



# Seven things you should know about factor investing

CHALLENGES YOU MAY FACE AND HOW TO TACKLE THEM

For wholesale investors only

**ROBECO**  
The Investment Engineers

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# Foreword

Factor-based investing has gained considerable traction over the past decade. Concepts such as ‘factor premiums’ or ‘smart beta’ have become popular buzzwords, and now appear frequently in mainstream financial media. Prominent institutional investors have also publicly embraced allocation to well-known factors, like value, momentum or low volatility.

The concept of factor investing is based on the existence of various academically documented premiums, which can be systematically harvested in order to reduce downside risk, generate higher risk-adjusted returns and achieve better diversification than traditional market cap-weighted indexes. Factors represent different characteristics or attributes of a financial security – such as its valuation, or its price momentum and volatility – that are important determinants of its risk and return in the long run.

For example, numerous empirical studies published since the early 1970s show that lower-risk securities tend to generate higher risk-adjusted returns over the longer term. This is because they usually fall less in down markets. Low risk securities are those that generate relatively stable returns compared to the broader market. Price variations can be measured either in absolute terms with volatility (the standard deviation of past returns), or relative to the market with beta. This counterintuitive phenomenon has been documented in many different markets across several asset classes.



But despite a growing awareness as to the potential benefits of factor-based investing, ensuring proper implementation often remains a puzzle for newcomers. Indeed, asset owners frequently lack precise knowledge about some of the underlying empirical findings, not to mention the vast amount of empirical insight on practical aspects that has been accumulated over the years and helps make a difference between efficient and inefficient factor strategies.

In this booklet, we address seven recurring challenges asset owners tend to be faced with when considering an explicit allocation to one or more factors. As a pioneer in this field, Robeco has carried out extensive empirical research on the existence of factor premiums as well as on how to implement factor-based strategies, both in equity and fixed income markets. We have been offering factor-based strategies that also integrate rigorous sustainability standards, for over two decades now.

The different questions answered in this booklet were determined based on the concerns raised by respondents to an annual survey of asset owners carried out by index provider FTSE Russell regarding smart beta, as well as feedback from our clients. Answers to these questions can be read independently. And while most of them may be rather consensual among academics and practitioners, some of them are still hotly debated. This booklet is also intended to help investors form their own opinion on these issues.



**Joop Huij**  
Head of Factor Investing Equities





# 'HOW DO I FIND THE RIGHT SET OF STRATEGIES?'

A growing number of academic studies suggest that systematically harvesting a number of well-rewarded factor premiums, such as Value, Momentum, Quality or Low Volatility ensures enhanced returns in the long run, both in equity and bond markets. Over the past decade, these findings have led to the emergence of a new kind of investment product, frequently branded as 'smart beta' or 'alternative beta', that have definitely drawn investors' attention.



Despite growing awareness, the practical implications of allocating to factors are often still very difficult for newcomers to grasp. There are currently hundreds of smart beta products available in the market, from basic single factor ETFs to sophisticated multi-factor solutions. Determining the best strategy or the best combination of strategies is often considered of utmost importance, when looking at factor allocation.

Indeed, finding the right combination of factors is a major challenge. The fact that it is very difficult to successfully predict which factors are going to do well in the near future and which factors are going to lag, supports diversification across factors. Unfortunately, individual factors also have negative exposures to one another. For example, strategies focusing solely on the momentum factor tend to have a very negative exposure to the value premium. Moreover, a 2016 paper<sup>1</sup> by David Blitz, Head of Quantitative Selection Research at Robeco, showed that many existing smart beta products do not offer maximum factor exposure. That's because they are exposed to cap-weighted factor indices, while equally-weighted factor strategies are known to generate higher returns.

### Combining factors efficiently

Efficient factor investing strategies should therefore be designed to avoid risk concentration and to ensure that premiums do not clash with each other. Our research and more than twenty years of practice show it is possible to build well-diversified portfolios selecting securities that provide efficient exposure to one specific factor while avoiding negative exposure to others. For example, it is possible to find stocks that are attractive not only from a low volatility perspective but also in terms of valuation and momentum. In a similar way, it is also possible to find attractively valued stocks that are also interesting from a quality and momentum point of view.

