

Smart Beta Series

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Trading Series Part 1:

Shiny New Name or Genuinely New Idea?

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Trading Series Part 2:

When Smart Is Not That Smart

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From Smarter Beta to Smart Alpha

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Smart Beta Series Part 1:

Shiny New Name or Genuinely New Idea?

Key Ideas

The term 'Smart Beta' has recently established itself as the clear winner in the battle to become the investment industry's preferred label for an eclectic mix of diverse investment strategies. The common thread linking these various 'Smart Beta' approaches is the objective of providing investors with a 'different' – but still systematic – equity exposure to that offered by traditional cap-weighted indices.

It is a new, modern-sounding name, and carries with it the positive connotations of 'smart' technology currently popular in consumer electronics. Who would admit to not having a smartphone or aspiring to a smart TV? The marketing implication of the term is that products labeled 'smart' seem to do what the users require of them almost intuitively, and without the requirement for skilled operation.

So it is certainly a new, 21st century name – but is it really a new idea?

In short, the answer is clearly 'no' – systematic alternatives to weighting schemes based on market capitalisation have, in fact, been around for more than thirty years.

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Dumb Beta?

Of course, the unspoken implication of the term 'Smart Beta' is that good old-fashioned traditional beta is not so smart. The original idea of a market's 'beta' has been around since the 1960s. Over the years, it has become industry shorthand for exposure to the market as measured by a capitalisation-weighted portfolio. Such portfolios, despite the fact that they represent just one of many possible systematic ways of weighting stocks in a portfolio, have themselves become the accepted proxy for the return of the market as a whole. They have the advantage of low cost, utter simplicity and limitless capacity. As a cheap, quick and easy way of investing vast sums in the stock market, cap-weighted index portfolios have attracted trillions of dollars from investors all over the world. Academic fuel to the cap-weighting fire was provided from the very beginning by the Capital Asset Pricing Model, which argues that (as long as you accept a whole range of oversimplifying and unrealistic assumptions) the cap-weighted index is, in fact, an efficient portfolio. This cornerstone of Modern Portfolio Theory spawned the belief, still widely held by many, that the cap-weighted index portfolio offers the highest achievable return for the level of risk associated with it. Cap-weighted index funds continue to attract large volumes of asset flows from all types of investors, all over the world, who still cling to this long-discredited notion.

EXHIBIT 1
CAP-WEIGHTED INDEX ASSETS



Source: P&I. Cap-weighted index assets may include amounts of assets benchmarked to non-cap-weighted indices due to past data reporting limitations.

When did the first 'Smart Beta' ideas emerge?

Although the term 'Smart Beta' was 30 years from being coined, systematic investment strategies designed to improve upon the inherent flaws of cap-weighted index portfolios began to emerge already in the 1980s. For example, Dr. E. Robert Fernholz, founder of Intech® and a creator of enhanced equity portfolio construction methods, published a seminal paper as early as 1982 in which he demonstrated that not only is the cap-weighted index NOT an efficient portfolio, but that a higher return can be generated with similar risk by simply better diversifying the holdings and rebalancing. At Intech®, we have been pursuing such an investment strategy for over 30 years, and today manage in excess of \$40 billion according to such principles.

Subsequent further attempts by practitioners and academics in the investment management industry to identify their own persistently successful portfolio 'tilts' are well-documented. There has been a plethora of various alternative weighting schemes proposed over the years: equal-weighted, revenue-weighted, dividend-weighted, earnings-weighted, liquidity-weighted, beta-weighted, wealth-weighted and GDP-weighted, to name but a few. Various blends of these 'factors' and others formed the basis for a succession of competing 'Enhanced Indexation' products offered by quantitative managers throughout the 1990s and beyond. They, too, may have been thrown into the 'Smart Beta' bucket at the time had the term been available.

However, a small number of these individual 'factors' stand out from the crowd; they are 'Size' (1981), 'Value' (1992) and 'Momentum' (1997). They have attracted such a following over the last three decades that they have achieved celebrity status and become named 'effects.' Some might add to this list 'Volatility,' with the 'Low Volatility Anomaly' currently knocking on the door of the "Risk Factor Hall of Fame." Portfolios constructed according to these measures have become immortalised as winning investment strategies that just 'work.' Whether or not this is true is open to doubt and the subject of a later paper. However, suffice it to say, that investment management firms have built entire businesses and manage hundreds of billions of dollars based upon offering products designed to exploit these effects. And furthermore, along with beta, they have become enshrined in both the literature, practice and faith system of our industry as the basic components of portfolio performance: risk factors that can be used to explain the performance of other portfolios.

