Dynamic Smart Beta Investing

Relative Risk Control and Tactical Bets, Making the Most of Smart Betas

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Abstract

In recent years, Smart Beta indices have seen increased interest in the asset management industry. This short article first describes the current landscape of the market and the typology of these strategies. It then concentrates on the risk of Smart Betas: these alternative weighting schemes display some specific risk that can be divided between optimality risk and parameter estimation risk. The Smart Betas might therefore go through extended periods of under-performance relatively to cap-weighted strategies. We recall the latest advances of relative risk control in the Smart Beta universe and argue that Dynamic Risk Budgeting techniques with properly defined floors can allow gaining access to their long run expected over performance while controlling for the potential underperformance to a level set ex-ante. Finally, we discuss how investors can dynamically allocate between Smart Beta strategies as a function of active views and market conditions.

Traditionally, the fund management industry was split between passive and active management. In recent years, a new form of indexation, referred to as Smart Beta, has seen a growing interest among investors.

The Third Alternative

Smart Beta strategies are alternative weighting schemes to traditional market-capitalisation weighted indices. They share some common features with active and passive asset management and offer a third option in the asset management landscape.

- ***Active Asset Management***: The active funds are meant to provide returns in excess of the benchmark, or 'alpha', in exchange of higher fees. They generally aim to do so by putting concentrated bets on selected stocks or sectors, or by timing the market.
- ***Passive Asset Management***: Passive funds aim to offer the investor exposure to the overall benchmark in a simple, transparent manner, in exchange of lower costs than active managers.

Smart Beta strategies intend to take the best of both worlds and provide transparent and diversified portfolios tilted toward rewarded risk factors.

According to Tower Watson [1], the industry has realised that what hedge funds do at great expenses can be reproduced with simple, easily accessible strategies at lower cost for the final investor. The Smart Betas therefore offer investors the possibility to capture a wide range of risk premia that used to only be available through expensive active strategies.

Current Landscape & Investors' Perception

According to *The Economist* [2], the sector is still small, with just $142 billion invested in Smart Beta funds compared to $2 trillion in hedge funds. However, Smart Beta funds received $15 billion in the first quarter of 2013, up by 45% on the same period earlier. A recent study by Russell [3] indicates that Europe leads in Smart Beta adoption. They confirm that the phenomenon is happening broadly, and that there is a strong outlook for an increased adoption of these techniques.

In a survey conducted on 300 institutional investors in November 2013, State Street Global Advisors [4] was able to confirm the interest toward Smart Beta strategies: 42% of the respondents have already committed a portion of their portfolios to alternative weighting strategies, and 24% intend to do so. The survey also allowed extracting the perception of investors: while three quarters of the respondents perceive Smart Betas as an alternative to capitalisation-weighted indices, two thirds also agree they are a viable alternative to active management. A large proportion of those surveyed therefore sees these strategies as an alternative for both, reinforcing this concept as a third alternative to traditional asset management.

Typology of Smart Beta Strategies

Capitalisation-weighted indices are very popular for their ability to reflect the current state of an economy by weighting the companies according to their economic footprint: market capitalization. However, these strategies have some major drawbacks and are not as neutral as one might think. Indeed, they are trend following as they put more relative weights on the stocks that perform the most and less on those that perform less. Put another way, they are more exposed to the most expensive stocks. This behaviour ultimately leads the strategy to be highly concentrated and thus overly exposed to the idiosyncratic risk of the most weighted stocks.

As a result, cap-weighted strategies are highly concentrated and negatively exposed to some well documented rewarded risk factors: the small caps and the value stocks. They are therefore sub-optimal strategies to hold for the investors.

Smart Betas aim at removing the aforementioned drawbacks of cap-weighted strategies: they reduce the concentration risk and intend to create more efficient portfolios. We can identify three major categories of Smart Betas:

- ***Equal Weight***: Also known as the *Maximum Deconcentration* portfolio, it is the simplest form of Smart Beta. This strategy presents the advantage that it does not require any parameter estimation. However, it can only be the most optimal portfolio under the hypothesis that all the assets have equal expected returns, equal volatilities, and equal correlations.

- ***Fundamental***: The weight of each asset is proportional to a fundamental economic measure: sales, earnings, book value... These portfolios tend to have a high "value" tilt relatively to cap-weighted strategies [1].

- ***Risk Based***: There are many different risk-based Smart Betas. Some well known strategies of this category are the *Global Minimum Variance* portfolio and the *Equal Risk Contribution* portfolio. Both require the estimation of the whole covariance matrix, but some simpler approaches such as the *Diversified Risk Parity* approach only require the estimation of the variances [5].