1. D. Blitz; 'Factor investing with smart beta indices', 2016

## *An optimal Factor Investing portfolio should be well diversified across factors and ensure that premiums do not clash with each other'*

### No single optimal solution

It is also important to note that there is no single ideal approach to factor allocation. In an article published in September 2016<sup>2</sup>, David Blitz and Joop Huij, Head of Factor Research at Robeco, argued that the optimal factor-investing portfolio depends on investor-specific beliefs and preferences. Depending on its own profile, each investor will seek a specific kind of performance, and will be willing to take on more or less risk.

For example, the low volatility factor is very attractive for those who want downside protection without sacrificing return potential, such as pension funds aiming for funding ratio stability. However, it can be less attractive for investors who care more about maximizing return than about reducing risk and for investors who dislike the high tracking error involved in low-volatility strategies. Generally speaking, investors will be able to choose between two main types of products, those aiming for higher returns (return-focused) and those offering downside protection (risk-focused).

2. J. Huij; 'Factor investing case studies – the merits of tailor made solutions', 2016



# 'HOW CAN I AVOID UNINTENDED FACTOR BIASES?'

Analyzing and attributing the origin of past portfolio returns is an essential part of the investment process. This is obvious for investors using a traditional fundamental approach, but it is also the case for those allocating systematically to factor premiums. However, assessing a portfolio's exposure to factor premiums and calculating the performance of individual factors is much less straight forward.



Undetected and unintended factor biases can seriously affect performance – and especially for newcomers to the factor investing arena. As we indicated in the previous chapter, the fact that it is virtually impossible to effectively time the different premiums makes a strong case for broad diversification. Unfortunately, this is easier said than done because factors can also clash with each other.

These potential clashes are one of the reasons why products based on common smart beta indices often prove inefficient when it comes to harvesting factor premiums. For example, most generic value strategies do not avoid stocks that are cheap for a reason, such as those of financially distressed companies. This is a typical case of the value factor clashing with low risk.

### Beware of smart beta indices

As a result, an investor using this kind of generic value investment product will also often end up being negatively exposed to low risk, without realizing it. In a 2015 white paper<sup>3</sup> David Blitz, head of Quantitative Selection Research at Robeco, and Matthias Hanauer, Quant Equity Selection Researcher, argued that the performance of a particular strategy explicitly targeting one specific factor depended heavily on the implicit exposures towards other premiums.

They also found that the return difference between ‘bad’ and ‘good’ strategies could amount to as much as 5%-7%, depending on secondary exposure to other factors. To measure this, they simulated four generic global strategies targeting value and momentum – two of which were good and two of which were bad. The good strategies specifically avoided factor clashes, while the bad strategies had strong negative exposure to other factors which resulted in lower returns.

3. D. Blitz and M. Hanauer, ‘Beauty and the beast of value and momentum investing’, 2015.

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*‘We make sure that all our strategies efficiently combine factors to avoid unintended biases’*

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### Four proven factors for equities

At Robeco, we exploit four factors that have proven their long-term performance potential: value, momentum, quality and low volatility. And while combinations of generic single factor products often result in opposing premium exposures that partly or totally neutralize each other, we make sure that all our strategies efficiently combine factors to avoid unintended biases.



# 'HOW CAN I AVOID UNINTENDED SECTOR BIASES?'

In the previous chapter we advocated a comprehensive and balanced approach in terms of exposure to different premiums. Because factors can clash with each other and are extremely difficult to time effectively, investors must avoid any excessive or undesired exposure to individual premiums. The same is true for geographic regions, countries and business sectors, as well as individual stock exposures.



Even those asset owners who fully embrace factor investing should not completely forget their traditional asset class allocation framework and keep on ensuring proper diversification. This diversification issue is important, because portfolio construction processes that focus solely on factor premiums can lead to significant, unintended biases, especially in terms of sectors. In a recent whitepaper<sup>4</sup>, researchers from the Scientific Beta/EDHEC-Risk Institute showed that portfolios targeting greater factor exposure also tend to focus heavily on a limited number of industries, and concentrate on fewer sectors overall.