Smart Beta – a name in search of a category?

So why the sudden emergence of ‘Smart Beta’ as a category, if the constituents of that category have been around for over 30 years? The answer lies most likely in some investment industry themes that have risen to heightened prominence in the last five years: how to achieve better returns, how to reduce risk and how to control costs.

Two major stock market crashes since the turn of the century have left investors bruised, pension funds in deficit and everyone in need of more return. At the same time, there has been a heightened focus by plan sponsors, regulators and investment committees on risk – how to diversify exposure, and thereby reduce it. And achieving both of these things in a highly cost-effective way is at the forefront of investors’ minds at a time of global economic austerity and modest expected future returns from the capital markets as a whole. The concept of ‘Smart Beta’ has been pushed forward to meet these challenges.

As previously noted, the term ‘beta’ is synonymous with passive management, of which a key benefit is its very low cost. However, for about 50 years, the only passive option on the menu was cap-weighted indexation, which, though inexpensive, has a number of shortcomings. Chief amongst these are: overexposure to overvalued stocks, overexposure to large stocks and lack of downside protection. Even in an index fund there’s a reasonable chance you might lose half your money in a 12-month period.

‘Smart Beta’ approaches purport to offer the same low-cost, passive approach enjoyed by cap-weighted index portfolios, but designed to exploit many of the favourite risk factors highlighted above, to generate a higher return at the same or less risk. They are sometimes called ‘alternative’ index portfolios, as they employ weighting schemes based on measures other than market capitalisation, such as fundamental valuation metrics or stock volatility. So accepted and mainstream have these ‘effects’ now become that they are considered commoditised exposures that can be accessed mechanistically and passively through rules-based processes as part of one’s ‘Smart Beta’ allocation – a diversifying alternative to traditional cap-weighted portfolios. Although such factor-based strategies have been around for over 30 years, ‘Smart Beta’ index portfolios aim to remove the need to employ skilled

active managers to access them. What was previously sold as alpha has been re-packaged as beta and offered to investors in generic ‘index’ form.

But are these strategies really indices? And are they truly passive? Is ‘Smart Beta’ genuinely smart, and is it really beta? The answers to these questions and others are the topic of the second article in this series.

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Investing involves risk including the loss of principal and fluctuation of value.

Intech is a private, quantitative asset manager investing on behalf of pension funds, governments, endowments, foundations, and other institutional investors worldwide. Having pioneered the application of Stochastic Portfolio Theory in 1987, Intech continues to seek distinctive alpha sources for clients in five continents. Today, Intech provides investment solutions encompassing ESG, absolute return, defensive equity, and traditional long-only strategies.

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Smart Beta Series Part 2: When Smart Is Not That Smart

Key Ideas

For years, the efficacy of capitalization-weighted portfolios has been questioned by academics, asset owners, investment consultants, asset managers and others. Most recently, the discussion has migrated to a new series of portfolio solutions that have been collectively referred to as “smart beta.” These portfolios generally weight stocks based on factors such as size, value, momentum and volatility, and are often claimed to be more efficient than cap-weighted indexes. Additionally, a basic tenet of smart beta is that these portfolios can be constructed systematically and simply at a reduced cost. Often overlooked are the embedded risks associated with these strategies, and the potential for unexpected results that can be generated by naively implementing them without appropriate evaluation.

Can beta become smarter?

Nobel Prize-winning economist William Sharpe introduced the notions of “beta” and “alpha” decades ago. Put simply, Sharpe defined beta as a measure of a portfolio’s sensitivity relative to the market. Under this definition, it is difficult to fathom how beta can become “smarter.”

