



Smart Beta's Incompleteness Problem: Restoring Balance to an Unbalanced Approach

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This paper will provide an overview of a typical Smart Beta strategy and analyze the market environments in which it might be expected to outperform or underperform. We then propose an approach to addressing the deficiencies in traditional Smart Beta, whereby more consistent factor exposures in each phase of the market cycle can produce superior returns with lower risk.

What is Smart Beta?

The term "Smart Beta" has become one of the most trendy ideas in investing. Seemingly countless articles and white papers have been produced; a Google search on the term produces roughly 460,000 results. There is no one clear definition for Smart Beta, but there is a general consensus that it refers to rules-based strategies that are detached from traditional market-capitalization (size-based) weighting schemes.

Smart Beta encompasses strategies as varied as equal-weighted indexes (such as the Russell Fundamental Index® which weights securities based on an average of three fundamental measures of company size rather than market capitalization), low-volatility/minimum-variance strategies, and newer single factor or combination factor strategies that attempt to replicate more traditional active quantitative approaches. As traditional passive investing strategies capture a dominant market position, representing roughly 35% of the retail equity market assets, allocations to Smart Beta strategies are small at this point. It is a nascent industry, perhaps the equivalent of passive indexing in the 1970s. But it's also a fast-growing segment of the market, one with a lot of "buzz." It's an industry that started in the institutional marketplace but has a growing retail footprint as well. Most of the strategies occupy a space somewhere between fully passive and fully active, typically with a comparable in-between fee structure as well.

Smart Beta = Factor Tilts to Size and Value

Although billed as pseudo-passive strategies, the most common form of Smart Beta is essentially a rebranding of value, low volatility, and size factors. These are factors quantitative managers have been using for years in their portfolios.

Some proponents of Smart Beta approaches even argue the vast majority of successful active factor-based strategies contain hidden value and size factors.¹ The not-so-subtle implication of this argument is that alpha is essentially just 'hidden' value and size tilts. Therefore, by extension, virtually all an investor needs is a low-cost

(equal-weighted) Fundamental Index because even if a Smart Beta strategy is a means of achieving value and small size tilts, most other systematic alpha approaches are just a roundabout way of getting to the same place.

We agree that the embedded characteristics of the most popular Smart Beta strategy systematically tilt toward value, smaller size, and low volatility names. We disagree, however, it is representative of all available factor exposures, or it is all an investor needs to achieve a balanced investment portfolio. We believe Smart Beta strategies are generally incomplete because they expose the investor to cyclical return characteristics and benchmark-relative performance deviations that are undesirable. A more balanced set of factor portfolio exposures can improve portfolio risk/return characteristics and deliver more complete exposures which compensate for shortcomings in typical Smart Beta approaches.

How Intelligent is Smart Beta?

Value and size anomalies have been known for years, with academic papers too numerous to list. In fact, they have become part of the bedrock of modern finance. Even the neoclassical efficient markets literature and its proponents, such as recent Nobel Prize winner Eugene Fama, essentially co-opted them in an attempt to salvage a modified version of the Capital Asset Pricing Model (CAPM) and Efficient Markets Hypothesis (EMH).

In the CAPM, a stock's expected return is determined by the beta of an asset relative to the market return,² so a stock's market-relative risk determines its return. The problem with the theory is empirical evidence shows value stocks (with high book-to-market ratios) historically provide higher returns at lower risk than growth stocks, while smaller cap stocks, although higher risk, provide higher than expected risk-adjusted returns relative to larger stocks. The single beta factor of the CAPM has given way first to the original Fama–French three-factor model³ which encompasses market beta and value and size factors, then later to a four-factor model which includes price momentum.⁴

The current standard in academic literature is any factor deemed to be accretive not only provides beta-adjusted excess returns, but also provides residual excess returns that are not explained by the present anomalies of value, size, and momentum. Investors in Smart Beta strategies often pose the logical question: if such anomalies are so well known, why pay active management fees for simple factor tilts? Proponents of the strategy suggest it is relatively simple to beat a passive index on a risk-adjusted basis over time with simple rules-based factor tilts toward value and small cap.

