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Applying factor insights to equity portfolios

A case study in refining manager selection and portfolio composition

 

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Summary

- Factor analysis can help investors with both their manager selection process and their portfolio-construction decisions.
- Style factors can be used to better understand active manager returns and to help determine whether managers are delivering true alpha.
- Including factor strategies alongside index and active may help achieve a number of objectives, from improving risk-adjusted returns to increasing diversification to reducing fees.
- The optimal mix of factors, index and active will differ for each investor, based on risk tolerance, investment philosophy, fee sensitivity, and desired outcomes.

In a recent whitepaper we examined some of the ways that investors may be able to construct better-diversified portfolios by incorporating factor insights into their asset allocation process. In addition to using factors to help set their overall asset allocations, investors can also harness the power of factors to refine and reshape their exposure within individual asset classes. Our focus here will be on equities, but factor insights can be applied to other asset classes as well.

Factor analysis can help equity investors with both their manager selection process and their portfolio composition decisions. Style factors can be used to better understand active manager returns and to help determine whether managers are delivering true alpha. Looking at the total equity portfolio through a factor lens can help investors decide what blend of index, factor and active strategies is appropriate for their investment objectives and risk targets.

We'll use a hypothetical case study to demonstrate both of these uses, but before we do, we'll start with a brief overview of the current landscape and the rationale for utilizing the full spectrum of equity strategies.

Investors have historically used a combination of active and index strategies to construct diversified equity portfolios. In recent years we've seen many adopt a barbell approach, with low-fee index funds making up the bulk of the equity allocation and high-conviction active strategies rounding out the portfolio.

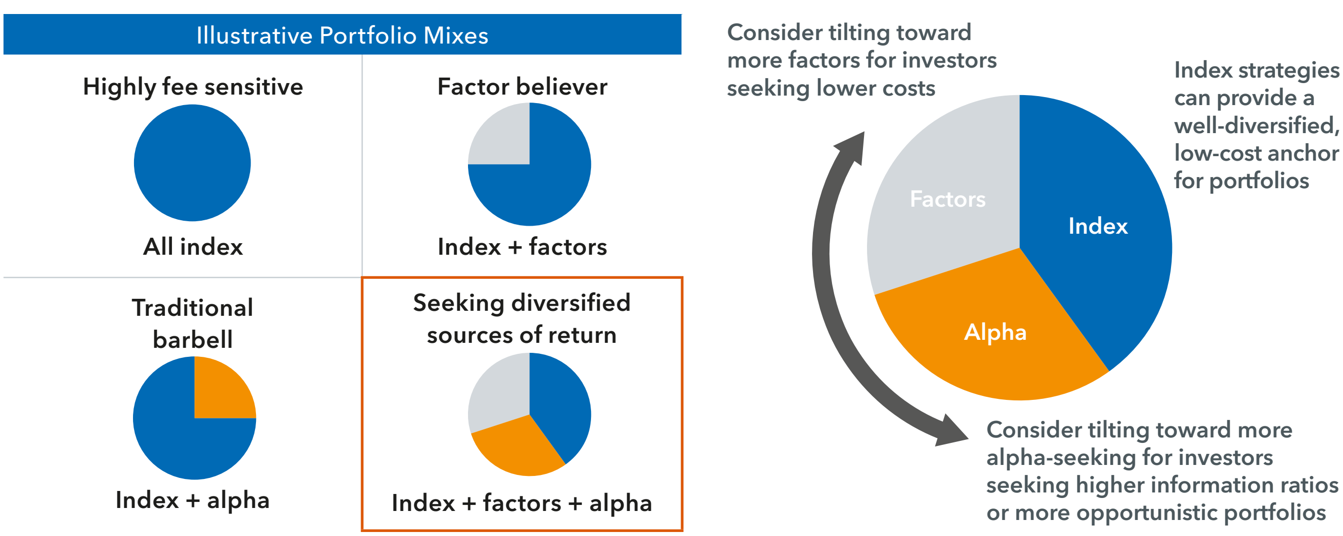
Combining alpha and beta in this fashion is a logical approach, as the individual risk tolerance of an investor can be recognized along the continuum between active and index. But we believe that investors can potentially enhance equity portfolios by adding style factor strategies alongside index and more conventional active choices. In such a portfolio, each investment approach fills a unique role.