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There is really only one true beta. On the other hand, there are various portfolio methodologies that lie on a spectrum between the classical definitions of beta and alpha proposed by Sharpe and the Capital Asset Pricing Model (CAPM). While we are not interested in a semantic debate on “dumb vs. smart” we do want to look at some of the common alternatives that are being discussed currently. More importantly, we believe that identifying and outlining the risks and potential pitfalls of these portfolios is more important than futile attempts to answer the question of who has smarter beta.

So what is it all about?

Recent industry estimates suggest that upwards of \$6tn in institutional assets will enter this asset category within the next five years.¹ Regardless of the moniker assigned to the category (smart beta, systematic portfolios, scientific beta, alternative beta, beta prime, etc.), institutional investors are now recognizing the potential benefits of investing in portfolios employing weighting schemes that differ from cap weighting. This is not surprising. Intuitively, most investors realize that constructing a portfolio around a cap-weighted index is unlikely to be optimal. Simply allocating portfolio weights to securities in proportion to their size leads to concentration in mega-cap companies and various other drawbacks that have been well-documented. Less well-appreciated is that cap-weighted indexation forgoes a potential return premium arising from rebalancing that will be examined in more detail in the third paper in this series. These intuitions, however, bolstered by numerous academic studies, have driven an increasingly large number of investors to seek alternatives to the cap-weighting approach, many of which fall under the label of smart beta.

Typically, smart beta classifications fall under three distinct categories:

- Factor portfolios (size, value, momentum)
- Fundamentally weighted portfolios
- Low-volatility/minimum variance portfolios

Adherents to each of these approaches believe that “tilting” the portfolio towards certain characteristics will result in a risk premium that will generate higher returns. Consequently, each has a potential risk impact that needs to be identified and addressed.

¹ Financial Times, September 6, 2013.

1. Factor indices

As the name suggests, these indices focus on providing systematic exposure to certain risk factors, typically size, value and momentum, which are expected to provide better than cap-weighted returns.

The size factor

There is a widespread belief that smaller stocks have higher returns than larger stocks in the long run. The most simplistic index designed to exploit this belief is the equal-weighted portfolio, which allocates equal amounts to all stocks regardless of their capitalization. Not surprisingly, this leads to significantly reduced allocations to large stocks and much higher allocations to smaller stocks than a cap-weighted index. Most investors that subscribe to equal-weighted portfolios are consciously targeting the return premium commonly associated with smaller companies. Unfortunately, the small cap allocations can lead to illiquidity

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and capacity constraints, which make maintenance of the equal-weighted structure difficult and expensive. Furthermore, such an approach also leaves the portfolio at risk of substantial long-term underperformance during those possibly extended periods when large-cap stocks outperform small.

The value factor

There is a similar broad-based belief in the notion that stocks with a low market value relative to their fundamentals deliver higher long-term returns. One unfortunate by-product of cap-weighted

indices is their concentration in often-mispriced stocks at the higher capitalization levels. As the cap-weighted index allocates weightings in proportion to the size of the company and not based on the intrinsic values of the underlying stocks, there is a tendency for the largest holdings to be overvalued. Thus, one smart beta solution to exploit this is to create a portfolio with a definitive 'value' tilt that focuses on the individual stock valuation metrics (e.g. price/book or price/earnings). While the value premium has been identified as a potential source of long-term enhanced return for many years, it is not without risks. Some companies may have low valuations with good reason, specifically poor and possibly deteriorating fundamentals that are unlikely to improve. A systematic tilt to low-value stocks may lead to an overexposure to distressed businesses. Furthermore it is well documented that there have been extended periods when value stocks have historically underperformed their growth counterparts, especially during stock bubbles. Value-tilted portfolios could be susceptible to prolonged periods of substantial underperformance during such periods. We will look further at the value premium in our review of Fundamental Indices in the next section.

The momentum factor

A third common belief is the notion that stocks that have outperformed in the recent past (for example the last 12 months) will continue to do so in the near future. In other words, good performance tends to persist. This performance 'momentum' is another factor targeted in some smart beta strategies. Although such strategies are less common, some investors do consider them for diversification purposes: they tend to do well when size, value and low volatility underperform. Favorable correlations notwithstanding, and despite impressive long-term returns, dramatic underperformance in shorter periods is not uncommon as markets correct (e.g. tech bubble, global financial crisis). Momentum indices can also be subject to extensive turnover. By definition, these indices are considered higher risk and may not be appropriate for investors seeking to manage surplus funding volatility.

