IS IT TIME TO TILT?

Exploring a Fundamental Question in Factor Investing

By Andrew Ang, PhD, Ked Hogan, PhD, and Justin Peterson

A majority of institutional investors are now investing in factor-based strategies, according to a 2016 Economist Intelligence Unit survey.[1] Many of these investors specifically target style factors such as value or quality, often through long-only smart beta strategies. And with good reason—style factors historically have outperformed the broad market over the long run, as seen in figure 1.

Individual factors historically have delivered positive long-run returns, but they are inherently cyclical. Because each factor is driven by different phenomena, they tend to outperform at different times.

A common way to address this cyclicality is to diversify exposures across many factors, thereby reducing the potential impact of any single factor on the results of the overall portfolio. Figure 1 illustrates this behavior: Individual factor returns vary widely in each calendar year, but each has a positive annualized return over the period 2001–2016. As seen in the last column, the annualized excess return of a diversified multifactor strategy (DMF) is higher than that of any single factor, demonstrating that diversification across factors is a powerful means to reap their long-term rewards. In fact, we believe that investors should maintain a diversified allocation to factors in order to harvest them effectively.

However, this cyclicality also raises an intriguing question. Can we time-vary allocations to different factors, anticipating their over- or underperformance in order to seek incremental returns above and beyond the long-run factor premiums? This topic has been the subject of heated debate in the factor investing world. Some investors have argued that only those factors that are undervalued are attractive and have based their investment views upon valuations alone. Others have concluded that factor timing is simply too difficult and advised investors to resist the temptation to time altogether.

Our research suggests that both these views have merit, but that each misses a part of the total picture. Although factor timing is a difficult endeavor that involves taking on additional active risk, we believe that a form of timing indeed can be additive, provided the methodology is sufficiently diversified and robust. We find that combining several indicators may yield enhanced results compared to using any one of them in isolation—we diversify our model inputs just as we recommend diversifying portfolios.

Valuation is one important insight, but we believe there are also other important indicators of near-term performance. Our approach brings together both fundamental and technical measures to evaluate each factor. Further,

ABOUT STYLE FACTORS

Style factors are well-understood drivers of return that historically have outperformed the broad market.

We focus here on five equity style factors that are grounded in economic intuition and well-supported by academic research. In every case, there is a risk premium, structural impediment, or behavioral anomaly that justifies a return premium.

Value strategies target securities that are inexpensive relative to fundamentals.

Momentum strategies invest in securities with improving prices or market sentiment.

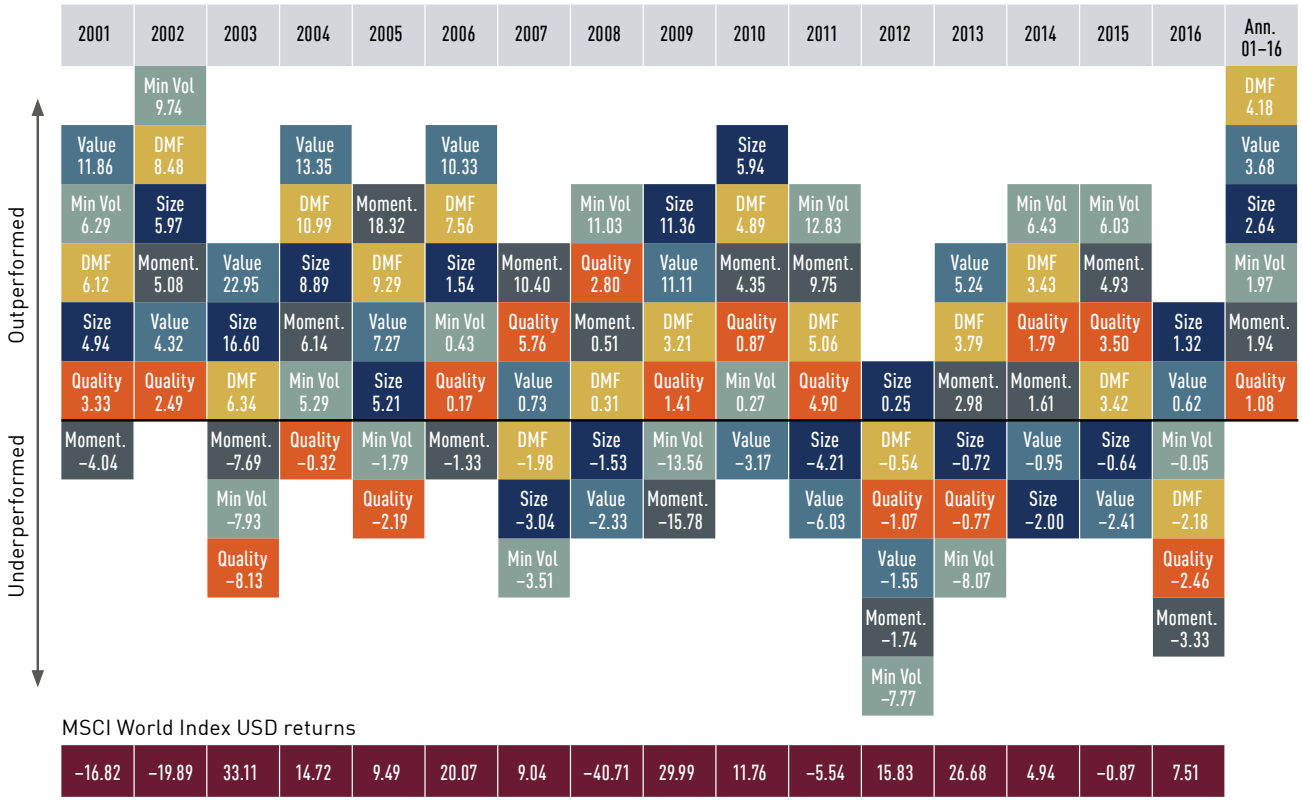
Quality strategies favor securities with stable and high-quality earnings.