The estimation of returns being extremely difficult, it is nearly impossible to create the portfolio that will be the most optimal out-of-sample. Index providers aim to get closer to optimality by tilting their strategies toward historically rewarded risk factors. The most known of these factors are *value*, *size* and *momentum*.

- ***Value***: Cheap stocks (according to their Price to Earnings ratio, Price to Book ratio) will perform more than the market average.

- ***Size***: Small companies perform better than large ones over the long run.

- ***Momentum***: Stocks that have outperformed in the past will continue to outperform in the future.

These factors have been documented in the academic literature and explain a big fraction of the returns generated by active asset managers [6]. It means that a large proportion of active managers' performance can be replicated through systematic exposure to easily implementable risk factors.

Smart Beta providers therefore mitigate the concentration risk often associated with active management and cap-weighted portfolios, and intend to approach the most efficient portfolio by using alternative weighting schemes often tilted toward rewarded risk factors.

The Risks of Smart Betas

In a recent paper, ScientificBeta [5], the Edhec-Risk Institute venture, identifies the specific risk associated to Smart Beta strategies.

Total Specific Risk	=	Parameter Estimation Risk	+	Optimality Risk

The *parameter estimation risk* is the risk of a substantial difference between the estimated parameter value and the true parameter value (returns, covariance matrix). It can be split between the *parameter model risk*, the risk of choosing the wrong model; and *the parameter sample risk*, the risk of relying on sample data. The cap-weighted and the equally weighted portfolios are not affected by the parameter estimation risk.

The *Optimality risk* is the risk of deviating from the optimal portfolio by choosing an alternative weighting scheme to the *Maximum Sharpe Ratio* portfolio. Indeed, the estimation of returns being extremely difficult, alternative weighting schemes are used as proxies for the optimal portfolio but they come with strong hypotheses and the investor should therefore pay attention to the

condition(s) of optimality of the weighting model proposed [5].

These risks are intrinsic to Smart Beta strategies and mean that their performance can be very different to those of the market portfolio, leaving the possibility of long periods of underperformance. There is consequently a risk of regret and thus the risk of withdrawing from the strategy at the wrong time. Tower Watson estimates that the investors should have a long term approach with a time frame of five to ten years [1].

Such a long time frame might not be available to every investor, and it should be noted that despite their publicly long term approaches, the CIOs often have to report to boards with cap-weighted benchmarks [7]. They clearly have a strong reputation risk, and most likely not five to ten years to prove their worth. It is therefore very important to explicitly integrate the benchmark risk in the portfolio construction.

Controlling the Risk of Smart Beta Strategies

Specific Risk of Smart Beta Strategies

Modern Portfolio theory states that investors should seek to allocate to risky assets so as to achieve the highest possible Sharpe Ratio. However, in practice, this task is extremely complex because of the estimation risk for the required expected returns and covariance parameters. Recall that the estimation error may entirely offset the benefits of optimal portfolio diversification [8].

In this context, the choice in parameter estimation is between "trying" which has a cost related to *parameter estimation risk*, or "giving up" which also has an *optimality risk* related to the fact that the proxy used can be very far from the optimal Maximum Sharpe Ratio Portfolio [5].

Hence different strategies will incur more estimation risk or more optimality risk. For example, the *Equal Weight* (EW) and the *Cap-Weight* (CW) portfolios incur no estimation risk as this approach does not require the estimation of any parameter, but it has a high optimality risk since its Sharpe ratio might be very far from the Sharpe ratio of the *Maximum Sharpe Ratio* portfolio (MSR). On the contrary, *Global Minimum Variance* (GMV) or *Equal Risk Contribution* (ERC) Portfolios have a higher estimation risk as the covariance matrix is needed, but their Sharpe ratio is expected to be closer to that of the MSR.

ScientificBeta [5] shows that a fifty-fifty fixed mix of an equal weight strategy and a *Global Minimum Variance* portfolio leads to higher out-of-sample Sharpe ratios than any of the MSR[i], GMV, EW and CW portfolios. That is, a simple mix between different Smart Beta strategies allows mitigating their specific risk and potentially leads to higher risk adjusted out-of-sample performance.

Tracking-Error Risk

If the goal of investing in Smart Beta Strategies is to outperform cap-weighed benchmarks, it seems logical to take account of the benchmark risk of these new indices relative to cap-weighted strategies [9]. Relative risk control is aimed to allow investors reaping the benefits of diversification without staying too far from their peer group represented by standard cap-weighted indices [9].