2. Fundamental indices

Fundamental indexation has emerged as the generic term for portfolios constructed systematically based on a rules-based combination of fundamental metrics. In this approach, a portfolio of stocks is created by comparing and weighing fundamental accounting data (e.g. sales, earnings, book value, dividends, cash flow) to create a portfolio that differs from the cap-weighted index. Not surprisingly, by weighting stocks in a manner that more closely reflects their intrinsic value, rather than their market value, the portfolio tends to end up with a definite value tilt. As such, the success of this strategy is dependent on the presence, and successful exploitation, of the previously discussed value premium. A further side-effect of this weighting methodology is a tendency to underweight the very largest stocks, as they are often the most overvalued. As a result, most fundamentally weighted portfolios also exhibit an exposure to the size factor. Given these two risk-factor exposures that result from the fundamental weighting methodology, it is clear that there will be periods when these factors are out of favor and, as a consequence, such portfolios can undergo extended periods of underperformance relative to their cap-weighted counterparts. Unlike pure value funds that are actively monitoring the fundamentals of their targeted/held stocks, these indices are very diverse (in many instances holding upwards of 1000+ stocks). Ironically, this diversity can potentially diminish the impact of their value premium by holding stocks that normally would not be held due to little or no intrinsic value.

3. Low-volatility or minimum variance indices

The empirical evidence that less volatile equity portfolios outperform their more volatile counterparts in the long run first appeared in the academic literature many decades ago. Interest in this phenomenon has increased dramatically in the past 15 years as equity markets have exhibited poor long-term returns with high volatility. The observation has spawned the increasingly widely held belief that less volatile stocks, therefore, must have higher average returns than more volatile stocks. This has become known in recent years as the 'low volatility anomaly' due to the fact that financial theory predicts less risky assets should have lower, not higher,

**Just as smart beta is not necessarily all that smart...
these indices are not truly beta or passive.**

returns. Numerous 'smart beta' offerings have emerged to provide exposure to this claimed anomaly. Some of these low-volatility offerings are branded as indices, and a variety of approaches can be used to achieve the desired low-volatility portfolio characteristics. The simplest approach is merely to select a certain number of the least volatile stocks from the relevant universe based on recent history, and allocate to them in inverse proportion to their volatility. Other, more sophisticated approaches also consider stocks' correlations (a crucial component of portfolio volatility) as well as volatilities and apply optimization techniques to portfolio construction order to achieve the desired effect. To claim index status, many such approaches artificially constrain portfolio turnover, thereby limiting the potential for volatility reduction. Those which do employ optimization typically use proprietary techniques and risk estimates. As such, transparency into the portfolio is limited and it is questionable whether such approaches can truly be considered indices. In fact, it is questionable whether or not low-volatility portfolios should really be included in the 'smart beta' category at all, particularly when considering that these offerings typically exhibit traditional 'betas' of substantially less than 1.0. This generally leads to an expected return pattern that can be very different to a cap-weighted index, with potentially very large outperformance or underperformance relative to the cap-weighted index over short- and even medium-term periods, especially during periods of extreme market movements.

Smart Beta is neither smart nor passive

As can be seen from the above summaries, while the various popular smart beta offerings purport and appear to outperform in the long run, all are subject, to a varying degree, to certain risk exposures that can lead to substantial short- to medium-term variation in relative return with respect to a cap-weighted benchmark. Some smart beta purists might argue that it is not appropriate to judge the performance of these approaches by comparison with a cap-weighted benchmark, as the approaches themselves represent a new benchmark. However for many investors this is a step too far, and the cap-weighted index, at least as the context if not as a formal benchmark for judging performance, is still too ingrained in the institutional investor psyche. Assessing the embedded risks in any of the above indices is a critical endeavor for any investor. More importantly, it is incumbent on asset managers to clearly identify and address any risk mitigation techniques that are being deployed on behalf of their investors. Most providers of smart beta strategies, however,

do not employ risk controls relative to the cap-weighted index to limit potential underperformance when the relevant risk factor to which exposure is being provided may be out of favor.

