Smart Beta and the Evolution of Factor-Based Investing

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In recent years, smart beta strategies captured the attention of many investors due to transparent, rules-based methodologies, competitive fee structures, and historical performance. Recently we have witnessed the introduction of multi-factor smart beta where multiple smart beta strategies are bundled into a single investment product. How does it work and what are its strengths as an investment strategy? Can multi-factor investing extend beyond a smart beta centric approach and how do you evaluate its efficacy?

FUNDAMENTAL INDEXATION – ARGUABLY THE ORIGINAL SMART BETA STRATEGY

Fundamental indexation, coined in 2005, had a simple objective. Is there a better way to define a company's weighting in an index outside of market capitalization? A focal point was placed on book value, as well as trailing five-year averages of cash flow, sales, and dividends to define a company's relative size – an intuitive definition as opposed to one defined by the stock market. The process entailed ranking U.S. companies by each of these dimensions and assigning relative stock weights as a function of these four equally weighted measures. Take your top 1000 names and you have a simple, transparent, intuitive definition of index weights that varies from market capitalization i.e., "fundamental" indexation.

The term smart beta was not introduced in the advent of Fundamental Indexation, but the concept certainly was – take an index and tilt it in a way that can potentially improve returns or reduce risk (or both) through the application of simple, transparent rules and, typically, low turnover. It was also a form of factor-based investing. Let's take a minute to explain.

Fundamental indexes were systematically underweight growth stocks relative to a cap-weighted portfolio i.e., a value tilt. Citing research from Eugene Fama and Kenneth French *(Common Risk Factors in the Returns on Stocks and Bonds, 1993)*, fundamental index outperformance was attributable to the value and size factors defined in Fama-French's research. In other words, a validation of previously defined and researched factors. Fundamental indexation was able to deliver these factors in a simple and intuitive manner.

FACTOR-BASED INVESTING

When you evaluate smart beta strategies you'll typically find similar underpinnings to factor-based investing, which seek to capture the equity risk premia or excess return from exposure to certain stock characteristics. Beginning with early work on the Capital Asset Pricing Model, academic research (Fama-French, Shiller, et. al) and market studies have demonstrated that above-market returns may be generated based upon certain stock traits. To have utility in developing investment strategies, analysts look for factors that have earned premia over time, possess high explanatory power for a universe of securities, and reflect exposure to systematic risk. Examples of factors that meet these criteria include:

Systematic Factors	What It Is	Commonly Captured By
Value	Captures excess returns to stocks that have low prices relative to their fundamental value	Book value to price, earnings to price, book value, sales, earnings, net profit, dividends, cash flow
Low Size (Small Cap)	Captures excess returns of smaller firms (by market capitalization) relative to their larger counterparts	Market capitalization (full or free float)
Momentum	Reflects excess returns to stocks with stronger past performance	Relative returns (3-month, 6-month, 12-month, sometimes with last 1-month excluded), historical alpha
Low Volatility	Captures excess returns to stocks with lower-than-average volatility, beta, and/or idiosyncratic risk	Standard deviation (1-year, 2-years, 3-years), downside standard deviation, standard deviation of idiosyncratic returns, beta
Dividend Yield	Captures excess returns to stocks that have higher-than-average dividend yields	Dividend yield
Quality	Captures excess returns to stocks that are characterized by low debt, stable earnings growth, and other quality metrics	Return on equity, earnings stability, dividend growth stability, strength of balance sheet, financial leverage, accounting policies, strength of management, accruals, cash flows

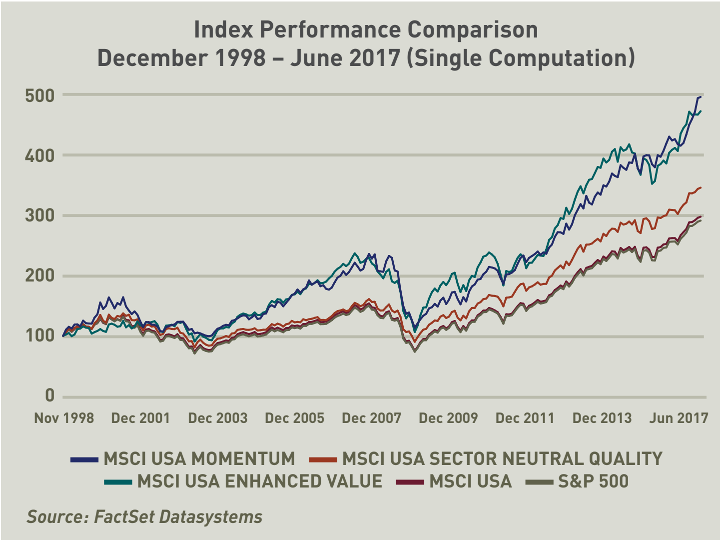
Source: Briand, Remy, Dimitris Melas, and Raman Aylur Subramanian, "Research Spotlight: Foundations of Factor Investing," Accessed September 2017. Available at https://www.msci.com/documents/10199/763f0d3c-c0a5-4c43-938a-19f797e29606.