Minimum volatility strategies target securities with lower volatility.

Size strategies favor smaller, more nimble companies over larger ones.

Figure 1

GOING IN AND OUT OF STYLE—EXCESS RETURNS OF STYLE FACTOR INDEXES VERSUS THE MSCI WORLD INDEX



Source: MSCI as of December 31, 2016. MSCI index methodology resources available at www.msci.com. MSCI World Momentum Index denoted as Momentum; MSCI World Equal Weighted denoted as Size; MSCI World Enhanced Value Index denoted as Value; MSCI World Sector Neutral Quality Index denoted as Quality; MSCI World Diversified Multi Factor denoted as DMF. Index returns are for illustrative purposes only. Index performance returns do not reflect any management fees, transaction costs, or expenses. Indexes are unmanaged and one cannot invest directly in an index. Data for time periods prior to the index inception date is hypothetical and is provided for informational purposes only. Please see back page for additional disclosures about back-tested index data.

our research suggests that evaluating one factor relative to the others can improve results—that is, we ask not if we should invest in value, but rather if we prefer value compared to quality or momentum.

Our approach is best described as factor tilting. Instead of employing concentrated long or short positions in individual factors, we believe that investors should consider incorporating modest tilts within the context of a diversified multifactor portfolio, emphasizing those factors with more attractive potential opportunities while remaining balanced across many drivers of return. Factor tilting around a diversified core may benefit from both the long-run return from each individual factor and from the additional return earned by emphasizing more attractive factors.

In this article, we explain our factor-tilting methodology and explore some practical applications within investors' portfolios. Our research is focused upon tradable, index versions of single factors, using the MSCI single-factor series as proxies. However, our conclusions are broadly portable to other versions of equity style factor strategies, as well as factor strategies in other asset classes.

HOW WE TILT

Our tilting methodology begins with assessing the prevailing economic regime to determine which factors are likely to have a tailwind or a headwind in the current environment. We then examine the valuation, the relative strength, and the dispersion of each factor, as seen in figure 2. Finally, we combine the insights drawn from each of these indicators into a single composite indicator.

ECONOMIC REGIME

The prevailing economic regime has a strong and intuitive link to market behavior. For example, increases in productivity and employment tend to fuel equity markets, and recession fears often send investors running to the safe haven of bonds. Likewise, the behavior of individual style factors is linked to the economic regime, with each factor rewarded at different times in the economic cycle.

To examine this relationship further, we first determine where we are in the economic cycle based upon the level of economic growth and the probability of recession. We use a variety of coincident and leading economic indicators, both proprietary and third-party. Third-party metrics include the Chicago Fed Coincident Indicator, which contains

Figure 2

FOUR CORNERSTONES—FACTOR-TILTING INDICATORS

ECONOMIC REGIME

Does the factor tend to do well in the current economic regime?

VALUATION

Is the factor rich or cheap compared to its own history?