- Index strategies seek to provide low-cost, diversified market exposure and can serve as the anchor for strategic benchmarks in target risk allocations.
- Style factor strategies seek to provide incremental returns by exploiting top-down insights to target historically broad, persistent, well-documented sources of return such as value, momentum and quality that exist within asset classes.
- Alpha-seeking strategies seek to provide differentiated alpha after accounting for factor exposures, by exploiting bottom-up insights to target unique, transitory sources of return.

By using factor insights to examine their lineup of active managers and to inform their portfolio composition, investors may also be able to construct equity portfolios that are better suited to target a variety of outcomes, from higher risk-adjusted returns to improved diversification to lower fees. See the *Adjusting the mix* chart.

Adjusting the mix

Different combinations of active, index and factor strategies can target different objectives



Source: Blackrock, June 2018. For illustrative purposes only.

Enhancing manager selection

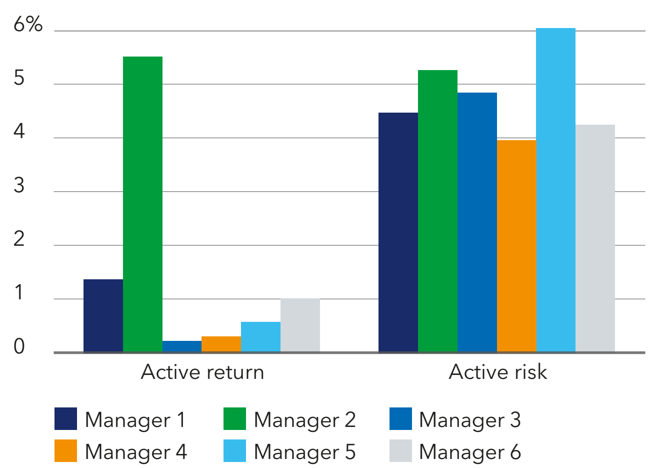
Our case study[1] considers a hypothetical institution that is looking to assess its roster of active managers and, if possible, to improve risk-adjusted returns and increase diversification. The institution's active equity portfolio is currently spread across six managers. In reality, many investors have exposure to a far greater number of active managers, but a similar analysis can be conducted with any size portfolio. New analytical tools can make the process more straightforward and transparent than in the past.

To begin our analysis, we look at the active risk and return that each manager is providing. As seen in the *Getting what you paid for?* chart, each of the managers is providing positive active return, with active risk levels ranging from approximately four to six percent. On the surface, this may appear to be an acceptable result – all of the managers are delivering what they are paid to deliver: above-benchmark returns.

But a closer look, one that also considers correlations and factor exposures, reveals a more nuanced picture, one that offers an opportunity for improvement. *The right combination?* table looks at the correlation of active returns across the six managers. We can see that certain managers have displayed high correlations with one another, raising the question of whether each manager is delivering a diversifying source of return to the overall portfolio.

Getting what you paid for?

Five year annualized active risk and return of each manager



The right combination?

Five-year active return correlation among managers

	Mgr 1	Mgr 2	Mgr 3	Mgr 4	Mgr 5	Mgr 6
Mgr 1	1.00					
Mgr 2	-0.47	1.00				
Mgr 3	-0.41	0.43	1.00			
Mgr 4	-0.27	0.47	0.26	1.00		
Mgr 5	-0.45	0.46	**0.78**	0.30	1.00	
Mgr 6	-0.16	0.41	0.33	0.38	0.43	1.00

While overall returns are good, high active return correlation can be cause for concern.

Sources: eVestment Alliance, MSCI, March 2018. Information shown is calculated using net of fees composite monthly return data (April 2013 to March 2018) for equity managers identified as being benchmarked to the MSCI World Index. Reflects trailing five year annualized active manager correlations, excess returns and annualized active risk. Past performance is not a guarantee of future results. Please see "Case Study Methodology" on Page 8 for additional information. **Portfolio and analysis provided for illustrative purposes only to demonstrate a potential approach to using factors to enhance manager structure. It is not representative of any actual client's portfolio and is not a recommendation of an investment strategy or allocation.**

1 For a full description of the case study methodology, see the explanation on Page 8.

To help answer that question, we need to look deeper and understand what is driving the returns of each manager. Specifically, we need to look at the factor exposures of each of the managers and determine whether they are delivering significant alpha that cannot be explained by those exposures. We can accomplish this by running a simple regression analysis of each manager's returns to decompose their alpha generation and their exposure to four prominent style factors: low size, value, momentum and quality. The results are summarized in the *Gaining transparency* table. Four of the six managers exhibit meaningful tilts to one or more factors, while only one manager has delivered significant alpha that cannot be explained by their factor exposures.

