

## Smart beta – equities

### Addressee

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The paper considers some of the developing approaches to investing in equity markets which are gaining prominence as alternatives to investing either actively or passive against a market cap weighted benchmark.

### Overview – what is smart beta?

Beta is a term used by investment practitioners to define the intrinsic return they expect from an individual security. Because of investor desire to diversify the idiosyncratic risk of individual shares, investors build portfolios and the portfolio return is a collective beta. The “smart” element of smart beta describes a series of endeavours to ensure that the collective return is as “efficient” as possible.

Investment practitioners will typically define changes to a portfolio as “efficient” if the changes improve the expected return without increasing the level of risk, or reduce the risk without a corresponding reduction in expected return. The normal measure of portfolio efficiency would be to maximise the return expectation in excess of risk free returns relative to the level of portfolio volatility (known as the Sharpe ratio). This is the standard measure sitting behind the Capital Markets Pricing Model (CAPM) which, even if imperfect, provides a practical basis for comparing efficiencies. Individual investors may exhibit a preference either for generating an improved return or for reducing volatility. There are smart beta approaches which aim to satisfy either of these goals as efficiently as practicable.

While we can be certain of the prevailing price of a security, the price in the future is unpredictable. A vast amount of news, specific to individual companies, sectors and macro level economic, political and even climate information, becomes available daily all of which might affect share prices. Essentially, there is a lot of noise in investment markets and it is hard to assess “signals”. This intrinsic uncertainty about share prices would suggest there is significant randomness about how share prices move.

### Equal weights – an alternative means of return capture

An investor who wishes to receive (say) £1,000 of return from a shareholding can make an assessment of how many shares to hold to achieve this. Clearly, a very large company such as Royal Dutch (8.5% of the FTSE 100 index) can satisfy a huge number of investors with this ambition. If, by contrast, we take the smallest FTSE100 constituent (Tui Travel at 0.11% of the index), it would only be able to satisfy a very much smaller number of investors with this ambition – Royal Dutch is around 800 times larger than Tui Travel.

An investor who believes that share prices are completely unpredictable may well take the view that the most efficient way to diversify the risk of holding a FTSE 100 portfolio is what is known as naïve (or 1/n) diversification, i.e. holding 1% of the portfolio in each of the FTSE 100 shares. Clearly, not every investor can do this, because there are insufficient shares in Tui to satisfy this need, but it would be much easier for Royal Dutch to do this. At a practical level, there are pooled funds available for investment tracking FTSE100 and S&P 500 on an equal weighted basis.

The typical index which investors use to measure the return of the FTSE100 is the market capitalisation-based FTSE100 index, a portfolio in which the weighting of each security reflects company size (shares in issue times price), so Royal Dutch has 800 times the weight in the index of Tui Travel. This also means that a 1% movement

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in the price of Royal Dutch affects the index movement by 800 times the impact of a 1% movement in the price of Tui Travel.

**Performance comparison and other issues**

An obvious question to ask is how performance compares between a naively diversified portfolio and a market cap portfolio. The historical back-tested evidence suggests that, in most markets, measured over any reasonable time period (e.g. 5 years), naïve diversification will perform considerably better. For example, measured over 35 years, the equally weighted S&P 500 index outperformed the market cap S&P index by 3.5% p.a. compound. We note this figure has not taken account of transaction costs that would have applied in practice, a point we return to later. Nevertheless, this lends evidence to the theory that stock price movements are exaggerated relative to the news upon which they are based or to some extent random, suggesting investors should adopt the lowest risk approach to capturing the random nature of returns, which is to give each company an equal chance in contributing to the portfolio outcome.

There are issues, however, that result from moving away from the market capitalisation index model, however:

1. A market cap index is the only index which is macro compatible, i.e. it is the only portfolio than can satisfy all investors, because all investors already hold all of the shares in issue for each index constituent. Clearly, if all investors wished to hold an equal weighted portfolio, they would quickly run out of shares in smaller index constituents.
2. The weightings of shares in a market cap index adjust to reflect price changes because the weightings depend on share prices. This means that, in the absence of corporate events and constituency changes, market cap indices re-balance automatically. By contrast, share price movements will distort the weightings in an equal weighted portfolio and so will require rebalancing (and re-balancing costs) to get back to equal weighting. Academic research into smart beta indices conducted by EDHEC estimate that turnover levels in "index" portfolios need to be contained at less than 20% p.a. in order to avoid transaction costs damaging return capture to any significant extent. Because of stamp duty on purchases of UK equities, the turnover level in UK indices will likely need to be lower. Annual turnover in market cap indices is around 5-6% p.a. essentially due to corporate activity and securities coming into and leaving indices.
3. Share price movements affect the indices differently. There will be periods when the market cap index outperforms and periods when the equal weighted portfolio outperforms. The tracking error of an equal weighted index relative to market cap is high and, for many investors where market cap still provides some sort of reference point, it may be too high to be tolerable.