For example, a strategy designed to capture the momentum premium without taking into consideration any other element, may rapidly lead to excessive concentration of the portfolio on a small number of industries that may be in vogue at the time. As a result, sector-specific developments can significantly undermine overall performance.

Concentration risk is especially important for generic factor-based strategies, particularly when they rely on the replication of popular smart beta indices. Many of these products do not have explicit concentration limits. The S&P 500 Low-volatility index is a good example. There are no constraints on sector weights, which can lead to huge concentrations. As a result, in December 2012, around 60% of this index was invested in only two sectors: utilities and consumer staples.

#### Classic diversification still matters

Although the focus should remain on optimizing exposure to relevant factors, the merits of broad diversification across a varied selection of securities should not be forgotten. Robeco's in-house research shows that adding constraints on sector weights to an unconstrained portfolio reduces concentration risk while not significantly altering returns, at least to a degree. At a certain point, however, concentration limits start to have a negative effect on performance.

4. N. Amenc, F. Ducoulombier, M. Esakia, F. Goltz and S. Sivasubramanian; 'Accounting for Cross-Factor Interactions in Multi-Factor Portfolios: the Case for Multi-Beta Multi-Strategy High Factor Exposure Indices', ERI Scientific beta, 2016

## 'Adding constraints reduces concentration risk while not significantly altering returns, at least to a degree'

As a result, there is a converse relationship between the return/risk ratio of a portfolio and concentration levels, as measured by the allowed active weight for regions, countries, sectors, size groups or single stocks. This means that an optimal level of concentration exists that must be taken into account by investors. Efficient factor strategies should therefore not only focus on maximizing exposure to premiums, but should also prevent unintended geographic or sector biases, as well as undue concentration on some single stocks or sub-segments of the financial markets.

#### Setting explicit concentration limits

To ensure appropriate diversification, all of our quantitative strategies are subject to strict but workable concentration rules, that lead to a varied selection of stocks or bonds while avoiding excessive sector and country tilts. For our Multi-Factor Equities and our Conservative Equities portfolios, for example, we apply position limits that allow an absolute deviation from the MSCI Index weight for regions, countries and sectors that does not exceed 10%. For size groups (large, mid and small caps), the maximum allowable deviation is 35%. Meanwhile, the maximum percentage that can be invested in a single stock is 2%.

These concentration limits are based on thorough research. They are monitored by the portfolio management team as well as Robeco's Compliance department. They are intended to further reduce concentration risk while maintaining focus on the primary objective: achieving the best possible exposure to the targeted factor premiums.



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# 'HOW MUCH SHOULD I ALLOCATE TO FACTORS?'

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While awareness as to the benefits of targeting academically-documented premiums has considerably improved, factor investing remains a relatively novel approach to investment, both in equity and fixed income markets. As a result, explicitly allocating to factors also remains a delicate decision for many individual and professional investors.



### In between active and passive

To determine how much of a portfolio should be explicitly be allocated to factors, investors can start by asking themselves whether or not they believe in the added value of traditional active management. Factor investing is based on the existence of a number of premiums, which can be systematically exploited through rules based stock or bond selection processes. As a result, it is often considered as a third alternative to purely passive and traditional active management.

Among asset owners who believe it makes sense to include active management in their portfolio, an allocation of one-third of the portfolio each to active and passive strategies and one-third to factor-based products is a popular approach. Generally speaking, at least one-third of a portfolio would have to be allocated to factors, in order to have any meaningful impact – unless the investor is only looking to get their feet wet before eventually aiming to allocate a higher proportion later.

Conversely, clients who see market cap-weighted passive investing as the starting point but, at the same time, want to benefit from factor tilts, can consider multi-factor equity strategies. Their transparent, disciplined and relatively low-cost investment process, as well as the benefits of factor exposures, make them an interesting alternative to passive investing.

Different factor-based solutions can be combined, but they also work very well in conjunction with traditional fundamental strategies. For example, low volatility strategies can be combined with benchmark-driven products or high dividend funds, in order to generate diversification benefits thanks to their less volatile return pattern.