We believe that applying this type of portfolio-construction lens is critical to achieving desired outcomes, rather than simply winding up with an ad-hoc collection of active managers. In practice, we would use a more comprehensive approach that emphasizes the analysis of security-level holdings alongside multi-factor regressions. In a real world manager-structure exercise we would also incorporate other considerations including fees, outperformance targets and capacity. We also recognize that results can vary when using realized performance and risk numbers (as in this case) versus forward-looking estimates of return and risk, and with the type and number of managers.

Ultimately, for the purpose of this simplified case we have elected to focus mainly on the analytical framework, with our primary suggestion being that investors use factors to help enhance manager selection.

Gaining transparency

Manager factor exposures and monthly alpha net of factor exposures

	R^2	Monthly alpha net of style factors	Low size	Value	Momentum	Quality
Mgr 1	47%	0.27%	-0.30	0.23	-0.29	-0.63
Mgr 2	40%	0.24%	0.54	0.04	0.21	1.13
Mgr 3	33%	0.00%	0.22	-0.52	-0.07	0.54
Mgr 4	39%	-0.17%	-0.18	0.36	0.19	0.82
Mgr 5	33%	0.03%	-0.09	-0.64	-0.10	0.58
Mgr 6	16%	0.06%	0.04	-0.28	-0.04	0.35

Sources: eVestment Alliance, MSCI, March 2018. Information shown is calculated using net of fees composite monthly return data (April 2013 to March 2018) for equity managers identified as being benchmarked to the MSCI World Index in eVestment. Reflects trailing five year annualized excess returns. Past performance is not a guarantee of future results. Please see "Case Study Methodology" on Page 8 for additional information. Manager excess returns were regressed versus four single factor MSCI indices as follows: MSCI World Equal Weighted Index (Low Size), MSCI World Enhanced Value Index (Value), MSCI World Momentum Index (Momentum) and MSCI World Sector-neutral Quality (Quality). R-squared is the coefficient of determination, a measure of how close data is to the fitted regression. Values for the four factors reflect factor loading (coefficient). ***Dark gray represents statistical significance at the 95% confidence level. Light gray is 90%.*** **This analysis contains backtested index data from MSCI.** Please see Index Disclosures on Page 8 for index inception dates. **Portfolio and analysis provided for illustrative purposes only to demonstrate a potential approach to using factors to enhance manager structure. It is not representative of any actual client's portfolio and is not a recommendation of an investment strategy or allocation.**

Revamping the portfolio

So what changes might we make to our hypothetical portfolio, based on the preceding results? We may want to replace Managers Three and Five, as they have not added alpha, they have negative factor loadings, and they have exhibited high correlations with the other managers. On the other hand, Manager One has delivered alpha net of style factors, but has negative factor loadings; Managers Two and Four have provided multifactor exposure; and Manager Six has delivered low correlations with the other managers.

Remembering our hypothetical investor's goals of improving risk-adjusted returns and increasing diversification, the investor could replace Managers Three and Five with an allocation to a diversified multi-factor strategy, in order to potentially help offset the negative loadings of Manager One. In this case, we have proxied this approach using the publicly available MSCI World Diversified Multiple-Factor Index (DMF) as it is designed to offer diversified exposure to each of our four factors in a transparent way.

Replacing the non-diversifying exposures of our deposed managers with a DMF strategy also reduces intra-manager correlations in our new hypothetical portfolio. See the *Complementary returns* chart.

To examine the net effect of the changes we have made to our hypothetical portfolio, we can look at the efficient frontier of our original portfolio alongside that of our modified portfolio. By replacing the managers that had negative factor loadings – and didn't add alpha – with a diversified multi-factor strategy with a high information ratio, we have pushed up the efficient frontier. See the *A new frontier* chart. We have also improved portfolio diversification, thanks to the lower correlations among managers, thus fulfilling both of our hypothetical investor's goals. As an added bonus, we have also potentially reduced fees by replacing active managers with a rules-based strategy.

It is worth noting that we could have also run this exercise using single factor exposures (an approach detailed in a prior paper[2]) or with single factors held alongside a multi-factor portfolio. Both approaches should fit within the framework detailed in this paper.