Neoclassical EMH proponents, such as Fama, would contend that even though value stocks have provided a higher return at lower standard deviation, it is actually just compensation for other hidden risks – such as

correlation with the economic cycle. This nuance raises potential concerns for investments that decline more when markets are going down and the appetite for risk is low or have a levered relationship with general business revenue and job risk, etc. Regardless, most institutional investors are more concerned with excess return and traditional volatility risk measures, such as standard deviation, than they are with such potential esoteric risks. On these traditional measures, value and small size tilts look good on a historical basis.

A potential concern some EMH adherents raise is any anomaly should eventually be arbitrated away by efficient markets given enough investor attention. The data in Chart 1 partially substantiates this view. The large cap value premium over growth, measured in the Fama-French data, was highly consistent until the 1990s. On a rolling 10-year basis, while the long-term average excess return is 3.38%, the average excess return since 1990 is -0.53%. In fact, the value premium reached the long-term average excess return only briefly at the peak of the last deep value cycle in 2009. Moreover, while the excess returns have not been as prolific recently, the measured volatility of value stocks was also higher over the same period.

Chart 1: Large Value Premium, 10-Year Rolling Returns (12/31/45 - 8/31/16)



Investors would be wise to consider whether simple factor tilts will produce the long-term benefits they might be expecting in the future based upon a simple extrapolation of the past. It might be advised to dig deeper into the questions of how intelligent a simplistic Smart Beta really is.

Missing Factors – What About Momentum and Quality?

What is missing in most Smart Beta portfolios? The first thing is the fourth factor in the oft-mentioned Fama-French Four Factor (FF4) model: momentum. The second aspect not covered in the FF4 model, but well covered and well supported in anomaly literature, are various quality-oriented factors.

Much as Fama might argue, simple value exposure leads to riskier stocks that are more cyclically correlated with the economic cycle – even if not manifested in monthly stock price variance – which correspondingly results in more negative exposures to many quality-related measures. The riskiness of value stocks and small cap stocks generally manifests in lower quality names, sometimes more colloquially referred to as “junk.”

From this point on, we will focus on the Russell Fundamental Index® as the most prevalent representation of typical Smart Beta. We recognize the Smart Beta moniker covers a wide array of strategies, but this index is widely representative of the tilts present in the sub-class that attempt to systematically break the link with capitalization-weighted indices.

Table 1 shows the historical (beta-adjusted) monthly returns of the Russell Fundamental Index® regressed against several alpha and risk factors. This gives a solid breakdown of the underlying positive and negative factor exposures in the index. Not surprisingly, it shows strong positive standardized exposures to *Value* (Book-to-Price and Earnings-to-Price), although negative exposure to cash on hand (Cash/Market Value). It also shows a strong tilt toward low volatility and illiquid stocks. What’s the trade-off? The portfolio is extremely negative on *Momentum* measures, such as estimate momentum (downward revisions, upward revisions, magnitude of revisions), expected earnings growth and also many *Quality* measures (capital discipline, shareholder yield, earnings quality).

So, in Fama-French terms, the portfolio is positively exposed to two anomalous factors of value and size and negatively exposed to momentum. These particular factor tilts might do well over time but will produce a very cyclical portfolio that will do well in some environments, like 2003 and 2009, and quite poorly in other environments, such as extended expansionary growth environments where trend is favored.

Fortunately, any unbalanced portfolio of factor tilts can be improved by including negatively correlated factors that also have positive long-term average excess returns. It is simple asset allocation theory applied at the factor portfolio level. With nothing more than consistent strategic allocations to factor portfolios that relate to value factors (Smart Beta, minimum variance, Russell Fundamental Index®), quality factors (Simulated Defensive Portfolio), and momentum factors (Simulated Expansion Portfolio), a substantially superior risk/return profile can be generated to that of a Smart Beta standalone approach.