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*‘At least one-third of a portfolio should be allocated to factors in order to have any meaningful impact’*

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# 'SHOULD I TRY TO TIME MY EXPOSURE TO THE DIFFERENT FACTORS?'

We already saw in a previous chapter that while single factor-tilted portfolios have proven they can significantly outperform the market over the long term, they can also experience periods of disappointing performance relative to other single-factor portfolios and even to classic market-cap weighted benchmarks. This phenomenon has been demonstrated extensively in the academic literature.



In a recent paper<sup>11</sup>, Elroy Dimson, Paul Marsh and Mike Staunton noted that “a factor that is ranked high in performance in a particular year may remain high, may end up in the middle, or may slip to low in the following year”. Their research focused on five of the most commonly targeted factors: size, value, income, momentum and low volatility. For each of them, they presented detailed annual return figures recorded since the financial crisis, and ranked the factors from the best to the worst in terms of performance.

Periods of relative underperformance of single-factor portfolios can last for years, testing the patience of many asset owners. As a result, deciding whether to tactically monitor and adjust exposures to different factors and, if so, how to eventually go about it, is often raised as a major concern.

### To time, or not to time...

Intuitively, it would seem logical for an investor to time his investments in one particular group of stocks or bonds showing similar characteristics in terms of valuation, volatility or momentum for example, depending on his views of future market developments, just as in traditional asset allocation. In practice, however, things are not so simple.

Indeed, academics and practitioners continue to debate this factor timing issue and can be divided into roughly two opposing camps. The first of these assumes single factor performance can be forecasted relatively accurately and therefore advocates tactical factor timing, at least in moderation. One popular timing approach is to look at the relative valuation of different single-factor portfolios. This usually involves analyzing classic measures of valuation, such as price-to-book or price-earnings ratios. The idea is to increase exposure to factors that trade at a discount compared to their historical norms, and to reduce exposure to those exhibiting high valuation multiples compared to their historical average.

11. E. Dimson, P. Marsh, M. Staunton; 'Factor-Based Investing: The Long-Term Evidence', 2017

## 'Academics and practitioners continue to debate this issue and can be divided into two opposing camps'

The second group considers factor timing – not to mention general market timing – too difficult, and therefore not really worth the effort<sup>12</sup>. Among other things, members of this group argue that different measures of valuation often lead to conflicting conclusions. Moreover, they think that deciding factor exposure based mostly on its valuation is misguided, since some of the proven factors, such as momentum or quality for example, also typically clash with the value factor.

12. C. Asness; 'My Factor Phillipic', 2016

### Valuation is important

At Robeco, we agree more with the second approach. As a result, we usually recommend that our clients either opt for broad diversification across the different factors we exploit in our strategies, or for one particular factor of strategic interest, but bearing in mind they will be faced with short term underperformance. This does not mean valuation should be ignored, on the contrary. Avoiding excessively-priced securities remains of paramount importance. Here again, it is important to highlight that investors should closely monitor their exposure to the well-established factors, including value, and make sure they avoid unintended factor biases.

This is also why the enhanced single-factor definitions, which are used in Robeco's multi-factor strategies, always take valuation criteria, among others, into account. That way, we can avoid buying stocks which are overpriced. This improves both the factor characteristics of our enhanced factor strategies and the efficiency of the exposures both in our single and multi-factor strategies.



# 'WILL IMPLEMENTATION COSTS RUIN PERFORMANCE?'

Over the past four decades, academic researchers have documented hundreds of different stock market anomalies and their related investment strategies. But while most of these strategies look compelling on paper, the results often end up being much less convincing in practice, and are sometimes even downright disappointing.



One of the key reasons for this mismatch is that, in their research, academics generally analyze the returns generated by a given strategy without taking into account transactions costs, management fees and other real-life investment constraints. They also often fail to support their empirical findings with proper out-of-sample confirmation tests. This is also frequently the case for the usual backtests and simulations put forward by some product providers in their brochures and presentations.

