1%  | 7.8%  |
| <b>Ann. volatility</b>           | 12.5% | 10.8% | 11.1% | 13.9% | 15.4% |

**Note:** All measurements are based on monthly observations for the period ending September 30, 2016. All return figures annualized. Return figures subtract annual expense ratios of the applicable fund from the index data quoted on Bloomberg as follows: DWA US Sector Momentum (40bp) and S&P500 (9.5bp). **Returns for the DWA Momentum Index are based on pre-inception performance data as supplied by the index provider.** "R-squared" (r<sup>2</sup>) is a statistical measure of the strength of the relationship between the index being measured and the S&P500 Index. Information ratio is a measure of the risk-adjusted performance of the index being measured versus that of the S&P 500 Index. **Past performance does not guarantee future results.**

**Source:** Bloomberg and AltaVista Research

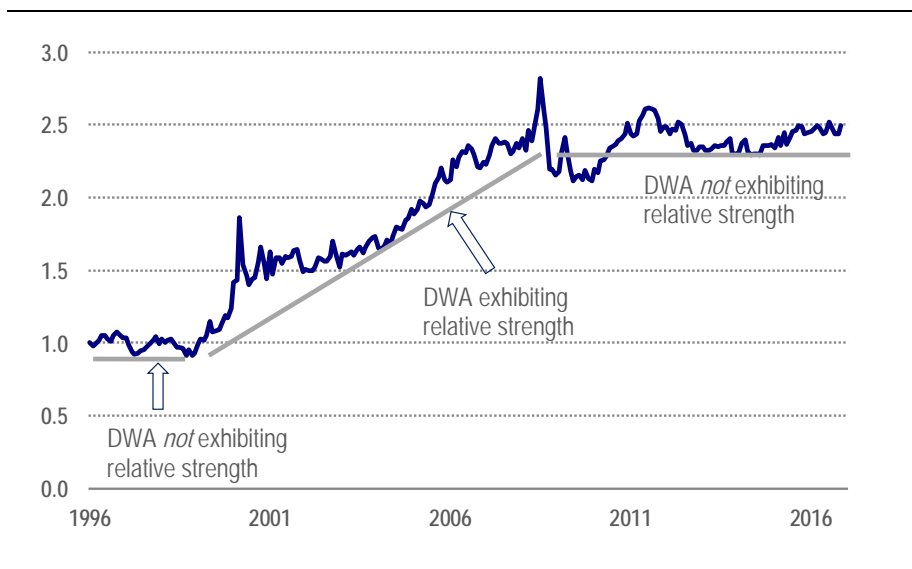
To see what’s going on, we looked at returns from a graphical perspective. While the chart of rebased returns against the S&P 500 *looks* very impressive (Figure 1 on the front page), if we examine the relative strength chart a more complex picture emerges. The relative strength chart divides the rebased DWA Momentum Index level by the rebased S&P 500 level. When the chart is rising the DWA Momentum Index is exhibiting relative strength—i.e., it is outperforming the benchmark. When it moves sideways, the DWA Momentum Index is performing basically in line with the market.

Looking at Figure 8, broadly speaking it appears there are three major phases in place over the last 20 years, as highlighted by the grey guidelines we’ve drawn on the chart. At the start, in 1996 through about the end of 1998, the DWA Momentum Index did not exhibit much relative strength as compared to the S&P 500, so it’s performance was roughly in-line with the benchmark. However, starting in 1999 and extending nearly a decade to mid-2008, the DWA Momentum Index showed fairly persistent relative strength, thus beginning a lengthy period of outperforming the S&P 500.

**DWA Momentum Index has seen extended periods of outperformance...and market performance**

Things changed again around the time of the Global Financial Crisis, and in the years since the DWA Momentum index again showed little relative strength. In other words, an index that is full of stocks each showing relative strength individually against their peers did not exhibit relative strength as a whole against the broader S&P 500!

**Figure 8: Relative Strength Trends**  
*DWA Momentum vs. S&P 500, 12/31/95 – 9/30/2016*



*Note: Monthly total returns, rebased, 12/31/95 = 100. Figures subtract expenses of applicable ETF from index data quoted on Bloomberg as follows: DWA Momentum (40bp) and S&P 500 (9.5bp). Returns for the DWA Momentum Index are based on pre-inception performance data as supplied by the index provider.*

