Thinking Ahead Institute

Investing in equity factors for the long run

A practical guide co-authored with Amundi Asset Management

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Factor investing: a long-horizon investing building block

Many asset owners construct their investment portfolios with the aim of meeting long-term liabilities or objectives. No institution can be sure of achieving its savings goals unless it adopts a full liability-matching strategy, which is typically expensive. Instead, most investors rely on a portfolio of assets to generate sufficient returns over time and thus face the uncertainties inherent in exposure to the financial markets.

However, an institution can increase its chances of success in long-horizon investing by following a number of steps. These include a thorough planning process, ensuring the ability to tolerate inconsistent returns, a diversified approach to portfolio construction and discipline when conducting portfolio rebalancing.

Equities are an asset class of choice for long-horizon investors and equity factors offer an attractive means of sourcing returns from equities. Factors arguably offer a more efficient way of constructing portfolios than the traditional approach of alpha/beta separation.

Under the traditional alpha/beta approach, an asset owner tracks market capitalisation-weighted indices for the beta core of the portfolio and engages active managers to generate alpha. The owner can expect benchmark performance in the core (before fees, which are typically minimal), but relies on the ability of the asset manager to generate alpha in the active part of the portfolio. As multiple studies have demonstrated, persistence in producing alpha is very hard to achieve.

Instead, a factor approach could be used across the whole equity portfolio.

By using factors, an investor "looks through" the equity asset class and benefits from the systematic sources of return associated with particular stock characteristics. This provides an opportunity for a long-horizon investor to tailor their equity exposure more closely to their liability profile or long-term objectives. A 2017 Thinking Ahead Institute study[1] identified factor investing as one of the building blocks of a substantial long-term premium for genuine long-horizon investors.

"Diversification across factors can help mitigate downside as well as tail risks and provide superior long-term risk-adjusted returns"

However, given the fact that factors work well at different points in the economic and market cycles, **diversification across factors can help mitigate downside as well as tail risks and provide superior long-term risk-adjusted returns.**

[1] See "The search for a long-term premium", Thinking Ahead Institute, May 2017

What are factors?

Factors are a form of "smart beta", an approach that is now used by nearly half of large investment institutions worldwide[1]. In Willis Towers Watson's definition[2], smart beta aims to capture:

- A wider spread of risk premia than offered by conventional index strategies, or
- Cheaper access to risk premia previously only available through expensive active strategies.

Smart beta includes both index-based and non-index-based strategies that aim to improve on perceived inefficiencies in the traditional capitalisation-weighted index, whether used as the target of an index-tracking fund or as a performance benchmark.

During past episodes of equity market euphoria, such as the 1999/2000 internet mania or the run-up to the 2008 financial crisis, capitalisation-weighted indices became dominated by stocks in the sectors that were at the centre of the bubble, leading to heavy losses when the upward trajectory in stock prices went into reverse. Risk-efficient approaches have understandably attracted significant interest amongst investors, because they aim to produce a more risk-balanced portfolio. These include portfolios in which the risk contribution of individual constituents is equalised, others in which the overall portfolio volatility is minimised and another category seeking to maximise the diversification of the portfolio.

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An even better risk-return profile can be achieved by tilting a portfolio towards stocks with certain shared characteristics.

Academic research has shown that stocks with these characteristics can generate persistent risk premia, which are known as factors. Well-known factors include value, size, momentum, minimum volatility and quality (see figure 1).

Figure 1: equity factors

Factor name	Description
Value	Value stocks have low prices relative to their fundamental valuations, and tend to outperform higher-valued stocks over time. These stocks can be identified, for instance, by looking at price-to-book or price/earnings ratios.
Size	Smaller companies generate potentially better returns over time than larger-capitalisation stocks. These stocks can be easily identified by looking at market capitalisations.
Momentum	Stocks which performed well in the past are likely to continue to outperform those which did not. Looking at the relative performance of stocks over different time periods highlights those with this factor.
Minimum volatility	Shares with lower historical volatility are likely to perform better than their more volatile counterparts over time. This is captured by looking at the standard price deviation.
Quality	Companies with low debt and stable earnings growth outperform less high quality companies. Looking at return on equity, stability of earnings and balance sheet strength identifies these characteristics.

[1] According to the FTSE Russell 2017 Smart Beta Survey, 46% of a sample of nearly 200 asset owners worldwide, with collective assets under management of over US$2 trillion, have an existing smart beta allocation.
[2] See "Understanding smart beta", Willis Towers Watson, August 2013.

Factors are a robust diversification tool, operating across investment styles, different cycles of performance and time horizons. They can be used to implement investment beliefs and impose relatively low demands on governance resources.

Viewed from the perspective of portfolio risk, factors share with other smart beta approaches the ability to avoid the return drag[1] of capitalisation weighting. And rather than attributing equity performance to a single factor (market risk) an approach involving multiple factors helps provide a more granular and sophisticated understanding of the sources of an equity portfolio's return.