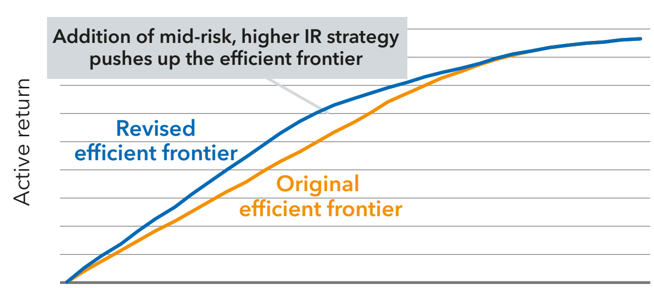
Complementary returns

Active return correlation among remaining managers and diversified multifactor strategy

	Mgr 1	Mgr 2	Mgr 4	Mgr 6	Multi-Factor
Mgr 1	1.00				
Mgr 2	-0.47	1.00			
Mgr 4	-0.27	0.47	1.00		
Mgr 6	-0.16	0.41	0.38	1.00	
Multi-Factor	-0.21	0.06	0.21	-0.02	1.00

A new frontier

Efficient frontier of original and modified hypothetical portfolios



Sources: eVestment Alliance, MSCI, March 2018. Information shown is calculated using net of fees composite monthly return data (April 2013 to March 2018) for equity managers identified as being benchmarked to the MSCI World Index in eVestment. Multi-Factor strategy is proxied by the MSCI World Diversified-Multiple Factor Index Net USD. Reflects active manager correlations, trailing five year annualized excess returns and annualized active risk. Past performance is not a guarantee of future results. Indexes are unmanaged and it is not possible to invest directly in an index. Please see "Case Study Methodology" on Page 8 for additional information. Efficient frontier modeled using Markov Processes International with above source data. **Portfolio and analysis provided for illustrative purposes only to demonstrate a potential approach to using factors to enhance manager structure. It is not representative of any actual client's portfolio and is not a recommendation of an investment strategy or allocation.**

2 *Solving the Puzzle: Implementing Factor Strategies in Institutional Portfolios.* Ang, Stafford and Underwood, 2017.

Optimizing portfolio composition

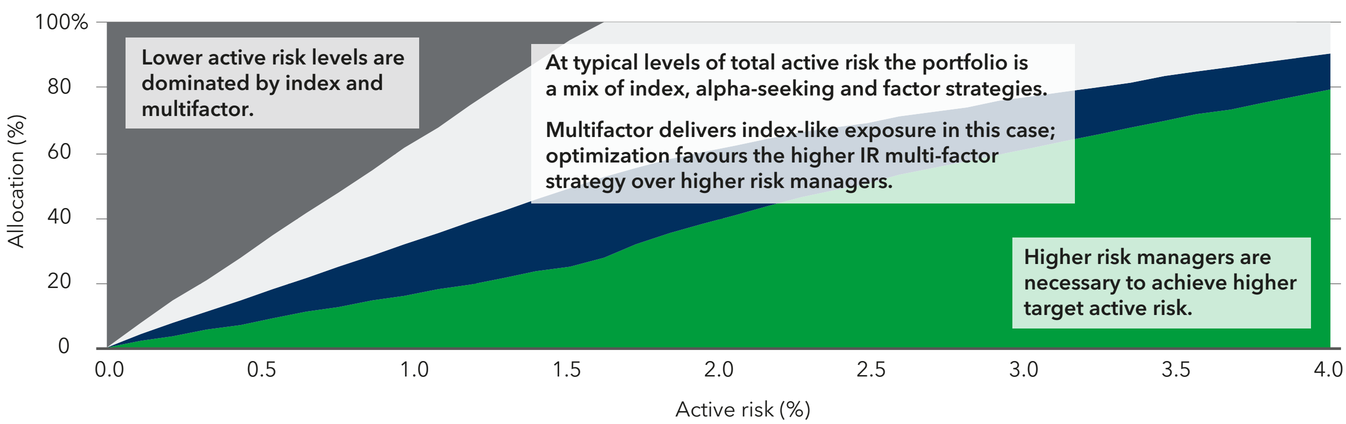
Based on the revised opportunity set, what would be the optimal mix among our active managers, the diversified multifactor index strategy, and a cap-weighted index strategy? If we target an active risk level of one percent, the portfolio would be split relatively evenly across factor, index and active strategies. Because the optimization process looks for high information-ratio strategies, it has retained Managers One and Two while replacing Managers Four and Six with the diversified multifactor strategy.

At higher active risk targets, investors would increasingly move away from the index strategy and toward greater allocations to the active and multifactor strategies. Conversely, at lower risk targets, index strategies would play an increasingly prominent role. See the *Active choice* chart and table. In practice, the right mix for each investor will differ based on a number of variables besides risk tolerance, including investment philosophy, fee sensitivity, and desired outcomes.