The table below shows the successful capture of the quality, value, and momentum risk premiums over the analyzed period. The MSCI USA Momentum, Enhanced Value, and Quality Indices posted better performance on both an absolute and risk-adjusted basis than either the MSCI USA Index or the Standard & Poor's 500 Index.

Factor-Based Investing Example:
MSCI USA Indices and S&P 500 Index Performance Comparison
15-Year Period Ending June 2017

Factor	MSCI USA Index	Annualized Return	Cumulative Return	Annualized Standard Deviation	Sharpe Ratio
Momentum	Momentum	10.07%	321.45%	14.59%	0.61
Value	Enhanced Value	10.04%	319.91%	16.62%	0.53
Quality	Sector Neutral Quality	8.73%	251.01%	13.14%	0.57
	MSCI USA Index	8.46%	238.03%	14.14%	0.51
	S&P 500 Index	8.34%	232.76%	14.08%	0.51

Source: FactSet Datasystems



Note: Some of the data used in this chart is backtested data (i.e. calculations of how the indices might have performed over that time period had the index existed). There are frequently material differences between backtested performance and actual results. Please refer to the index definitions and additional disclosures located at the end of this report.

THE NEXT STAGE: FROM SINGLE-FACTOR TO MULTI-FACTOR SMART BETA

"Multi-factor indexes attempt to limit the risk, magnitude and extent of periodic index underperformance and to offer potential improvements in risk-adjusted outcomes, compared with exposure to single factors."

FTSE Russell, "Factor exposures of smart beta indexes"

If single-factor strategies could outperform simple indexes, does it make sense to combine factors in a single portfolio? The earliest smart beta strategies focused on single factors such as value or quality to achieve long-term investment objectives. However, single-factor strategies may be subject to periods of underperformance due to overcrowding and cyclicality.

Overcrowding: Popular single-factor strategies can be victims of their own success. As investors see that stocks possessing a certain trait or characteristic are outperforming, they ramp up purchases and cause the anomaly that created the opportunity to vanish.

Cyclicality: Factors tend to be cyclical and follow different patterns of performance. While a factor has its periods of outperformance, it can suffer over a period of time when it is out of favor. For example, value investing was out of favor during the dot-com bubble from 1997 to 2000 and the style suffered through a long period of underperformance relative to growth and broad market benchmarks.

As a result, increasing attention is being given to multi-factor strategies that incorporate several factors into a unified investing methodology. By combining factors that are not highly correlated, multi-factor investing can:

- Enhance diversification and lessen the risks associated with exposure to a single factor.
- Provide the opportunity to outperform the broad market on a risk-adjusted basis over extended periods.
- PNC Capital Advisors believes that there are potentially additional return-enhancing opportunities from integrating multiple factors into the portfolio construction process, rather than simply allocating to multiple single-factor strategies.

Understandably, the attractiveness of multi-factor investing has grown as market uncertainty and volatility have heightened. Recent research confirms that there is growing interest in multi-factor smart beta investing. The FTSE Russell *"2017 Trends and Outlook for Smart Beta"* found that 64% of institutional investors surveyed were currently using multi-factor strategies, a 20% increase since 2015.

THE END STATE FOR SMART BETA?

Moving from single-factor to multi-factor smart beta is widely regarded as a logical progression for our industry. As discussed, factors can and do serve complementary roles when evaluated on a historical basis. But what is the best way to combine or integrate factors? A smart beta approach, utilizing simple rule sets e.g., equal weightings of value, momentum, quality, et. al may be additive, but is it a sustainable information advantage as an investor? Simple and transparent rules are easy to understand ... but they are also easy to replicate. If it works, others will likely follow. Overcrowding can become a legitimate concern. By association, investors need to be mindful of valuation. Smart beta has taught us that investors will quickly adopt a good idea.