In this context, for asset owners considering factor allocation, but who are still unfamiliar with the associated practical consequences, keeping implementation costs down is often perceived to be a major challenge. Over the past few years, a growing number of academic papers<sup>13</sup> delving further into this question have been published. Meanwhile, various prominent asset managers and index providers, including Robeco, have voiced their concerns on the matter.

### Not just high turnover

Indeed, transaction costs and other practical hurdles can be a major drag on performance. This is especially true since factor-based strategies tend to generate higher turnover than passive market-weighted ones, due to the fact that the portfolio must be rebalanced regularly in order to maintain exposures to the different factor premiums.

It is possible to keep turnover within reasonable bounds, while ensuring the appropriate factor exposure. But this usually requires a more sophisticated approach than those used for the popular products – mostly ETFs – that is based on generic ‘smart beta’ indices. For example, we found that the low volatility anomaly can be harvested with a turnover of less than 30% per annum.<sup>14</sup>

However, potentially excessive turnover is only one of the pitfalls. Other aspects, such as liquidity issues, potential ‘mistrades’, inefficient portfolio construction processes and investment constraints can also have a serious impact on performance. The cost of switching from a traditional asset allocation framework, based on asset classes, geographic areas and business sectors, should not be overlooked, either.

13. See for example: A. Frazzini, R. Israel, T. Moskowitz, ‘Trading Costs of Asset Pricing Anomalies’, 2014. Or: ‘A Taxonomy of Anomalies and their Trading Costs’, R. Novy-Marx, M. Velikov, NBER Working Paper No. 20721, 2014. Or: N. Beck, J. Hsu, V. Kalesnik, H. Kostka, ‘Will Your Factor Deliver? An Examination of Factor Robustness and Implementation Costs’, *Financial Analysts Journal*, 2016.

14. P. van Vliet, ‘Low Volatility Needs Little Trading’, 2015.

## ‘Targeting the well-established factors can add value, even after taxes, trading costs and restrictions’

### Good design needed

At Robeco we acknowledge that implementation costs are of paramount importance. This explains why we focus on only four of the hundreds of factor premiums reported in the academic literature: value, momentum, quality and low volatility. These meet the required rigorous academic criteria and can be put to work efficiently in real-life conditions. Moreover, our portfolio construction models have been designed to minimize implementation costs, both in equity and fixed income markets.

Our research, and also our real-life experience with managing factor strategies, has shown that ensuring strategies are properly designed by focusing on the well-established factors is clearly worth the effort. Targeting these factors can add value, even after taxes, trading costs and restrictions.

A 2014 research paper<sup>15</sup> by Eduard van Gelderen and Robeco’s head of Factor Investing Equities, Joop Huij, illustrated this very clearly, making the case for an allocation to multiple factors in an equity portfolio. In this study, the authors analyzed the returns of US mutual funds over the 1990-2010 period and found large differences between factor investing funds and the other funds. Only 20% of the funds not engaging in factor investing yielded outperformance in the long run. For funds that did engage in factor investing, this figure was substantially more favorable, ranging from 51% for single factor funds to 68% for two-factor funds, and 78% for three-factor funds. In all cases, the dispersion in performance was large though, which underscores the need for well-designed strategies.

15. E. van Gelderen, J. Huij ‘Academic Knowledge Dissemination in the Mutual Fund Industry: Can Mutual Funds Successfully Adopt Factor Investing Strategies?’, *The Journal of Portfolio Management*, 2014.



# 'HOW TRANSPARENT SHOULD MY FACTOR STRATEGY BE?'

One key reason for the stunning success of so-called 'smart beta' ETFs, which are based on public indices, is that they are generally considered a cheaper, more straightforward alternative to active factor investing strategies. The fact that their investment process is fully transparent is usually a powerful sales argument, as it allows clients to easily understand the different trades and the resulting positions in their portfolio. But this transparency comes at a cost.



A good example of these simple products, are the popular ETFs that replicate the S&P Low Volatility index. This index targets the low volatility premium by selecting 100 stocks, out of the 500 included in the S&P 500 parent index, merely based on their volatility over the preceding twelve months.