In other words, factors help reproduce some of active managers' traditional return sources in a cost-effective, transparent and systematic way. But they also capture some of the performance traditionally associated with market beta (see next page).

[1] By construction, a capitalisation weighting approach overweights overvalued stocks and underweights undervalued stocks. It therefore underperforms relative to alternative non-capitalisation weighting approaches when prices converge to values.

From portfolio monitoring to portfolio construction—the evolution of factors in theory and practice

The original role of factors was in portfolio risk monitoring and measurement, an approach founded in the Capital Asset Pricing Model (CAPM), a ground-breaking financial theory set out in the 1960s.

Under CAPM, investors are compensated for holding a portfolio of securities in two ways: they earn the risk-free interest rate, plus an expected premium. That expected premium is expressed, by means of a coefficient called beta, as a multiple of the return on the underlying asset class. A low-beta portfolio has less risk than the overall market, and is expected to earn a lower return. Conversely, a high-beta portfolio is expected to produce a higher return than the market.

Notably, CAPM is a single factor model, with beta showing the relationship of the portfolio to the equity asset class as a whole.

In 1993 investment theory moved from single to multiple factor models. Eugene Fama and Kenneth French published a paper describing a three-factor model, with value and size as the two additional factors. Subsequently, researchers produced evidence for factors representing low volatility (or low beta), momentum and quality. In these multiple factor models, each factor represents a distinct form of systematic risk.

Originally, factors were used primarily in portfolio risk attribution and monitoring. They operated in a long-short framework (i.e., academics assumed that it was as easy to be short a factor as to have long exposure to it) and paid little or no attention to the real-life constraints faced by investors. In their 1993 paper, for example, Fama and French ignored transaction costs, a primary concern for anyone building factor portfolios.

From their original use in risk modelling, factors have steadily gained popularity as a tool for portfolio construction. Investors create portfolios to replicate the factor premium (or multiple premia), either with or without the use of an index. With the rise of interest in investing in factors, researchers and product providers now pay a great deal more attention to questions of investability, such as capacity or turnover constraints.

As a result of this evolution in theory and practice, factors now provide a robust framework for long-horizon investors to build their portfolios, taking into account different investment styles.

For long-horizon investors considering using factors as a tool, an immediate question is **how to select from the range of available factors and how best to integrate them.**

Below, we expand on this topic by highlighting the distinct characteristics of individual equity factors and the questions typically raised when multiple factors are combined in a portfolio.

A well-designed factor portfolio is one that represents a happy medium between over-diversification, with the associated costs, and using too few factors or too concentrated approach to individual factors, with the associated risks.

"An immediate question is **how to select from the range of available factors and how best to integrate them.**"

How to select factors

It is important to guard against data mining when selecting factors. Do the candidates have a solid economic, structural or behavioural rationale? Is there something unreliable in the data?

Factors should also show reliability across market contexts, regions, sectors and over different time periods. They should help in portfolio diversification.

And **factors require scalability: there is no point using factor language to describe a strategy that works only in a small niche of the securities market.** In many cases, institutional investors will have moved to a factor approach in recognition of the fact that alpha is not scalable. Factors should therefore be available for use at scale without an obvious detrimental effect on portfolio risk or return.

Nevertheless, there are trade-offs in factor investing, since by definition a factor strategy offers somewhat less capacity than a capitalisation-weighted market index. **A key skill in factor portfolio construction is to recognise at what point a factor strategy starts to run into capacity or liquidity constraints, or when it might risk a degradation in performance as a result of crowding.**

"Factors should also show reliability … and should help in portfolio diversification. Factors require scalability."

Capacity of factors

A combination of factors will only represent a sub-segment of the equity market.

We estimate that the capacity and the liquidity available for the 5 factors (using MSCI factor indices as of 30/09/2017) represent 60% of the MSCI World index. In other words, we do not see capacity currently being an issue considering the present assets invested in factor strategies.

A key issue, however, is the potential crowding effect, should sufficient investors decide that a particular factor, or group of factors, are of interest. Some factors have a lower level of capacity and can be more impacted by potential crowded trades.

Crowding can be monitored and controlled through relatively simple measures. Assessing the current valuation of a factor relative to its long-term history can provide a good estimate of whether a factor is becoming "too popular" due to a sudden and strong multiple expansion. **This valuation measure coupled with lower liquidity can be used as a forward looking signal of a crowding risk.**

Factors are different in nature

Some factor premia can be understood as compensation for assuming a particular type of systematic risk. Just as investors earn the equity risk premium over time for preferring shares to less risky assets like bonds, investors in the value factor earn a risk premium for holding a particular type of stock, in this case equities offered at a valuation discount to the rest of the market.