There are ways to handle all of these problems. Given how well this approach works, it is odd that it is not adopted more widely. Perhaps one of the reasons is that the concept is so naïve that its power is doubted.

**Why does equal weight outperform due to re-balancing?**

This is a crucial question, but also one that appears to have a surprising observation. First of all, it is necessary to contain rebalancing (costs) by setting thresholds under which the costs of re-balancing exceed the benefits. For example, it may be that weights would need move under 0.9% of index or above 1.1% of index, before it is worth re-balancing. Secondly, a very large proportion of the outperformance generated came from selling the overweight shares (i.e. shares whose prices had risen) and buying underweight shares, i.e. shares whose prices had fallen (a sell high, buy low approach). This lends weight to the idea that relative share price movements are unpredictable and noise (and investor activity) dominates signal.

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### Interim conclusion

It would appear that naïve diversification could be a smarter way to capture market beta. Clearly, however, not every investor could manage assets in this way, because there are insufficient shares in some companies. Further, not all investors will be happy with the “career risk” of the high tracking error.

It does lead to the further question: If equal weighting is “smart beta”, is it the “smartest beta”? How could we do better?

### Smart beta - risk considerations

It is helpful to consider smart beta from the perspective of risk. To put this into context, we can use changes in investors’ risk preference to explain market events.

- In an earlier era (mid to late 1960s), investors developed a growing belief that the US nifty fifty companies, the large capitalisation majors, would dominate the world forever, irrespective of price. Investor demand for those companies (IBM, General Motors, Eastman Kodak, etc.) led to aggressive PE expansion and high stock prices. The inevitable price collapse that followed the realisation of the folly of the premise could be attributed to investors growing awareness of the price risk.
- At the time of the technology bubble, investors believed that companies which had failed to meet the challenge of new technologies were doomed and the future lay with the exciting new internet-based companies. So, there was risk in remaining exposed to the old and failing to capture the new. The collapse of the bubble was essentially a reversal of risk preference.
- In the first decade of the century, the strong performance of emerging markets might be explained by investors’ attitude to risk. The growth prospects were long recognised; however, emerging market equities had always traded at a significant ratings discount to developed markets because of perceived risks. As this risk perception gradually eroded, the PEs or emerging market equities rose towards developed market levels.

These are all macro level events, and the argument may be stretching the risk analogy too far. Nevertheless, it is clear that investors utilise some understanding of risk in evaluating where and how they invest. Another aspect to consider is “career risk”; this is often considered to apply to managers or trustees, and essentially is concern about a non-consensus approach (“maverick risk) in case you are wrong. It is safer to be wrong and be in the herd. This is one of the reasons why people worry about the tracking errors of smart beta approaches, relative to the market cap index which is still considered as the reference benchmark for comparisons.

### Risk efficiency

If we consider any basket of equities, they will tend to correlate to an overall market direction. There will also be correlations at the sector level. Further, smaller stocks may all suffer from illiquidity so price moves will be correlated in a liquidity squeeze. Highly cyclical stocks will be priced to reflect the risks of price cyclicality, etc.

It is clear, therefore, that it would be helpful to consider the correlations of stocks held, to identify whether the aggregate portfolio suffers from risk concentrations that might be adjusted. For example, an equally weighted FTSE100 index will hold only four healthcare companies (so only 4% in healthcare) but will hold ten companies in support services (so 10% in support services). It is clear, therefore, that adopting an equal weight portfolio has introduced sector risk concentrations. If we adopt a risk-based approach, it may be helpful to consider trying to optimise portfolio risk. There are several approaches.

### Risk efficient indices

The two most prominent indices in this area are the EDHEC Risk Efficient index series (maximum Sharpe ratio) and TOBAM’s index (earlier known as the Lehman anti-benchmark portfolio, based on maximum diversification). Both of these indices adopt the approach of mitigating risk by optimising (typically reducing) unwanted correlated

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risk factors. An interesting feature of the EDHEC model is a concept of seeking out highly volatile stocks that are lowly correlated (technically, they have high idiosyncratic risk). Investors price these stocks individually at a discount because of their high volatility. It follows that a portfolio of these holdings will have much lower risk than any of the individual holdings but can be acquired cheaply, so this should result in strong return potential for low aggregate portfolio risk (read in conjunction with low volatility indices).

### Value-based indices

Two noted US economists, Eugene Fama and Kenneth French, who specialise in portfolio theory and asset pricing, have identified three persistent drivers of market returns - Momentum (investors will favour shares that have performed well recently), Value (if you buy cheaply enough, there is greater scope for upside) and the Small Cap effect (over time, small cap stocks will deliver higher returns than the broad market). The traditional market cap indices are, by construction, dominated by large companies and capture momentum in price movements, so an investor seeking diversification from a market cap weighted index should typically consider opportunities to adopt some form of value bias and also target a greater capture of returns from mid and small cap.