> "One way to consider data science is as an evolutionary step in interdisciplinary fields like business analysis that incorporate computer science, modeling, statistics, analytics, and mathematics."
>
> **New York University, "What is Data Science?"**

Can you define, combine and/or integrate factors in a unique way that has produced compelling, realized excess returns over a complete market cycle of, say, 10 or more years? For multi-factor smart beta, we may have to wait 10 years to garner the desired results. For multi-factor industry veterans, their realized track records are the supporting evidence of their specific philosophy and process. Have they been able to build something better through the use of advanced data science? Is there value to more sophisticated analytical techniques than simple equal-weightings when combining factors? Can you add value in the specific formulation of a factor? Can your portfolio construction process provide another source of value, particularly on a risk-adjusted basis? Are you able to discern and capitalize on intra-year trends by reconstituting portfolios on a monthly or quarterly basis as opposed to calendar years, a common practice with smart beta strategies? In summary, data science and "big data" have become a pervasive phenomenon in just about any industry. Has it been helpful to investors who are interested in multi-factor investing?

PNC CAPITAL ADVISORS' MULTI FACTOR APPROACHES

PNC Capital Advisors has been a long-standing advocate and practitioner of factor-based investing, be it our large-cap centric Advantage Equity team or our Structured Equity team, which focuses on multi-factor small-cap investing. While each team has its own specific set of factors and portfolio construction processes, multi-factor model development and application have been in place for well in excess of 10 years for both of these teams. We're fortunate to have historical portfolio data to evaluate the efficacy of specific factors, combinations of factors, as well as portfolio risk management processes and controls. **Our results are not theoretical.** When the models were developed, we did use the research of Fama-French and Shiller as a foundation, with additional insights coming from Thaler and Kahneman in the context of behavioral finance. We believe Shiller was right – there are inefficiencies in the marketplace, at least in the short- to intermediate-term. We believe that we have been able to capitalize on these behavioral biases, in addition to harnessing value, size, low volatility, and quality as effective factors. Albeit outside the scope of this discussion, we welcome investors to learn more about the philosophy, process, and investment track record of our investment teams.

CLOSING THOUGHTS

We're excited our industry has embraced factor-based investing through the advent and growth of smart beta strategies. We believe the progression from single-factor to multi-factor smart beta is a logical evolution, particularly if we witness greater cyclicality in specific factor efficacy. That could be a function of overcrowding, valuation, or exogenous effects outside of our models. We have personally managed multi-factor models through a variety of cycles since the mid-1990s as industry practitioners and for over 10 years with PNC. We are steadfast in our commitment and say welcome aboard to investors who are intrigued by factor-based investing and its underlying scientific foundation.

The MSCI USA Index is designed to measure the performance of the large- and mid-cap segments of the U.S. market.

The MSCI USA Momentum Index is based on the MSCI USA Index, its parent index, which captures large- and mid-cap stocks of the U.S. market. It is designed to reflect the performance of an equity momentum strategy by emphasizing stocks with high price momentum, while maintaining reasonably high trading liquidity, investment capacity, and moderate index turnover.

The MSCI USA Enhanced Value Index captures large- and mid-cap representation across the U.S. equity markets exhibiting overall value style characteristics. The index is designed to represent the performance of securities that exhibit higher value characteristics relative to their peers within the corresponding GICS® sector. The value investment style characteristics for index construction are defined using three variables: price-to-book value, price-to-forward earnings and enterprise value-to-cash flow from operations.

The MSCI USA Sector Neutral Quality Index captures large- and mid-cap representation across the U.S. equity markets. The index aims to capture the performance of securities that exhibit stronger quality characteristics relative to their peers within the same GICS® sector by identifying stocks with high-quality scores based on three main fundamental variables: high return-on-equity (ROE), low leverage, and low earnings variability.

The MSCI USA Momentum Index was launched on Feb 15, 2013. The MSCI USA Sector Neutral Quality Index and the MSCI USA Enhanced Value Index were both launched on Dec 12, 2014. ***Data prior to all of these launch dates is backtested data (i.e. calculations of how the index might have performed over that time period had the index existed). There are frequently material differences between backtested performance and actual results.***