Such shares can be considered as having a higher risk of default. As an example, we could cite automobile stocks, which represent a highly cyclical industry. The stocks of these companies became very cheap during the recession that followed the 2008/09 financial crisis, amidst widespread worries that the auto makers would default on their debts.

Similarly, the size factor premium can be understood as compensation for the risk of holding less widely followed, relatively less liquid and less established company shares.

Other factors are less easy to interpret as risk premia. Instead, they accrue to investors as a result of market anomalies, some of which could reflect collective behavioural biases amongst the investing public. In other cases, the anomalies could result from the market's internal structure or from legal or accounting biases.

We categorise equity factors in two ways. First, we distinguish those factors that are driven more by the pricing of stocks (such as the size and momentum factors) from those that are driven by non-price-based, fundamental measures of companies' worth (such as quality). Second, we distinguish between risk-based and anomaly-based return premia. We can then map our five preferred factors to a chart (see figure 2).

Figure 2: a typology of equity factors

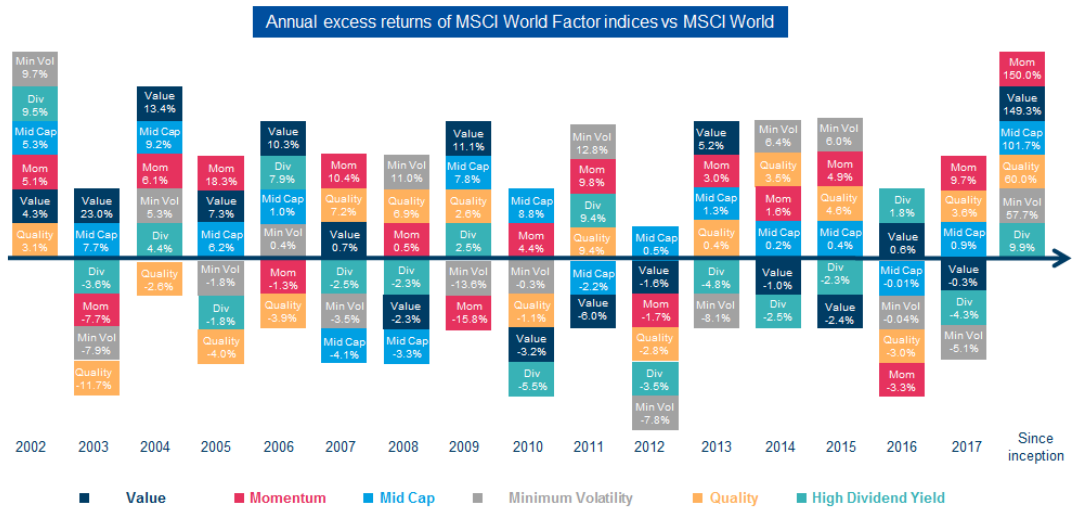
For illustration purposes only

Each factor has its own characteristics on the two axes. Understanding the different types of pay-off inherent in each factor helps the long-horizon investor build a well-diversified portfolio that is a good match for their objectives.

Long-horizon investing in factors should stay away from market timing

Factors perform differently at different points in the economic and market cycle. This can be seen clearly in figure 3, which illustrates the annual relative returns of MSCI's factor indices against the MSCI World index, a representative capitalisation-weighted benchmark.

Figure 3: annual relative returns of MSCI factor indices vs. global equity benchmark



Source: MSCI. Data as of end December 2017. Relative returns vs MSCI World.

An investor trying to time factor allocations could easily have moved into or out of a factor at the wrong time. However, an investor exhibiting patience would have benefited: over the whole period value outperformed the other factors by a comfortable margin.

The lowly-correlated return streams of different factors offer investors the opportunity to diversify. In figure 4 we show the correlations between factors over the same 15-year period. None of the correlations between factors exceeded 40%, while several of the factors were negatively correlated, helping smooth the overall return stream of investors able to combine them in a portfolio.

Figure 4: historic correlations of factor excess returns

Correlations of excess return – Global 2002-2017					
	Mid Cap	Minimum Volatility	Momentum	Quality	Value
Mid Cap	100%				
Minimum Volatility	-19.0%	100%			
Momentum	16.3%	31.1%	100%		
Quality	-30.9%	39.7%	31.8%	100%	
Value	28.9%	-35.2%	-22.1%	-53.9%	100%

Source: MSCI, Amundi. Data as of end December 2017. Net monthly returns in USD.

Several of these intra-factor correlations are intuitive. For example:

- Value and quality are negatively correlated, since the value factor focuses on riskier, cheap stocks, with potentially higher levels of gearing and default risk, while quality focuses on more defensive stocks, with proven balance sheet strength and good profitability;
- Value and size are positively correlated, since the categories of cheap (value) stocks and stocks with smaller capitalisations (which are possibly underpriced) may overlap;
- Minimum volatility and quality are positively correlated, since the characteristics of quality stocks (profitability, earnings quality and low leverage) are also likely to produce a lower level of stock price volatility.