RELATIVE STRENGTH

Does the factor have a supportive price trend?

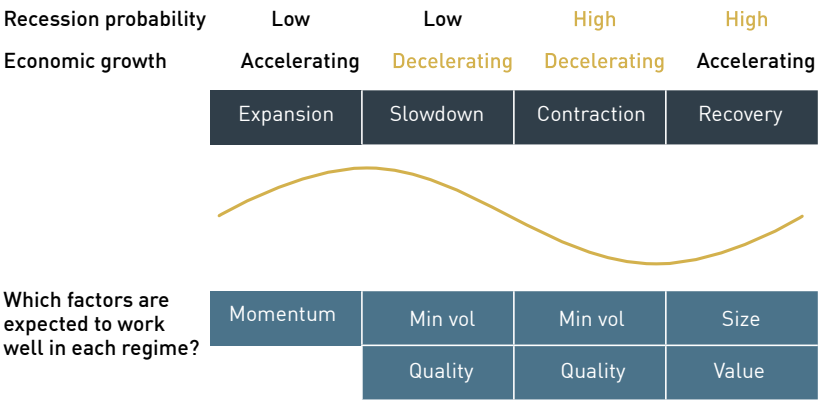
DISPERSION

How robust is the opportunity set for the factor?

Source: BlackRock. For illustrative purposes only.

Figure 3

SINE OF THE TIMES—ECONOMIC REGIMES, GROWTH, RECESSIONS, AND FACTOR PERFORMANCE

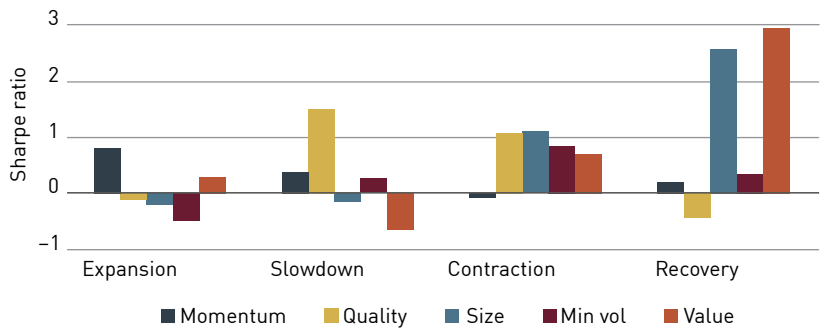


Source: BlackRock. For illustrative purposes only.

Figure 4

CHANGE OF LEADERSHIP

SHARPE RATIOS OF STYLE FACTORS IN DIFFERENT ECONOMIC REGIMES



Source: BlackRock, over the period January 1990–September 2016. Sharpe ratio is the average monthly risk-adjusted return for each of the five factors during the indicated regime, as determined by our proprietary regime model described above. MSCI USA Momentum Index denoted as Momentum; MSCI USA Risk Weighted denoted as Size; MSCI USA Enhanced Value Index denoted as Value; MSCI USA Sector Neutral Quality Index denoted as Quality; MSCI USA Minimum Volatility Index denoted as Min Vol. Index returns are for illustrative purposes only. It is worth noting that the MSCI version of size is based upon the MSCI Risk Weighted Index, constructed by weighting every security in the parent universe by the inverse of its realized volatility. This methodology results in a pronounced bias toward midcap stocks (thereby capturing the low size factor) but also in a low volatility bias. The low vol bias of this factor index contributes to its strong performance in the contraction phase. Index performance returns do not reflect any management fees, transaction costs, or expenses. Indexes are unmanaged and one cannot invest directly in an index. Data for time periods prior to the index inception date is hypothetical and is provided for informational purposes only. Please see back page for additional disclosures about back-tested index data.

more than 85 measures of economic strength spanning data across wages, unemployment, inventories, and production. We combine these with proprietary measures developed by our systematic investing teams across equities and fixed income to gain a more complete picture of the current economic climate.

By aggregating these metrics, we can estimate the current state of the economy and classify it as falling into one of four phases: expansion, slowdown, contraction, or recovery, as illustrated in figure 3.

We then examine historical data to determine when each factor was rewarded. For example, as the economy expands and trends become well-established, momentum strategies have tended to perform well. When the economy moves beyond the peak of the cycle into the slowdown and contraction regimes and the probability of recession and market shocks increases, investors become more cautious and minimum volatility and quality strategies tend to perform well due to their risk-mitigation properties, lower leverage, and steadier earnings. Finally, as the economy recovers from a trough, smaller companies and value companies are often well-positioned to benefit from renewed economic growth.