The latter should be straightforward, although it is difficult to find indices which track mid and small cap effectively. Further, mid and small cap index constituencies often display significant sector and factor biases, so it may be that active strategies will be a more appropriate approach to mitigate other factor risks.

The main series of “smart beta” value biased indices that have evolved are:

- Fundamental indices, such as RAFI, which re-weight index holdings to reflect historic accounting data (drawn from revenues, earnings, cash flows, dividends, book value, etc.), breaking the link with share price (and thereby the market’s estimate for the forward price to earnings ratio). This results in an overall index tilt to value, although index constituency will mirror that of a reference market cap index.
- An index such as MSCI Value which partitions an existing broad market index into two halves, the lower half of which is the stocks exhibiting the strongest value biases (using factors as above). Clearly, the constituency of this index will exclude a significant proportion of the stocks in the reference market cap index (note: some stocks are included at proportionate allocation on the basis they have x% value style and (100-x)% non-value style).

### Low volatility indices

The premise behind low volatility indices is that investor behaviour leads to exaggerated enthusiasm for high momentum stocks, which often ends in disappointment. Biasing the index away from this stock category should lead to a better risk / return trade-off. In developed markets, low volatility portfolios have delivered broad market returns (over time). Among the reasons proposed are that the portfolios deliver a value premium and also that investors have a speculative demand for gambling and so overprice high volatility stocks (leading to lower returns in the future). The dynamics of emerging markets are different so low volatility portfolios have proved less effective there. As investors increase allocations to low volatility portfolios, that might be causing a change in market dynamics, which is destroying the previous persistency of outcome and the entire premise.

One naive approach taken in low volatility portfolios is to exclude high volatility stocks. Typically, stocks will be placed into deciles based on historic (timescale can vary) volatility and the index construction will eliminate the deciles with high volatility. Other approaches weight portfolios by inverse beta or inverse volatility. There are risks that these approaches introduce other factor risks, e.g. sector biases.

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### Diversity weighted indices

This is a pragmatic approach that lies between the extremes of cap weighting and equal weighting. The aim is to capture the benefits of periodic re-balancing, while containing the tracking error relative to the market cap weighted index within limits. The approach offered by Janus INTECH offers a family of these indices adopting a range of tracking errors.

### Risk clusters

Typically, these portfolios adopt equal weights of risk buckets, with the stock weightings within the clusters based on market capitalisation. The risk clusters could be based on geography, sector, size or style.

### Size capping and small and mid-cap overweighting

We may well believe there is a small cap premium. This can be achieved with a dedicated small cap portfolio.

If we believe (see next page) that one of the excess return drivers of smart beta is re-balancing, capping the size of mega-cap stocks will not obviously lead to significantly more re-balancing activity. However, the fact that it reduces concentration risk may be of sufficient benefit, particularly for UK equities where stamp duty costs which result from re-balancing activity damages returns.

### Valuable research

Whatever you may believe about the smart beta approaches, the data mining and data analysis that has been conducted in the research is very valuable background information when examining active managers. For example, an outperforming equity manager might result from equal weighting or a bias away from large cap concentration. Is the manager adding true value, or could passive portfolio construction deliver the same result?

### Conclusions

There are a relatively large number of “smart beta” approaches. Rather than investigate them all, it would be helpful to narrow the range according to a number of considerations. First of all, though, it will be helpful to establish parameters we believe to be necessary.

1. There needs to be a clearly defined set of ground rules for how the index operates. This must be in the public domain and the index must be capable of being replicated by other than the index provider (which might be a manager offering product).
  - a. The ground rules need to cover information about the constituency (inclusion, and rules and price basis used for entry and exit) and categorisations (e.g. sector allocation, geography, penetration by size, etc.).
  - b. Re-balancing rules need to be well documented.
  - c. There needs to be some form of valid index oversight.
2. We need to be comfortable that there is sufficient capacity in the approach for a sustainable period of time, so that index management costs do not erode all of the benefit inherent in the approach. It would also be helpful if there is manager choice.
3. We need to believe that there are advantages in the approach. We may be comfortable that diversification is sufficient, rather than requiring any expectation of superior return.
4. We need to understand how the approach will deliver returns, and believe in the premise.

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### How smart beta works

Essentially, all smart beta approaches appear to have some common factors:

1. Re-balancing appears to be a major factor in delivering extra returns [this also means that re-balancing processes are important and re-balancing costs need to be curtailed]. This lends credence to the idea that reaction against “price” is a common factor, so there has to be a belief that pricing inefficiencies exist.
2. The approaches all appear to have some concept of buying future return per unit of risk more cheaply than is priced into the market.

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### General Risk Warning

Please note the value of investments, and income from them, may fall as well as rise. This includes equities, government or corporate bonds, and property, whether held directly or in a pooled or collective investment vehicle. Further, investments in developing or emerging markets may be more volatile and less marketable than in mature markets.

Exchange rates may also affect the value of an overseas investment. As a result, an investor may not get back the amount originally invested. Past performance is not necessarily a guide to future performance.