Combining factors brings diversification benefits

When diversifying across factors investors should look beyond correlations, which can be unstable, especially in stressed market conditions. For instance, some assets may present a low correlation in a normal regime and a high correlation in periods of market crisis.

A better approach to building a diversified factor portfolio will take into account the nature of individual factors' pay-offs in different market conditions.

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For example, during periods when equity markets are rising strongly, the value factor tends to perform even better than the market. Conversely, when markets are falling sharply, value tends to underperform the market.

By contrast, the low volatility factor has a very different pay-off profile. It tends to outperform strongly in turbulent and bear markets, while it tends to lag when the market is strongly bullish.

A long-horizon investor's factor diversification approach should therefore be multifaceted. **The investor should be diversified not just across risk factors, but also across payoff functions and over time.**

Factors are governance friendly

Viewing the behaviour of markets through a factor lens helps asset owners gain a much more granular understanding than could be offered by a reliance on other benchmarks, such as investor peer groups or capitalisation-weighted indices. It follows that factors can help to make governance more robust. For asset owners who are accustomed to delegating investment management responsibilities to third parties, factors can help simplify the manager selection, due diligence processes, and monitoring. This should ultimately result in greater operational efficiency, the ability to change asset allocation more quickly and accurately, and an overall reduction in costs, to the benefit of the beneficiaries.

Could anything go wrong?

One of the easiest ways for investors to lose money is to buy high and sell low. We strongly believe that a factor-based approach, if executed well, can enhance long-term returns, but we acknowledge that asset owners can easily destroy value by constantly chasing the "hottest" factors in the recent past. There is extensive commentary, or heated debate, in the press about whether factor timing is possible or advisable.

We very much support a long-horizon factor investment approach. As previously shown in figure 3, the returns of individual factors can vary sharply from one year to the next and timing market allocations is notoriously difficult. A long-horizon investor who is willing to stay the course and hold a portfolio combining multiple factors can reap significant benefits.

But that doesn't mean we should turn a blind eye to potential hidden biases. **Crowding in individual factor strategies could lead to a degradation of the factor's future expected returns.** For instance, some factors may become a victim of their own success which may lead to extreme valuations. Monitoring and analysing crowding and valuation risk is important, and will likely lead to rebalancing.

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"These strategies need to demonstrate their ability to provide enough capacity and liquidity to asset owners."

Conversely, new factors could emerge, offering opportunities to those able to identify them.

Things could also go wrong if asset owners fail to understand the implications of capacity. By definition, a factor approach involves some reduction in investment capacity and liquidity by comparison with a portfolio tracking the capitalisation-weighted index. **These strategies need to demonstrate their ability to provide enough capacity and liquidity to asset owners who would like to deploy significant assets in these strategies as a core positioning in their portfolios.** Factor-based strategies are well diversified and are exposed to different segments of the market. Therefore, a combination of factors provides good liquidity. But we need to monitor whether capacity constraints or frictional costs ever become a significant threat to returns.

Conclusion

Following the financial crisis, many asset owners have sought to bring about improved cost-efficiency, transparency and efficiency in their portfolios. In this environment, interest in factor approaches has grown substantially. Factors offer a way to reproduce many of the sources of return traditionally exploited by active managers, at much lower cost. Equally, factors offer one way to address the return drag of capitalisation-weighted approaches. Given these benefits, we believe factors are a useful and valuable tool for long-horizon investors.

To summarise, we propose that the asset owners and their advisers follow four steps to develop a factor-based framework.

1. Develop a shared understanding and belief that a factor-based approach adds value in a long-horizon investing programme
2. Identify what factors are best suited to the investment objectives and risk budget
3. Construct a diversified portfolio of factors by understanding the nature of individual factors' pay-offs in different market conditions
4. In measuring and monitoring performance, asset owners should guard themselves against market timing while in the same time being adaptive when extreme valuations are created by crowding.

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Limitations of reliance – Amundi Asset Management

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- Build on the belief in the value and power of thought leadership to create positive change in the investment industry
- Find and connect people from all corners of the investment world and harnesses their ideas
- Work to bring those ideas to life for the benefit of the end saver.

At the Institute we identify tomorrow's problems and look for investment solutions, which, we strive to achieve through:

- A dynamic and collaborative research agenda that encourages strong member participation through dedicated working groups
- A global programme of events including roundtable and key topic meetings, webinars and social events
- One-to-one meetings between Institute member organisations and senior representatives of the Thinking Ahead Group.

The solutions we collectively develop fall into three overlapping areas:

- Better investment strategies
- Better organisational effectiveness
- Enhanced societal legitimacy.

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