Figure 4 displays the Sharpe ratios of each individual factor through the four economic phases and highlights the fact that the performance of individual style factors differs markedly depending upon the regime. Our model incorporates this information by assigning a positive, negative, or neutral score to each factor for each regime.

VALUATION

Factor indexes are themselves baskets of securities. Just as relative valuations reflect the opportunity set for individual securities, sectors, or countries, valuations are indicative of the cheapness or expensiveness of style factors, as defined by their respective indexes.

Rather than relying on a single valuation measure such as price-to-book, we find it more effective to utilize a backward-looking metric and a forward-looking one. We prefer cash flow to operations as the backward-looking metric because it does not count financial or accounting assets such as goodwill. For the forward-looking metric we use one-year forward earnings yield per share.

We combine both these measures into a composite valuation score. We view a factor as being relatively cheap when it has a low valuation relative both to its history and to other factors. As part of this process, we adjust for the perennial richness or cheapness of each factor because, for example, one would expect that a value index will generally be less expensive than a momentum index.

RELATIVE STRENGTH

Relative strength is a measure of momentum. We see evidence of momentum in equities, fixed income, currencies, and many other asset classes.

So too do we see trending behavior in factors, with the same behavioral justifications. For example, investors tend to pile into, and thus bid up the prices of, assets that have exhibited strong recent performance. Translated to factor terms, this means that a factor that performed well over the past six months tends to perform well over the next six months.

To gauge relative strength we use a simple measure of 12-month price momentum to determine the trending behavior of each factor and compare market sentiment in one factor versus the others. This allows us to pick up the trends in each factor and to overweight the factors with recent high performance and to underweight those with recent low performance.

DISPERSION

Dispersion measures the opportunity set for each factor. The greater the opportunity set across a particular factor, the greater the potential to capture excess returns.

For example, consider the quality factor. If there is a large spread in the metrics that we use to separate high-quality companies from low-quality ones (return on equity, earnings consistency, and debt to equity), then we would expect a relatively large difference in the subsequent returns of high-quality stocks versus low-quality stocks.

Conversely, when this spread is relatively narrow, we would expect more muted returns from overweighting high-quality companies and underweighting low-quality ones.

Accounting for dispersion allows us to overweight those factors that we believe have a higher likelihood of delivering excess returns. As we saw with our valuation measures, the average level of dispersion differs across different factor metrics (e.g., the average dispersion in the quality factor is different from the average dispersion in the momentum factor), so we must carefully adjust our dispersion measures to account for long-run averages.

STRONGER TOGETHER

Each of the preceding indicators is individually useful, but they are more powerful when combined. To illustrate, we include a hypothetical back-tested example that begins with a portfolio that is equal-weighted across the five style factors (value, momentum, size, quality, and minimum volatility) as represented by the respective MSCI indexes. We then examine the hypothetical results of applying each of our indicators to this five-factor portfolio during January 1990 to September 2016. Finally, we create an aggregate signal with equal weights to each of our four indicators and apply that aggregate signal to our five-factor portfolio.

As seen in table 1, the economic regime signal would have had the highest individual Sharpe ratio and the valuation signal results in the smallest maximum drawdown. The maximum drawdown for each indicator occurs at different times, highlighting the potential diversification benefit of combining multiple indicators.

Indeed, the aggregate indicator would have had a higher Sharpe ratio and a smaller maximum drawdown than any of the individual indicators: By combining four indicators with low correlations to one another, we harness the power of diversification to generate an aggregate indicator that is greater than the sum of its parts.

ADDITIVE AND DIVERSIFYING

Our factor-tilting model provides a forward-looking evaluation of each

Table 1

GREATER THAN THE SUM: SHARPE RATIOS AND MAXIMUM DRAWDOWNS OF INDIVIDUAL INDICATORS AND AGGREGATE INDICATOR

Signal	Sharpe ratio	Max drawdown	Max drawdown range
Economic regime	0.71	-1.6%	October 2003–June 2008
Relative strength	0.42	-2.3%	March 2000–July 2003
Valuation	0.48	-1.4%	September 2002–August 2006
Dispersion	0.38	-1.6%	June 2008–February 2009
Aggregate signal	**0.88**	**-1.4%**	**September 2002–April 2005**