Table 1: An Analysis of Russell Fundamental Index® Returns (7/31/96 - 9/30/16)

Regression Statistics	
Multiple R	0.78
R-Square	0.61
Adjusted R-Square	0.57
Standard Error	0.99
Observations	242

ANOVA Table	degrees of freedom	Sum of Squares	Mean Sum of Squares	F-stat
Regression	16	341.77	21.36	21.65
Residual	226	222.98	0.99	
Total	242	564.75		

Factor Statistics	Coefficients	Standard Error	t-Stat	P-value	Lower 95%	Upper 95%
VALUE						
B/P	0.73	0.15	4.99	0.00	0.44	1.02
Cash/MV	-0.12	0.19	-0.63	0.53	-0.50	0.26
Forward E/P	0.50	0.10	5.02	0.00	0.31	0.70
QUALITY						
Balance Sheet Quality	-0.03	0.20	-0.16	0.87	-0.44	0.37
Capital Expenditures	-0.33	0.22	-1.46	0.15	-0.76	0.11
Earnings Quality	-0.35	0.21	-1.71	0.09	-0.76	0.05
Shareholder Yield	-0.14	0.22	-0.65	0.51	-0.58	0.29
MOMENTUM						
Upward Revisions	-0.82	0.17	-4.94	0.00	-1.15	-0.49
Downward Revisions	-0.73	0.17	-4.26	0.00	-1.07	-0.39
Earnings Change	-0.26	0.16	-1.70	0.09	-0.57	0.04
Relative Strength	-0.05	0.10	-0.47	0.64	-0.24	0.15
GROWTH						
Cash Flow	-0.10	0.21	-0.48	0.63	-0.51	0.31
Expected Growth FY1	-0.39	0.16	-2.48	0.01	-0.71	-0.08
RISK						
Price Volatility	-0.33	0.06	-5.32	0.00	-0.45	-0.21
Liquidity	-0.69	0.12	-5.95	0.00	-0.92	-0.46
Size	-0.22	0.08	-2.72	0.01	-0.37	-0.06

Balanced Factor Portfolios = Smarter Beta

Table 2 shows the historical returns for the Russell 1000 Index, as well as the style indices, compared to the Russell Fundamental Index®. The attraction of the Smart Beta approach is clear from the aggregate historical risk/return profile. Value beats growth historically with less volatility, hence its designation as a Fama-French anomaly factor, although we have seen this does not hold true for the Fama-French data (see Chart 1). The correlation of the Russell 1000 Value Index is highest, as we would expect, with the Fundamental Index approach. The Fundamental Index, however, due to its smaller size tilt and low volatility tilt as well as the exposure to more illiquid stocks (a liquidity premium), yields an even better historical risk/return profile over the available index return history, as reflected in its higher Sharpe Ratio. The underperformance of value over the last decade changes the Fundamental Index profile despite the outperformance of small size and low volatility over the same time frame, as shown in Table 3.

Table 2: Smart Beta vs. Traditional Indices Risk and Return Characteristics (6/30/96 - 9/30/16)

	Total Return	Std Dev	Semi Std Dev	Sharpe Ratio	Sortino Ratio	Correlation
R1000 Index	8.48%	15.53%	9.34%	0.40	0.66	0.94
R1000 Value Index	8.82%	15.22%	9.20%	0.43	0.71	0.99
R1000 Growth Index	7.63%	17.57%	10.70%	0.30	0.50	0.82
Russell Fundamental Index®	10.06%	14.85%	8.75%	0.52	0.89	1.00

Table 3: Smart Beta vs. Traditional Indices Risk and Return Characteristics (9/30/06 - 9/30/16)