However, full transparency comes at a price for those who passively follow this kind of benchmark. The fact that these indices are publicly available to market players and that changes in their composition are announced well ahead of actual inclusions and exclusions makes them prone to overcrowding and arbitrage, since opportunistic investors can easily figure out in advance which trades are going to be executed, and can opportunistically take advantage of this.

As a result, portfolios that replicate these indices tend to systematically buy securities at already inflated prices and to sell them at depressed ones. This can significantly damage performance in the long run. In a 2016 research paper<sup>16</sup> focusing on MSCI Minimum Volatility indices for various markets, Joop Huij and Georgi Kyosev, from Robeco's factor investing team, estimated that maintaining the transparency of public factor-based indices costs investors 16.5 basis points per year.

### Sophistication, not opacity

But public availability is far from being the only issue with generic 'smart beta'. These products still tend to involve a significant amount of market index exposure as well as unexpected negative exposures to other factors. Moreover, the use of basic factor indices also often implies inefficient portfolio construction processes, that may lead to unnecessary turnover, high concentration on some countries or business sectors, or to an excessive exposure to large capitalization stocks.

Addressing the different pitfalls associated with generic index-based products requires the adoption of more sophisticated approaches, which are typically offered by active asset managers. These can be

16. J. Huij, G. Kyosev, 'Price Response to Factor Index Additions and Deletions', 2016.

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*'We make sure to keep our factor-based strategies as simple as possible, and as complex as needed'*

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provided through classic proprietary active strategies that are only transparent to the clients who use them. This ensures the risk of overcrowding and arbitrage is avoided.

However, sophistication should also be treated with caution, as it can lead to opacity. For example, investors should avoid solutions using excessively complex definitions for the different factor premiums, as well as those relying on dubious portfolio construction tools.

### As simple as possible, as complex as needed

At Robeco we make sure to keep our factor-based strategies as simple as possible, and as complex as needed. We strive for investment approaches that ensure efficient exposure to the well-rewarded factor premiums while remaining transparent to clients, with portfolios and transactions that are easily explained.

For all of our factor-based strategies, we therefore prefer intuitive portfolio construction algorithms over off-the-shelf optimization tools which tend to look like a 'black box'. In equity markets, for example, our disciplined investment process is fully based on the ranking generated by our stock selection model. Instead of relying on an optimizer at a later stage, unintended market risk exposure is already neutralized in the stock selection phase.

This reduces the need for more complex optimizers and risk models in the portfolio construction stage of the investment process. It enables us – and our clients – to understand the reason behind each portfolio position and each buy or sell decision. Applying our more robust and transparent portfolio construction algorithm makes it much easier to remain in full control.



# Appendix: Robeco's quantitative equity strategies

Is your focus on limiting downside risk or on generating extra return? Factor strategies can be differentiated based on the risk or return focus, number of factors they apply and general approach. In this appendix, we look at the difference between return-focused and risk-focused strategies offered by Robeco to Australian investors. These strategies provide exposure to well-rewarded factors and also integrate rigorous sustainability standards.

## Risk or return?



### Multi-Factor Equities Alpha: access to Robeco's enhanced factor definitions and factor mix, with low-turnover implementation

Multi-Factor Equities Alpha exploit proven factors: value, momentum and quality. They use enhanced factor definitions, rather than generic definitions, to strip out unintended risk and maximize its return potential. We use a building-block approach based on allocations to enhanced standalone factor strategies that avoid the various pitfalls that generic factor strategies involve. Multi-factor Equities Alpha aim to achieve higher risk-adjusted returns than both the broad market and generic factor indices over a full business cycle by taking efficient, well-diversified exposure to these enhanced factors.



### Conservative Equities: stable returns and high income

Conservative Equities capture the low-risk anomaly. They target a long-term full-cycle performance equal to or greater than the equity market with substantially lower downside risk. Robeco's innovative stock selection model combines the beta and volatility effects in one low-risk theme. It focuses on low-risk stocks that also have low distress risk, attractive valuation and positive momentum have a better risk-return profile, in order to maximize Sharpe ratio. The strategies are managed according to a transparent and disciplined investment process. It combines the signals of the stock-selection model with a unique portfolio-construction algorithm and a set of risk controls, including human overview by a dedicated team of portfolio managers.

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