**Past performance does not guarantee future results.**

*Source: Bloomberg and AltaVista Research*

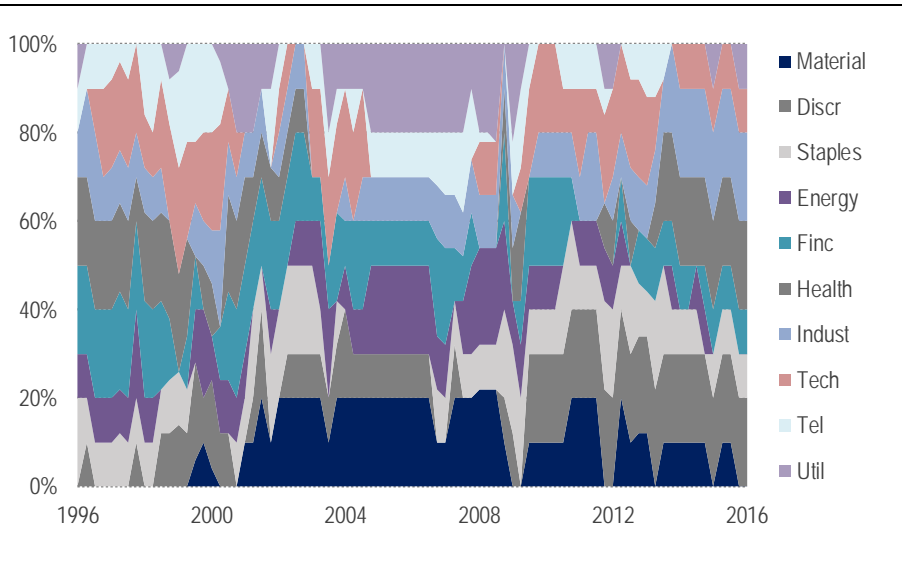
So what was going on during the almost 10 years from 1999 to mid-2008 when the DWA Momentum Index exhibited persistent relative strength, that was *not* occurring in the two other periods when the index did not have persistent strength?

Historical sector allocations of the DWA Momentum Index shed some light on the subject. Although Figure 9 is somewhat busy, it’s easy to discern periods when the sectors with momentum were relatively stable, versus times when sector leadership exhibited more fluctuation.

Recall that the DWA Momentum Index has exposure to seven of the ten GICS sectors at any one time, with 20% in each of the top three and 10% each in the next four, with quarterly rebalancing. When sector leadership is constantly shifting (i.e., when no sector exhibits relative strength for very long), the DWA Momentum Index must also shift its sector allocations frequently, dropping sectors that have ceased performing well in favor of those that are newly performing well. This sounds a lot like performance chasing.

While that term typically has negative connotation, here it is simply a function of methodology. And while performance chasing can be detrimental to returns for many investors, for the DWA Momentum Index these periods of no sector leadership have historically meant simply keeping up with the broader market.

**Figure 9: Sector Allocation History**  
*DWA Momentum, Jan. 1, 1996 – Jan. 1, 2016, Quarterly*



*Note: Quarterly sector allocation history is based on pre-inception data as supplied by the index provider.*

*Source: Dorsey Wright & Associates*

Where the DWA Momentum Index really shines is when sector leadership persists for longer periods, such as it did in the first eight years or so of the 2000s. During that time, the sectors with the most cumulative exposure were (in descending order) Materials, Financials, Utilities and Energy. Not surprisingly, when sector leadership persists, the DWA Momentum Index benefits by virtue of having maintained significant exposure to those very same sectors for an extended period of time.

**The DWA Momentum Index really shines when sector leadership persists for longer periods**

So the big question for investors is: what kind of market will we see next? Will the leaderless market that has prevailed since the Global Financial Crisis continue in the years ahead, or will it settle back into one in which a few sectors start to lead the way for a sustained period? If the former, history suggests the DWA Momentum Index may just keep pace with the broader market.

However, recent declines in correlation between sectors since the 2016 U.S. presidential election are an encouraging sign that perhaps new sector leadership will emerge. If in fact a few sectors can maintain leadership—whichever they may be—then the DWA Momentum Index is poised to do well since by definition it will maintain sizeable exposure to the leading sectors.



## Parting Thoughts

The growth and popularity of index investing has made it easy and often cheap to implement many differing investment strategies. However, because index construction is rules-based, differences in those rules can have a big impact on index composition, characteristics and performance, even among indices targeting the same basic strategy.

For momentum-based indices, an approach based on stock selection like with the MSCI USA Momentum Index can result in a high conviction index, but one that may also become too concentrated in certain sectors with high momentum, resulting in larger drawdowns when momentum for the favored sector suddenly reverses.

Meanwhile, an approach based on stock weighting, as with the S&P 1500 Positive Momentum Tilt Index may result in a low conviction index, since it only underweights but still includes hundreds of stocks that do not meet any sort of momentum criteria. One downside to this approach is that it closely resembles the broader market. As a result, performance may be highly correlated to the market, and failing to provide investors with the characteristics they may desire for a momentum index.

The new DWA US Sector Momentum Index, like the MSCI Momentum Index, is also a high conviction index in that it includes only select stocks meeting its momentum criteria. However, DWA employs a sector overlay to determine allocations and provide balance, avoiding the pitfall of concentration that can otherwise result.

Analysis of twenty years of back test data show that the DWA Momentum Index has tended to go through multi-year periods of either broad performance in-line with market averages, or broad outperformance. The difference between the two is whether sector leadership was in constant flux, or whether sector leadership persisted for longer.

Since the Global Financial Crisis, sector leadership has changed frequently, causing the DWA Momentum Index to largely track the market. With a new, more business-friendly administration and a more normal interest rate environment, conditions may start to favor more stable sector leadership (though we are not making that prediction). If so, the DWA Momentum Index could be a good way to capture their upside.

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*An investor cannot invest directly in an index.*

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