	Total Return	Std Dev	Semi Std Dev	Sharpe Ratio	Sortino Ratio	Correlation
R1000 Index	7.10%	15.53%	9.68%	0.41	0.65	0.99
R1000 Value Index	5.55%	16.08%	10.26%	0.30	0.47	0.99
R1000 Growth Index	8.55%	15.53%	9.46%	0.50	0.82	0.95
Russell Fundamental Index®	7.26%	16.01%	9.81%	0.41	0.66	1.00

We learn even more when we separate returns into three distinct market regimes: Cyclical Upturn, Market Downturn, and Expansion Trend (Table 4). We see that the Smart Beta tilt to low volatility value factors produces the biggest outperformance in Market Downturns. There is a slight advantage in the Cyclical Upturn market phase, where the market and economy are in a rebound recovery phase that favors lower quality, higher beta, deep value stocks. These periods exhibit brief and extreme high return months that occur as the market bounces off the bottom. They represent only 7% of the observations (15 months out of 243) during this time frame, but they are months that produce substantial return contribution nonetheless.

Table 4: Smart Beta vs. Market Index Returns in Different Market Phases (6/30/96 - 9/30/16)

	Cyclical Upturn	Market Downturn	Expansion Trend	Total Return
R1000 Index	46.03%	-12.77%	14.84%	8.48%
R1000 Value Index	45.94%	-6.79%	12.67%	8.82%
R1000 Growth Index	46.19%	-18.95%	16.83%	7.63%
Russell Fundamental Index®	52.64%	-4.02%	12.32%	10.06%

Interestingly, the tilt toward lower volatility also helps during the Market Downturn phase that generally favors lower beta, higher quality stocks, despite the value exposure that performed slightly poorer in such environments. These Market Downturn observations represent about 29% of the months (70 of 243) during this period that encompassed a largely sideways decade after 2000. Therefore, 29% of observations are more prevalent than would be expected in a long-term dataset. Still, downside protection is obviously critical to the preservation of return and highly prized by investors. We know from our earlier analysis that while there is an emphasis toward low volatility and a slight positive exposure toward balance sheet quality, the Russell Fundamental Index® actually has substantially *negative* exposures to other quality factors that perform well during this market phase.

The obvious defect of the typical Smart Beta portfolio is during the Expansion Trend phase, which is the most common market phase. It clearly underperforms the Russell 1000 Index and the overall best Russell 1000 Growth Index. The Expansion Trend phase is the most prevalent market state, representing 64% of the months (156 out of 243) during this time frame and an even higher percentage in the long run. The Expansion Trend phase is when growth decisively beats value and momentum factors perform the best.

Comparing simulated style portfolios' performance during each of these market phases can illustrate how more consistent factor exposures can produce superior returns in each phase of the market (Table 5). The simulated Recovery Portfolio has the most consistent exposures to the pure value factor set. This produces even better returns than the value-oriented Smart Beta portfolio during the Cyclical Upturn phase and similar returns in the Market Downturn phase. The simulated Defensive Portfolio produces the second highest long-term return and a portfolio that is almost flat (0.37%) during the 70 months, when the Russell 1000 Index is down by -12.77% on an annualized basis. The simulated Expansion Portfolio is able to beat the long-term performance of the Smart Beta approach despite underperformance in two phases, largely due to the phenomenal outperformance in the most prevalent Expansion Trend months that represent almost 64% of the observations.

Table 5: Smart Beta vs. Style Portfolio Returns in Different Market Phases (6/30/96 - 9/30/16)

	Cyclical Upturn	Market Downturn	Expansion Trend	Total Return
Russell Fundamental Index®	52.64%	-4.02%	12.32%	10.43%
Recovery Portfolio	67.36%	-4.99%	12.89%	11.55%
Defensive Portfolio	38.49%	0.37%	14.26%	11.95%
Expansion Portfolio	49.37%	-19.08%	21.93%	12.03%

Strategies that perform best in distinctly different market phases can be utilized as an advantage in portfolio construction. As mentioned, combining lowly correlated factor portfolios can result in a far superior long-term strategic mix. How can we intelligently improve upon a traditional Smart Beta portfolio? We know traditional Smart Beta is missing both momentum and quality factor exposures, so if we combine it with the Defensive Portfolio and the Expansion Portfolio, that should improve both the total return and the pattern of the returns. In Table 6, we show a strategic weighting of 30% Russell Fundamental Index®, 30% Expansion Portfolio and 40% Defensive Portfolio. We label this the simulated Completion Portfolio.