In addition, we must address one of the most promulgated fallacies around these indices: they are passive. Just as smart beta is not necessarily all that smart, and most certainly does not represent a panacea, these indices are not truly beta or passive. Cap-weighted indexation, 'traditional' beta, is the only truly passive, buy-and-hold strategy. As noted for each of the above categories, their success is dependent on identifying and systematically harvesting a targeted fundamental factor. This can only be achieved by active trading. Without active trading, the efficacy (and impact) of these indices is diminished. Over time, without systematic maintenance of the desired factor tilts through trading, the targeted benefit is missed and/or eliminated as the portfolio succumbs to style drift due to market action.

Not surprisingly, each smart beta provider regards trading differently. The timing and frequency of trading varies by strategy as the providers look to balance capturing the factor premium with the erosive effects of excessive trading costs. Each provider should be expected to clearly articulate their trading strategy (timing, frequency, etc.) as well as effectively measure and monitor the trading cost impact. Proprietary algorithms or not, the increased demands on institutional investors to find better, more cost effective investment alternatives necessitate better disclosure and most cost effective trading. While this may cause difficulties for some, it really *is* a smart thing to do.

Most smart beta strategies lie on a spectrum of passivity ranging from highly rules-based, transparent strategies at one end, to optimized, high-maintenance strategies at the other end. The former have perhaps the greater claim to index status, but their very transparency leaves them vulnerable to exploitation and front-running around any systematic reconstitution points. This could be especially problematic if such strategies are popular and attract very large volumes of assets to what are quite capacity-constrained approaches. The optimized strategies are sometimes less transparent and therefore less susceptible (but by no means immune) to such dangers, but it is even more questionable whether such approaches are suitable and usable by investors and even managers as true indices, if they are based on proprietary optimization techniques, which are by definition opaque.

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Conclusion

The smart beta phenomenon is real and expected to grow over the foreseeable future. While the growth trends are real, the expectation of creating “smarter” beta is not. Changing the naming methodology, often done in the name of investment innovation, does not change the fact these solutions are based on age-old fundamental factors. Not surprisingly, most plan sponsors still subscribe to the cap-weighted indices as benchmarks for their money managers, even when subscribing to a “smarter” alternative. Why? There is only one true beta. In this context, the third and final paper in this series will examine the underlying common return driver of most popular smart beta strategies and introduce the notion of a strategy designed specifically to exploit this phenomenon: smart alpha.

Intech is a private, quantitative asset manager investing on behalf of pension funds, governments, endowments, foundations, and other institutional investors worldwide. Having pioneered the application of Stochastic Portfolio Theory in 1987, Intech continues to seek distinctive alpha sources for clients in five continents. Today, Intech provides investment solutions encompassing ESG, absolute return, defensive equity, and traditional long-only strategies.

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Smart Beta Series Part 3: From Smarter Beta to Smart Alpha

Key Ideas

Smart beta is available in many different forms and flavors. What almost all of them have in common is that they are systematic, formulaic weighting strategies. This means that some algorithm, normally at least partially transparent, is periodically used to determine the weight of each stock in the portfolio. Of course, cap-weighting itself fits into this category: the algorithm in this case is to hold each stock proportionally to its market capitalization. This is just “beta,” but why should cap-weighting be so dim-witted in comparison with other weighting strategies dubbed as “smart beta?”

The answer usually given is that smart beta taps into various risk premia and/or behavioral anomalies that cap-weighting overlooks and that are responsible for improved performance. This explanation neglects to take into account the unexpectedly crucial fact that, unlike cap-weighted indexes, smart beta strategies are not buy-and-hold: they require trading and rebalancing to maintain their respective exposures. This can have a surprising impact on long-term performance, and may also provide a cause for concern in the shorter term.

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Adrian Banner, PhD
Chief Investment Officer

How might systematic rebalancing contribute to portfolio return? A strategy that consistently buys low and sells high across hundreds of securities intuitively has an advantage. The key is to recognize that much of the short-term price movement of stocks is dominated by natural volatility, not fundamental data or events; and, in any case, large populations of stocks tend to behave statistically as though they are primarily driven by volatility rather than trends. Rebalancing has the potential to add return to portfolios by capturing this natural volatility in a beneficial fashion.

