Factor investing: an introduction

The performance of individual securities and asset classes can largely be explained by their systematic exposure to quantifiable investment themes. These “factors” include value, momentum, quality, and size, among others. The rapidly growing space of factor investing is based on the approach of explicitly allocating directly into a portfolio of these factors using tradable securities merely as instruments to achieve broad and diversified exposure. Depending on investors’ preferences, they might choose an active or a passive approach, based on a single-factor or a multi-factor strategy. Regardless of the implementation chosen, holding a diversified, well-balanced portfolio of factors aims to reduce risk and deliver a smoother return stream.

In recent years, factor-based investing has become ever more popular among investors seeking precise and systematic solutions. We give an overview of the concept, describe its history and highlight popular factors. Finally, we contrast active with passive, as well as multi-factor with single-factor concepts.

A substantial body of academic research, coupled with advancements in data collection and processing, has expanded investors’ understanding of the key factors historically affecting risk and return. Moreover, the introduction of specific indexes and ETFs, alongside the offerings of active quantitative managers, now provide an array of options for investors to implement these factors in their portfolios. Estimates put the current total assets under management in “factor” or “smart beta” strategies, as they are often referred to, at USD 1.2 trillion. ¹

Style factors, macro factors...

At the most fundamental level, “factors” can be described as quantifiable characteristics of assets. They include: value, size, momentum, volatility and quality. Some researchers distinguish between risk and return factors, with return factors explaining long-term returns and risk factors explaining their variability. However, we prefer to view risk-return on a continuum. Consequently, we refer to both risk and return factors as “style factors” (Figure 1).

While style factors are often discussed in the context of equity portfolios, they can also be used for other asset classes. For example, value corresponds to assets trading attractively relative to intrinsic value as measured by price to book in equities and term premium (the current yield versus future expected yield) in bonds.

In addition, there are “macro factors”, such as growth and inflation. These are especially well-suited for spanning asset classes, as different asset classes have different macro factor sensitivities. For example, investors often associate lower average returns with bonds as compared to equities. But that is not necessarily true. A factor investor would say that bonds have a lower exposure to the growth factor, which often drives equity returns.

¹ “Enhanced index” and “smart beta” strategies as defined by eVestment, Preqin, The Economist Intelligence, as of April 2016.
...and factor investing
Essentially, factor investing means allocating a portfolio to style and macro factors in an effort to achieve particular investment objectives. Similar to more traditional investment processes, factor investing involves taking positions in individual assets. But, unlike more traditional approaches focusing on security selection, a factor approach makes use of tradable securities, such as stocks and bonds, to achieve broad and diversified exposure to specific investment themes.

A look back in time
The origins of factor investing are largely academic in nature. The first milestone is the seminal work of Sharpe (1964). His "market model" separates the market factor beta from the stock-specific alpha. The "three factor model" of Fama and French (1993) extends this approach to include both size and value (defined as price-to-book ratio) as additional explanatory variables. A few years later, Carhart (1997) introduced the momentum factor, to form what is now known as "the four-factor model". It explains stock returns with the four factors: market, size, value and momentum.

In practice, quantitative portfolio managers have used variants of the four-factor model to manage money for quite some time. In fact, Invesco is one of the pioneers in this space and has been investing via factor models since 1983.

Figure 1: What is a factor? Macro and style factors

<table>
<thead>
<tr>
<th>Macro factors</th>
<th>Inflation</th>
<th>Political</th>
<th>Currencies</th>
<th>Credit</th>
<th>Real rates</th>
<th>Liquidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflation</td>
<td>$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Political</td>
<td>![Icon]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Currencies</td>
<td>$£¥</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Credit</td>
<td>![Icon]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Real rates</td>
<td>![Icon]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liquidity</td>
<td>![Icon]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Style factors</th>
<th>Low size</th>
<th>Momentum</th>
<th>Low volatility</th>
<th>Dividend yield</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>![Icon]</td>
<td>![Icon]</td>
<td>![Icon]</td>
<td>![Icon]</td>
<td>![Icon]</td>
</tr>
</tbody>
</table>

Source: Invesco. For illustrative purposes only.
More recently, in a study for the Norwegian Government Pension Fund (GPFG), Ang, Goetzmann and Schaefer (2008) give an idea of different factors used in the multi-asset space. Ang, Goetzmann and Schaefer also point out that over two-thirds of Norway’s sovereign wealth fund’s performance was driven by exposure to systematic factors. This suggests a paradigm shift away from allocation by asset class, toward allocation by factor.

While it may be some time before investors broadly and holistically reframe their investment problem to focus on factors similar to GPFG, the study has created renewed interest in the idea that portfolio return and risk can be largely explained by factor exposures, whether intended or not. And, given that investors are exposed to factors, they would benefit from a better understanding of them. Once this achieved, they may consider actively investing in factors for two reasons: to generate factor return (Figure 3) and to manage factor risk.