Table 6: Smart Beta vs. Complete Style Portfolios (6/30/96 - 9/30/16)

	Total Return	Std Dev	Semi Std Dev	Sharpe Ratio	Sortino Ratio
Russell 1000 Index	8.48%	15.53%	9.34%	0.40	0.66
Russell Fundamental Index®	10.06%	14.85%	8.75%	0.52	0.89
Completion Portfolio	10.95%	14.67%	8.63%	0.59	1.00

Table 7: Smart Beta vs. Complete Style Portfolios (9/30/06 - 9/30/16)

	Total Return	Std Dev	Semi Std Dev	Sharpe Ratio	Sortino Ratio
Russell 1000 Index	7.10%	15.53%	9.68%	0.41	0.65
Russell Fundamental Index®	7.26%	16.01%	9.81%	0.41	0.66
Completion Portfolio	8.05%	15.11%	9.43%	0.48	0.77

It is clear a balanced portfolio including momentum and quality factors embedded in the simulated Expansion and Defensive Portfolios outperforms over both the last ten years and the entire historical coverage period for the Russell Fundamental Index®. Moreover, this hypothetical Completion Portfolio only applies a naïve static weighting, which could be improved upon with more optimal weighting of individual factors, as implemented by many active quantitative managers.

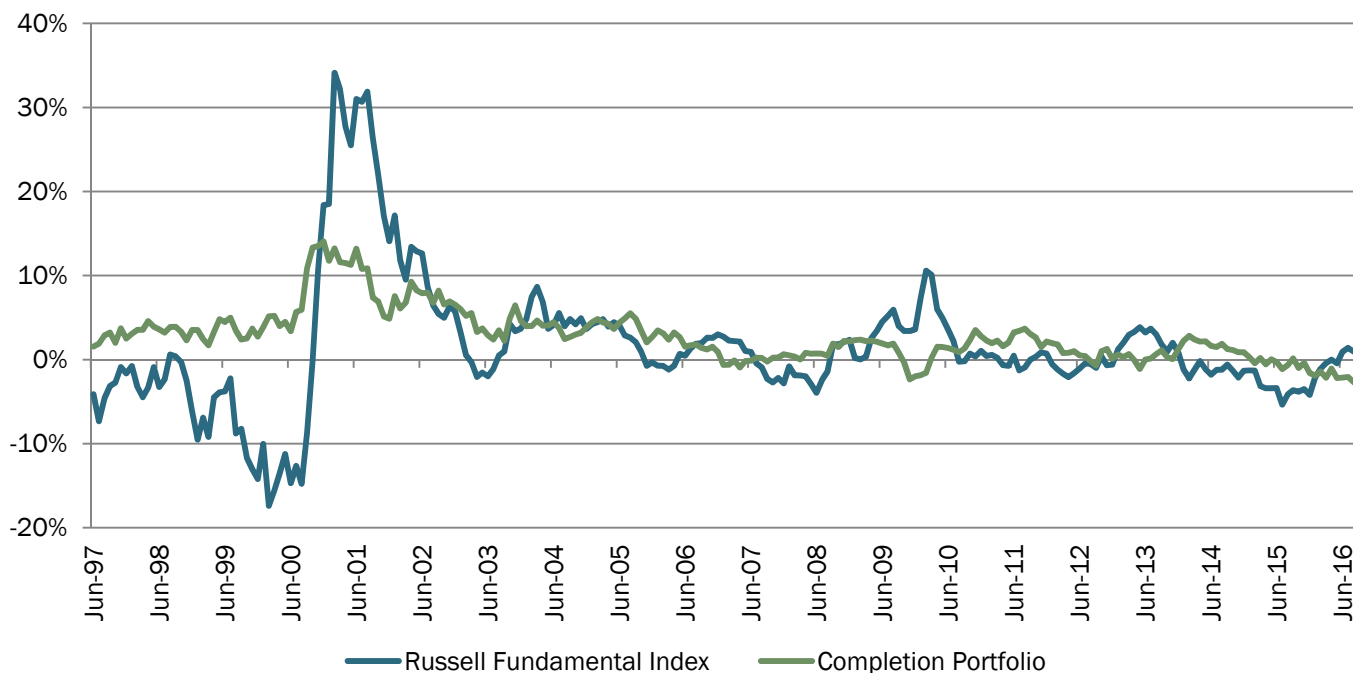
Chart 2 illustrates the rolling 12-month returns in excess of the Russell 1000 Index for the two strategies. The Russell Fundamental Index® has cyclical return behavior outperforming the Completion Portfolio during the Cyclical Upturn phases, which only represent 7% of the monthly observations. In giving up the levered return to cyclical, lower quality, value stocks, however, an investor gains a superior risk/return profile that has the added benefit of a closer relation to the overall market. The correlation of the Russell Fundamental Index® with the Russell 1000 Index is 0.94, while the Completion Portfolio has a correlation with the broad index of 0.99.