Source: BlackRock, as of September 2016. Relative strength and business cycle indicators begin in January 1990, and valuation and dispersion indicators begin in December 1999, due to availability of holdings data. The aggregate signal begins in January 1990 with the inclusion of the signals as they become available, equally weighted. Index performance returns do not reflect any management fees, transaction costs or expenses. Indexes are unmanaged and one cannot invest directly in an index. Data for time periods prior to the index inception date is hypothetical and is provided for informational purposes only. Please see back page for additional disclosures about back-tested index data.

factor. Comparing this aggregate measure to that of other factors, we can determine which factors to overweight and which to underweight. But how large should those over- or underweights be? We translate our forward-looking factor views into an optimal factor portfolio using mean-variance optimization and a risk model to estimate the volatility and correlations of each factor. We also incorporate constraints to help ensure that our factor portfolio remains diversified. Specifically, we constrain the portfolio to a minimum holding of 5 percent and a maximum holding of 35 percent in each factor index.

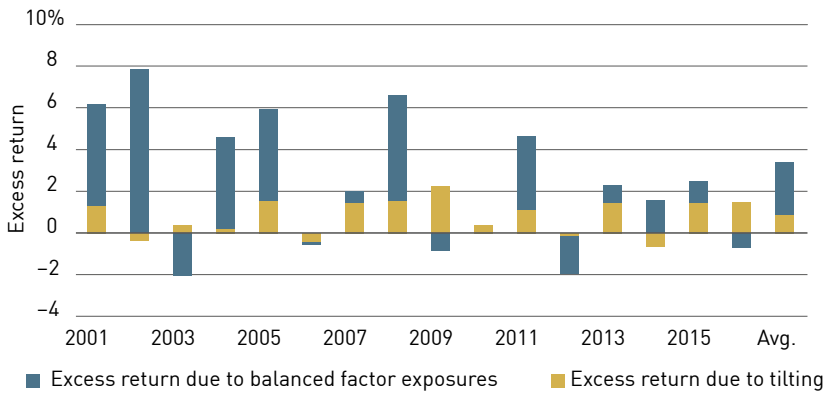
Figure 5 shows the results of this hypothetical back-tested simulation for U.S. equity factors. Figure 5 summarizes the returns of the factor-tilting portfolio compared to the cap-weighted MSCI USA Index. The excess returns come from two sources:

1. The excess returns of the equal-weighted factor portfolio over the index (the blue bars).
2. The incremental returns from tilting away from the equal-weighted portfolio and toward the factors that appear more attractive (the gold bars).

Figure 5

THE TIME HAS COME

EXCESS RETURNS OF HYPOTHETICAL AND BALANCED FACTOR EXPOSURES AND FACTOR-TIMING STRATEGY VERSUS THE MSCI USA INDEX



Sources: BlackRock, Morningstar, Reuters, as of December 2016. This analysis is based on back-tested index data for the Five-Factor Portfolio. Excess returns from factor tilting are calculated for the hypothetical factor-tilting strategy against an equal weighted five-factor portfolio and against the stated benchmark MSCI USA. Five-Factor portfolio represents an equal weighted combination of the five equity single-factor indexes: MSCI USA Min Vol, MSCI USA Momentum, MSCI USA Enhanced Value, MSCI USA Sector Neutral Quality, MSCI USA Risk Weighted Index. Index performance returns do not reflect any management fees, transaction costs, or expenses. Indexes are unmanaged and one cannot invest directly in an index. Data for time periods prior to the index inception date is hypothetical and is provided for informational purposes only. Please see back page for additional disclosures about back-tested index data.

Our simulation suggests that modest tilts may add incremental value above a simple equal-weighted factor portfolio, which itself may add value compared to an allocation to the benchmark index.

In addition to providing a potential source of excess returns, factor tilting also may bring diversification benefits.

As seen in table 2, the hypothetical returns from our aggregate factor-tilting indicator would have exhibited low correlations to long-run factor returns (as represented by the five-factor portfolio) and to traditional active management excess returns (as represented by the five largest U.S. active mutual funds, by assets under management). These results suggest that a factor-tilting strategy is likely to be diversifying to many active equity programs, because most active managers are focused on stock selection or macro themes rather than on factor behaviors.