For example, a strategy which looks to exploit the “size effect” by investing in smaller-cap names will sell stocks after they have gone up in value thus becoming ineligible to meet that strategy’s rule for inclusion (by virtue of being too large). The strategy will also purchase formerly large cap securities that have recently fallen in price to become small cap. Even if the rebalancing happens only infrequently, this favorable “buy low/sell high” trading can explain **all of the long-term outperformance of small cap indexes versus large cap indexes**. Observe that not all rules-based strategies that require rebalancing consistently buy low and sell high: indeed, a large cap index generally sells out of stocks that have recently gone down in value and buys stocks that have increased in value, leading to detrimental, rather than beneficial, rebalancing. Momentum strategies may also be subject to this sort of detrimental rebalancing, but can make it up by exploiting sufficient trend-following behavior often present in equity markets.

If rebalancing, and therefore trading, is the principal source of extra return for many smart beta strategies, then trading efficacy must be scrutinized and evaluated. Very few indexes (if any) include a transaction cost component in their returns to cover the trading required to reconstitute or rebalance the index, so it is up to investors or third parties to try to replicate the index as cheaply as possible. Not surprisingly, trading cost impact is exacerbated

for strategies that have higher portfolio turnover. However, even if the turnover of a strategy is relatively low, overcrowding can still adversely affect performance. For well-subscribed smart beta strategies, the magnitude of the trading shifts necessary to rebalance can be so large as to negatively impact trading efficacy, as the total size of these trades precludes getting best price and execution. A more insidious consideration is front-running. As most smart beta strategies are defined by their systematic construction process, this trait makes them potentially subject to the predatory practices of front-runners. Ironically, the rules-based and systematic portfolio construction practices that define smart beta portfolios may be playing into the hands of opportunistic traders. While overcrowding and front-running may not necessarily lead to underperformance, they could potentially reduce the index returns themselves. Investors may discover that they have subscribed to a vehicle that may not meet their initial expectations.

Even with the above caveats, smart beta strategies provide relatively cheap exposures to various risk factors in the market, and can be used to augment a portfolio of active managers, if the overall portfolio turns out to be over- or underexposed to these factors. More difficult is the prospect of building a portfolio of smart beta strategies. A naive reliance on historical correlations may be ill-advised. If many factors turn sour at the same time, underperformance versus a cap-weighted index could be severe and prolonged. It may be sensible to dynamically adjust exposures to different smart beta strategies over time, but this is probably no easier than determining when individual stock prices – or the market as a whole – are likely to rise or fall.

Given all of the above, perhaps smart beta isn’t smart enough. How can investors be smarter about smart beta? The answer is smart alpha.

Smart alpha is a means by which investors can tap into the common return source of the most popular smart beta strategies, but in a way that is designed to make the best use of this return source in a risk-controlled and targeted framework.

What is “Smart Alpha?”

We have made the point that the common thread linking the various non-cap-weighted smart beta strategies described is the necessity to rebalance. It can further be demonstrated that this very rebalancing activity **is actually the principal driver of the return enhancement**. Most smart beta strategies tap into this rebalancing premium accidentally, while pursuing their own particular factor exposure objective.

But if rebalancing is the true underlying alpha source, shouldn't it follow that the truly “smart” approach would be to pursue this very alpha deliberately and efficiently?

Smart alpha means:

- A deep understanding of when and why re-weighting away from cap-weighting leads to a more efficient portfolio.
- Using this understanding, and portfolio-level risk controls, to increase efficiency further.
- Effective trading tailored to the strategy and with an eye to resistance to overcrowding and front-running effects.
- The ability to customize portfolio solutions to meet client needs based on risk budgets, return targets or funding status.

It is true that smart beta has the potential to generate long-term returns above cap-weighted indexes without picking stocks or forecasting stock returns, but suffers from the dangers of inadequate risk controls relative to the market benchmark, overcrowding/capacity issues and sub-optimal implementation.

Smart alpha is a means by which investors can tap into the common return source of the most popular smart beta strategies, but in a way that is designed to make the best use of this return source in a risk-controlled and targeted framework.

Intech® has been on the cutting edge of the theory and practice of equity portfolio construction techniques for more than 30 years, and currently applies its “smart alpha” approach on behalf of institutional equity investors all over the world.

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