The key point here is an investor does not need to take greater cyclical deviation from the underlying benchmark in order to attain superior return/risk characteristics. All that is required is a strategic exposure to factors which

provide risk-adjusted excess returns. The difference between a truly robust approach to factor exposures and most common forms of Smart Beta, however, is the difference between exposure to a limited set of factors and a larger, more balanced set.

No strategy approach will outperform all the time, but more balanced factor-based approaches will achieve less benchmark-relative variation than more narrow factor approaches, represented by the majority of Smart Beta approaches.

Chart 2: Rolling 12-month Excess Returns vs. Russell 1000 Index (7/31/96 - 9/30/16)



Conclusion – Balancing the Unbalanced

Smart Beta strategies have been billed as pseudo-passive approaches to portfolio construction. These factor tilts most commonly represent exposures to value, low volatility, and small size. At their core, they are strategic tilts toward factors many active managers have been using for decades, although the exact application may vary depending upon the specific time horizon, turnover, and tracking error constraints. Additionally, quantitative managers understand that these factors can be applied effectively in numerous ways depending upon those portfolio parameters.

For instance, a systematic conditional sorting of the universe toward value and small size first, with subsequent sorts on momentum can be effective with long horizon, low turnover strategies. It can also lead to deep value, cyclical portfolios with substantial sector bets. Conversely, low tracking error portfolios that are sector neutral with a balance of factors can be employed effectively over shorter time horizons. In this approach, value works as a filter on other factors that are more effective over that time frame. Systematic managers understand Smart Beta is just one way to apply value and size factor tilts and not the only approach.

This paper has demonstrated Smart Beta strategies (as represented by the Russell Fundamental Index®) do indeed have value, low volatility, and small size exposures. These are accompanied by negative exposures to momentum and quality factors. Accordingly, such Smart Beta strategies have provided the bulk of their historical return in deep value markets and they exhibit a cyclical benchmark-relative return pattern – in short, a portfolio that lacks factor balance. By combining a Smart Beta approach, which does well in Cyclical Upturn market phases, with factor portfolios that do well in Market Downturn and Expansion Trend phases of the market, factor balance can be restored.

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Endnotes

1 Arnott, Hsu, Kalesnik, and Tindall [2013]

2 Treynor [1961] and Sharpe [1964]

3 Fama and French [1992]

4 Asness [1994] and Carhart [1997]

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