Factors vs. fundamentals
The factor-based approach is often set in contrast to a “fundamental” approach, which implies that factor investing is not fundamentally based – something of a misconception. Many, if not most, widely used factors, such as: value, momentum or quality, rely on the same fundamental investment themes used by more traditional asset managers. Some would argue that these drivers take advantage of behavioral anomalies, creating exploitable market inefficiencies. Others would counter that factor returns reflect premia for additional risk over the broad market. In either case, similar to most traditional asset management concepts, factor models require a strong investment rationale. So, the real difference between a factor-based approach and a more traditional one is not the nature of the investment themes, but the way they are implemented in a portfolio. Whereas traditional or “fundamental” managers typically rely on bottom-up selection and careful investigation into the current state of each company, factor investing delivers transparent, structured and disciplined operationalization of traditional investment themes.
Figure 3: Why would we expect to earn a factor premium?

<table>
<thead>
<tr>
<th>Risk premiums</th>
<th>Behavioral rationales</th>
<th>Market structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>For bearing additional risk over the broad equity market e.g. an undesirable return pattern</td>
<td>Markets are inefficient due to behavioral biases of participants</td>
<td>Markets may be inefficient because of restrictions and limitations</td>
</tr>
</tbody>
</table>

Source: Invesco. For illustrative purposes only.

Similar to a more traditional/fundamental approach, the factor-based approach is also highly research intensive, but the research tends to be longer term, focused on identifying the underlying return and risk drivers and heavily reliant on statistical evidence. By focusing on factor exposures, rather than individual names, portfolios are built to systematically harvest factor premia.

A few examples
To better understand how this works, let us consider specific examples of style and macro factors.

“Momentum” is a common style factor: it refers to the phenomenon that assets with positive (negative) returns in the past, tend to also have positive (negative) returns in the future. There is a very good reason for this: Peter Lynch, the legendary “fundamental” manager of Fidelity’s Magellan Fund, has said that investors tend to “trim the flowers and water the weeds”. In other words, they sell winners too early and hold onto losers for too long. Such behavior leads to incomplete price discovery and – ultimately – price trends, i.e. “momentum”.

“Growth”, on the other hand, is an important macro factor: since World War II, in periods with increasing GDP growth, stocks have had a significantly higher Sharpe ratio than bonds. Therefore, a portfolio with a large equity allocation relative to bonds is significantly exposed to growth factor risk, and has typically been rewarded with higher returns in these periods.

Other macro factors include inflation, currency appreciation/depreciation or even policy rate changes, all of which help to explain how multi-asset portfolios performed in various economic environments.

Active vs. passive?
An important question is whether implementation of factor investing should be passive or active. Exposure to factors can be achieved either way, and the implementation is largely a function of investors’ objectives, preferences and budgets. Passive factor-based strategies are often labelled “smart beta”, and are commonly implemented via exchange-traded funds (ETFs). These strategies seek an enhanced risk-return profile by using factor-based indexes, instead of a traditional cap-weighted one. These “smart” indexes tend to use factor definitions that are standard, stable and have been widely used and well-established in academic literature. Investors in passive strategies expect consistency of the methodology and complete transparency with respect to both index construction and holdings.
Alternatively, active factor-based strategies are frequently offered by quantitative arms of asset management firms. They rely heavily on teams of researchers and portfolio managers, who leverage proprietary factors and sophisticated portfolio construction techniques evolving over time. Clients are often large, institutional investors who are willing to forego complete transparency in return for a more customized and sophisticated approach to delivering factor exposures.

Overall, passive factor investing allows investors to access well-established factors in an efficient, relatively low cost and transparent manner, while active factor investing offers exposure to dynamic, proprietary factors, which are carefully combined to seek alpha and diversify risk. Both methods represent different but effective ways to implement factors within a portfolio. The specific implementation will depend on the client.

**Single-factor vs. multi-factor?**

Both active and passive approaches can be implemented by combining factors into multi-factor solutions, or by targeting single factors such as low volatility or value. However, passive approaches have tended to utilize a single-factor framework while active approaches are more commonly implemented as multi-factor. Single-factor exposures provide targeted building blocks for investors to create custom factor blends, while multi-factor solutions attempt to balance factor exposures holistically on the investor’s behalf.

In principle, for investors with absolutely no exposures to style and macro factors, the solution could be to employ a multi-factor model with sophisticated portfolio construction techniques and careful risk control. In practice, many clients will already have some exposure to factors, but unless their factor investments have been intentional, their portfolios are unlikely to have an ideal factor balance.

Simply adding a multi-factor-based strategy to an existing portfolio with inappropriate factor tilts may not be the perfect solution. A process of “factor completion” could be more appropriate. Various techniques are available to complete one’s factor exposures, from a simple combination of multiple single-factor portfolios, to a sophisticated, holistic implementation providing optimal factor blends. Such portfolio rebalancing can be performed within a single asset class or across multiple asset classes. In the extreme, an investor will change his/her view of the world – from one in which investments are allocated across assets and securities to one in which he/she allocates into the underlying factors that drive security and asset class returns.

**Conclusion**

Factors are investments, and, as with other investments, holding a diversified, well-balanced portfolio of factors may reduce risk and deliver a smoother, positive return stream. After understanding the philosophy of balanced factor investing, the next question is how to practically implement a factor strategy. In forthcoming articles, we plan to investigate these approaches in greater detail.