FROM INSIGHT TO IMPLEMENTATION

The widespread availability of factor exchange-traded funds (ETFs) makes implementation of a factor-tilting strategy straightforward. Some investors may consider an explicit allocation to a factor-rotation strategy as a part of their equity allocation. Others may choose to layer factor-tilting insights into existing investments, either as a part of a multi-manager strategy or by directly incorporating factor-tilting insights within actively managed strategies. For example, global tactical asset

Table 2

A DIVERSIFYING ADDITION

HISTORICAL CORRELATIONS OF FACTOR TIMING SIGNAL WITH FIVE-FACTOR PORTFOLIO AND ACTIVE MANAGER EXCESS RETURNS

	Five-Factor Portfolio	Active MF 1	Active MF 2	Active MF 3	Active MF 4	Active MF 5	Average MF
3 Year	-0.03	0.13	0.34	0.02	0.11	0.23	0.17
5 Year	0.20	0.19	0.19	-0.28	-0.07	0.16	0.04
10 Year	0.12	-0.02	0.08	-0.16	-0.25	-0.08	-0.09
15 Year	0.15	0.16	0.23	-0.18	-0.13	0.12	0.04

Sources: BlackRock, Morningstar, Reuters. As of December 2016. Correlations are computed based upon monthly excess returns over 3, 5, 10, and 15-year periods. Excess returns from the Factor-Tilting Model are calculated for the hypothetical factor-tilting strategy against an equal weighted five-factor portfolio. Five-Factor portfolio represents an equal weighted combination of the five equity single-factor indexes: MSCI USA Min Vol, MSCI USA Momentum, MSCI USA Enhanced Value, MSCI USA Sector Neutral Quality, MSCI USA Risk Weighted Index. The five active mutual funds chosen are the largest five by assets under management across US Large Cap, with the Average representing the average excess return of these five managers. Excess returns are calculated against the funds' benchmark, S&P 500 TR Index.

allocation managers historically have focused on capturing trends across asset classes, regions, and sectors, but now many also are considering the implicit and explicit incorporation of style tilts within their portfolios.

Investors also may incorporate factor tilting more informally, by including tilting insights with the mosaic of market data that influences their manager selection, portfolio construction, and rebalancing decisions. For example, most investors regularly balance allocations across managers, periodically harvesting gains to return to target allocations. But if investors have a positive outlook on value, for example, they might choose to let an overweight in value-oriented strategies persist rather than rebalancing to target allocations. Other investors might explicitly choose to overweight value strategies and tactically implement the overweight position with value factor ETFs.

Whether explicit or implicit, the addition of factor timing insights may be highly additive to investment programs. With careful consideration of both fundamental and technical indicators, we can construct a robust forward-looking view for each factor, providing a new source of potential return and diversification.

Andrew Ang, PhD, is a managing director and the head of the factor investing team at BlackRock, Inc. He earned a BEc (Hons) degree in actuarial studies from Macquarie University, and an MS in statistics and a PhD in finance from Stanford University. Contact him at andrew.ang@blackrock.com.

Ked Hogan, PhD, is a managing director and the head of investments for factors at BlackRock, Inc. He earned BA and PhD degrees in economics from Arizona State University. Contact him at ked.hogan@blackrock.com.

Justin R. Peterson is a vice president and factor researcher at BlackRock, Inc. He earned a BS in both financial mathematics and mathematical economics, magna cum laude, from Pacific Lutheran University and a Master of Financial Engineering from the University of California, Berkeley. Contact him at justin.peterson@blackrock.com.

ENDNOTE

1. The Economist Intelligence Unit's January 2016 global survey of 200 executives from institutional investment firms. More information can be obtained at https://www.blackrock.com/institutions/en-us/literature/whitepaper/blk-rise-of-factor-investing-amrs.pdf.

CONTINUING EDUCATION

To take the CE quiz online, www.investmentsandwealth.org/IWMquiz

This analysis uses back-tested index data from MSCI Inc.

Index Name	Index Inception Date	Dates of Back-Tested Returns
MSCI USA Minimum Volatility (USD) Index	6/2/2008	5/31/1988 – 6/2/2008
MSCI USA Index	5/31/1986	12/31/1969 – 5/31/1986
MSCI USA Sector Neutral Quality Index	2/15/2013	11/30/1998 – 2/15/2013
MSCI USA Enhanced Value Index	4/11/2011	11/28/1997 – 4/11/2011
MSCI USA Equal Weighted Index	1/22/2008	12/31/1974 – 1/22/2008
MSCI World Minimum Volatility (USD) Index	4/14/2008	5/31/1988 – 4/14/2008
MSCI World Index	5/31/1986	12/31/1969 – 5/31/1986