ARTICLE
For professional investors
December 2017

ROBECO
The Investment Engineers

Mixed versus integrated multi-factor portfolios

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- We compare bottom-up integration and single-factor mixing
- Mixing of generic single-factor strategies is inefficient
- Investors' objectives and practical considerations are key

One of the fastest growing and ubiquitous themes in investment management today is factor-based investing. In this paradigm, factors such as value, momentum, quality, and low-volatility, which have been shown to deliver superior risk-adjusted returns against capitalization-weighted benchmarks, are regarded as the main building blocks of investment portfolios. While many investors have already acknowledged its merits and are currently allocating more and more assets to multiple factor premiums, asset managers still disagree on the most efficient ways to harvest these premiums.

Although some investors may have good reasons to focus on a single factor or a set of particular factors, the general consensus is that one should hold a portfolio which is well-diversified across various factors that have been shown to deliver significant premiums in the long run. Such an allocation enables them to reap the benefits of having exposures to various factors, while avoiding large concentrations in any single strategy that expose their capital to the risk of short-run underperformance of any given style. In this note, we summarize the arguments that have been put forward for and against each of these ways to combine factors in multi-factor portfolios, and discuss how we tackle these issues when designing our factor-based investing strategies.

'The key question is whether to mix stand-alone factor 'sleeves' or to construct a bottom-up integrated factor portfolio.'

Factor mixing versus factor integration

The key question here is whether to mix stand-alone factor 'sleeves' or to construct a bottom-up integrated factor portfolio. The factor mix approach entails allocation to single-factor strategies that are constructed to provide maximum exposure to a chosen factor. This approach is transparent, convenient for performance attribution, and also allows for tactical factor allocation. In most cases, however, it ignores the fact that a strategy which targets one specific factor may implicitly bring along undesired negative exposures towards other factors. As a consequence, mixing single-factor sleeves can result in sub-optimal and unintended exposures at the overall portfolio level. The proponents of the integrated approach use this point as their main bargaining chip, claiming that one can achieve better performance characteristics by combining factors optimally from the outset. They do so by selecting stocks with the highest integrated factor scores. Some other advantages of this approach are transaction cost netting and a moderate decrease in turnover.

Another important distinction is that between 'generic' one-factor strategies that systematically trade on signals based on a single factor model, and 'enhanced' single-factor strategies that are designed to eliminate unintended exposures to other factors while still targeting a specific factor premium. The latter are sometimes said to offer 'pure' factor exposures. These are effectively partly integrated strategies that provide many advantages of the single-factor sleeves, but overcome common pitfalls associated with these portfolios. For instance, adding some momentum and quality exposure to value strategies helps to avoid the so called 'value traps' (stocks that are cheap for a reason) and adding value to momentum or quality helps to avoid the most overpriced stocks. As the integration of other factors is only partial, the main return driver remains the selected factor premium. These 'enhanced' factor strategies can be further mixed into multi-factor vehicles, but interestingly, this approach has not been a subject of thorough investigation by the literature that explores the ways in which factors can be combined into multi-factor portfolios.

Asset managers and index providers have responded opportunistically to these developments, by simply providing solutions that cater to both sides of this debate. While there is quite some unity when it comes to the selection of factors, there is a clear lack of consensus among practitioners on how best to combine them into multi-factor vehicles. Various recent studies attempt to bring order to this chaos by examining in detail how the integrated and mix approaches to factor-based investing hold up in a head-to-head contest.

Clarke, de Silva, and Thorley (2016), Bender and Wang (2016), and Fitzgibbons, Friedman, Pomorski, and Serban (2016) all argue that integrated portfolios deliver higher absolute and risk-adjusted returns than their mixed-sleeve counterparts, and are therefore superior. Contrary to this stream of literature, Amenc, Ducoulombier, Esakia, Goltz, and Sivasubramanian (2016) emphasize some of the shortcomings and risks of integrated portfolios such as inefficiency, instability and inability to control factor exposures and nonfactor risks. While both streams in the literature focus on keeping a certain risk-related metric, such as tracking error or total volatility, constant across these portfolios, none of them explicitly aims to achieve the same amount of factor exposure between the mixed and the integrated portfolios. This makes the comparisons unfair: an integrated portfolio may simply exhibit superior performance characteristics because it comes with higher factor exposures than a mixed portfolio. In addition, the integrated and mixed-sleeve portfolios often differ greatly in their concentrations, the integrated portfolio being substantially more concentrated than the combination of single-factor portfolios.