Amenc et al. (2012), from the Edhec Risk Institute [9], developed a methodology for Relative Risk control as a two-step process: in a first step, one should combine the optimised portfolio with a suitably designed time-varying quantity of the benchmark portfolio so as to ensure that the relative risk is kept under the budgeted limits. The suitably designed quantity is taken to be a function of the tracking error budget, as well as time-varying parameters of the optimized portfolio. This approach is referred to as the core-satellite approach. Second, the optimised portfolio risk exposures are aligned with the benchmark portfolio risk exposures so that a substantial allocation to the optimized portfolio

can be allowed within the core-satellite approach.

This method allows accessing the returns of Smart Betas while exercising a control on the tracking error of these strategies. However, such tracking error constraints are possibly exceeded out of sample. This risk is mitigated by aligning the optimised portfolio to the implicit risk factors of the benchmark, but while this still does not explicitly guarantee the control of the tracking error, one can also wonder whether this is done at the cost of less access to rewarded risk factors.

Control of Cumulated Underperformance

Controlling for the tracking error suggests a symmetric control of the returns above and below those of the benchmark. Moreover, tracking error is not an intuitive measure of risk for investors and therefore not the most appropriate to formulate a risk budget.

Daniel Mantilla, Head of Research & Development at Koris International developed a generalisation of the maximum drawdown floors for portfolio insurance strategies [10]. *The relative drawdown floor* allows creating Dynamic Core-Satellite strategies with control of the cumulated underperformance to a level set ex-ante. Contrary to the tracking-error, this measure can have a clear interpretation in the formulation of the risk budget: controlling for the cumulative underperformance is equivalent to controlling for the difference between the logarithmic returns of the core and the satellite.

A Dynamic Core-Satellite approach with sophisticated floor definition thus offers a clear interpretation of the risk budget and allows investors to generate asymmetric relative performance: they benefit from the upside potential of Smart Beta strategies compared to their cap-weighted counterpart, while controlling for the maximum cumulated underperformance to a level set ex-ante. It therefore appears to be a very appropriate way to allocate to Smart Beta under the presence of benchmark risk.

Implementing Active Views with Smart Betas

Different market conditions will favour different assumptions on the returns and the covariance matrix [9]. Thus, alternative weighting schemes might exhibit contrasted results depending on market conditions.

The agnostic investor can therefore mitigate the strategy risk by making an equally-weighted portfolio of different strategies, and thus diversifying model selection [9]. But some investors might want to integrate their views in the choice of the Smart Beta strategy, for example, if they anticipate a higher volatility, they can invest more in a *Global Minimum Variance* portfolio that is known to perform better in highly volatile conditions.

That is, the investor can go beyond static diversification approach, and may also implement improved dynamic allocation techniques, making the allocation to various Smart Beta strategies, conditional upon market conditions [5]. This creates opportunities for tactical bets: in the presence of active views, the investor ought to allocate the most to the strategies whose conditions of optimality are the closest to what he expects from the market.

Tactical bets can also be of a different nature, and depend on the specific risk of Smart Beta. Indeed, we highlighted the trade-off between *estimation risk* and *optimality risk*. While the aforementioned research [5] mitigates this risk with a fifty-fifty fixed mix portfolio between an *Equal-Weight* strategy and a *Global Minimum Variance* strategy, investors might want to depart from this mix and allocate more or less to an *Equal-Weight* portfolio or to strategies relying more on parameter estimations as a function of the perceived level of uncertainty in the estimation of the parameters.

Conclusion

Undoubtedly Smart Beta indices are raising interest amongst investors. The market is expected to grow in the coming years as these strategies fill a gap between active and passive asset management: they offer access to a wide range of risk premia while mitigating the concentration risk associated with cap-weighted indices and active asset management.

However, there are a number of challenges to overcome: cap-weighted strategies are still widely used as benchmarks and it is therefore crucial to control the potential underperformance of Smart Beta strategies. This article discussed the latest advances on relative risk control in the Smart Beta context and argues that Dynamic Risk Budgeting strategies with sophisticated floor definitions can be used in order to benefit from the long term expected over-performance of Smart Beta strategies while controlling for the cumulative underperformance to a level set ex-ante.

Different Smart Betas will perform differently in varying market conditions. This creates opportunities for tactical bets in which the investor can allocate to the strategies that benefit the most from the market conditions he expects in his active views. This opens the way to the creation of indicators that could help investors choose the most appropriate Smart Beta strategy.

Finally, we welcome the recent emergence of Exchange Traded Products on Smart Beta indices that will offer access to these strategies to a wide range of investors at low cost and will facilitate the implementation of Dynamic Allocation portfolios.

Sources

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