Example

To illustrate this point, consider the study of Clarke, de Silva, and Thorley (2016). Using the 1,000 largest US stocks, they construct an optimized, integrated portfolio which simultaneously targets four factors (value, momentum, low-beta, and small-cap). This integrated portfolio consists of 200 stocks, but is compared with a combination of a 200-stock value portfolio, a 200-stock momentum portfolio, a 200-stock low-beta portfolio, and an 800-stock small-cap portfolio. These two approaches give very different levels of factor exposures and capacity, and thus, are unfair to compare directly.

So which approach is better?

Having established that it is crucial to account for differences in the level of factor exposure when comparing multi-factor strategies, we now turn to discuss which approach is better. In order to answer this question, we consider empirical, theoretical, and practical arguments.

Ghayur, Heaney, and Platt (2016) argue that a preference for one or the other ultimately depends on the main objectives of the asset owner. They find that two portfolios that are constructed to have the same level of factor exposures to the four factors that they consider (value, momentum, quality, and volatility), but using two different way to achieve this – bottom-up integration or mix single-factor strategies – are both viable options whose relative attractiveness depends on the asset owner's objective.

A recent paper by Leippold and Rueegg (2017) takes a systematic look at this problem by considering a richer set of factor combinations, robust statistical tests, and longer time periods to conclude that integrated portfolios do not outperform the mixed ones. While they do find that the integrated approach lowers the overall portfolio risk through better portfolio diversification than the mixed-sleeve approach, this lower risk is accompanied by a lower return. In fact, any difference in risk between the two approaches can be explained by a higher exposure of the integrated portfolio to the low-risk anomaly. The authors also recognize that comparing mixed and integrated portfolios with vastly different levels of concentration, and therefore active risk, is not a fair comparison. Once they account for these differences, they find no evidence in support of one approach over the other.

To summarize, it seems that, empirically, there is not much difference between the integrated and the mixed approach once differences in the degree of factor exposure are properly accounted for. This is also the conclusion if we look at theory for guidance on this problem. Expected stock returns are modeled as a linear function of exposures to factor premiums in commonly used asset pricing models that underpin the entire philosophy behind factor-based investing. While there is an abundance of evidence supporting the existence of factors, the academic literature has not yielded any proof that combining them into integrated portfolios leads to superior factor solutions. That is, there is no evidence that integrating factors gives access to an additional source of alpha that cannot be obtained by mixing factors. While we do not dismiss the possibility that the real world is much more complex than the one described by these linear factor models, and that there are many non-linear and interaction relationships that these models fail to account for, to date solid evidence on this is lacking.

Practical implications

If the integrated approach is not intrinsically superior to the mixed approach, nor the other way around, does this mean that it does not really matter how one goes about constructing factor portfolios? Absolutely not! In a theoretical world without transaction costs and with the flexibility to lever portfolios up or down as much as one likes, any desired factor profile may be obtained using whatever factor strategies are available. But in reality investors can only invest a dollar once, transaction costs are important, and the application of leverage is severely constrained. Attractive factor solutions are the ones that deliver the highest amount of factor exposure for any given level of active risk that is chosen, and that never disregard other factors, also when targeting just one factor in particular.

Taking these aspects into consideration, generic single-factor factor strategies tend to be suboptimal. For instance, some generic value strategies do not provide much exposure to the value premium to begin with. Other generic value factor strategies do provide a high degree of value exposure, but are only able to do so by accepting significant negative exposures towards other factors. When generic value, momentum, quality, and low-volatility strategies are combined, factor exposures at the portfolio level are diluted because of these conflicting underlying exposures.

Our enhanced single-factor portfolios address such issues and are designed to provide a more efficient exposure to a selected factor. They are well-suited for investors who prefer to have the flexibility to choose their own factor weights and want transparency and ease in interpreting the performance drivers of their portfolio returns. They are also suitable for investors who want to stir their existing portfolios in a certain direction – for instance, they already may have a significant exposure to a set of factors that they would like to augment with a factor that they do not have. To address the common pitfalls of generic single-factor solutions, we apply partial factor integration to ensure that stocks that have negative expected return contributions from other factors do not end up in the portfolio. These enhanced single factors can be further mixed into multi-factor vehicles that can be customized based on clients' investment objectives.

On the other hand, there are clients who prefer to leave it completely up to us to decide on the choice of factors and how to combine them, or who have a preference for a strategy with a limitation on active risk. For these clients, we offer integrated solutions which are designed to achieve the highest possible factor exposure given a certain relative risk level. There are also investors who prefer a strategy concentrated in a relatively small number of stocks with high exposures to multiple factors - something that is hard to achieve with the mixed-sleeve approach. For this clientele, we provide integrated solutions which are designed to provide high exposures to multiple factors in the most efficient way. Our mixed and integrated factor strategies both provide improved factor exposures compared with generic approaches, so performance is typically not the main consideration when choosing between the two alternatives.

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Version 8/17