Whatever their goals and beliefs, now is an opportune time for all institutions to examine both their total equity portfolio and their roster of active managers with a factor lens. With equities unlikely to repeat their strong recent performance in the near future, there is an increasing imperative for investors to maximize the efficiency of their allocations. Utilizing a factor framework for portfolio construction and manager selection presents an opportunity for investors to realign their portfolios for the road ahead.

Active choice

Hypothetical portfolio composition at different levels of active risk



Allocations at varying levels of active risk	0% Active Risk	0.5% Active Risk	1% Active Risk	1.5% Active Risk	2% Active Risk
Mgr 1	–	8%	16%	24%	21%
Mgr 2	–	8%	17%	25%	41%
Mgr 4	–	–	–	–	–
Mgr 6	–	–	–	–	–
Multifactor	–	15%	29%	45%	38%
Index	100%	69%	38%	6%	–

Sources: eVestment Alliance, MSCI, March 2018. Information shown is calculated using net of fees composite monthly return data (April 2013 to March 2018) for equity managers identified as being benchmarked to the MSCI World Index in eVestment. Multi-Factor strategy is proxied by the MSCI World Diversified-Multiple Factor Index Net USD. Index is represented by MSCI World Index. Please see "Case Study Methodology" on Page 8 for additional information.
Portfolio and analysis provided for illustrative purposes only to demonstrate a potential approach to using factors to enhance manager structure. It is not representative of any actual client's portfolio and is not a recommendation of an investment strategy or allocation.

Case Study Methodology

Portfolio and analysis provided for illustrative purposes only to demonstrate a potential approach to using factors to enhance manager structure. It is not representative of any actual client's portfolio and is not a recommendation of an investment strategy or allocation.

For the case study the following steps were undertaken. All data is as of 3/31/2018.

- The top 25 active equity strategies by AUM that self-benchmarked to the MSCI World Index in eVestment were used as the starting point for manager selection.
- Of the 25 managers, only those that self-reported net of fees strategy returns were used in the analysis.
- Managers that used factor-based or lower tracking error (3% or less) investment approaches were excluded, as were managers that pursued niche investment strategies (ex. ESG, REIT). Managers with negative trailing five year returns were also excluded.
- Trailing five year annualized active risk, annualized active return, and managers correlations were calculated using net of fee returns as reported in eVestment.
- MSCI World and MSCI Diversified Multiple-Factor (DMF) Indices were used to proxy "Index" and "Multi-Factor" strategies, respectively. These are unmanaged indices that do not reflect any management fees, transaction costs or expenses.
  - Note: For investors wishing to utilize this framework, we recommend it be done while taking into account the effective fees that an active or indexed portfolio manager may charge for the share class or vehicle available to the specific investor.
- Regression analysis was performed on excess manager and DMF returns over the MSCI World Index vs. four single factor indices: MSCI World Equal Weighted Index, MSCI World Enhanced Value Index, MSCI World Momentum Index and MSCI World Sector-neutral Quality. Included in the returns were the R-squared (coefficient of determination), monthly alpha after style factor loadings, and the factor loadings for each strategy. Results that exhibited a confidence level of 95% and 90% were highlighted in gray.
- Based on correlation and regression results, a decision was made as to whether to retain or eliminate each manager. Managers that generated alpha were retained. Managers with no alpha but with statistically significant negative factor loadings and high excess return correlation were removed. As some managers exhibited multi-factor tendencies, the DMF Index was added to the potential mix of investment choices as a potential replacement as it purposely targets diversified factor exposures.
- Using Markov Processes International, an efficient frontier was created for both the initial screened set off managers plus the MSCI World Index, as well as the revised manager set (including DMF). The two efficient frontiers were them compared to see how the curve changes.
- For the resulting efficient frontier, we plotted the resulting portfolio allocation at varying levels of active risk.

Index disclosures (as of March 31, 2018)

- **This analysis contains back-tested index data.**
- Index returns are for illustrative purposes only and do not represent any actual fund performance.
- Index performance returns do not reflect any management fees, transaction costs or expenses.
- Indexes are unmanaged and one cannot invest directly in an index.
- Past performance does not guarantee future results.

- Data for time periods prior to the index inception date is hypothetical and is provided for informational purposes only to indicate historical performance had the index been available over the relevant time period.
- Hypothetical data results are based on criteria applied retroactively with the benefit of hindsight and knowledge of factors that may have positively affected its performance, and cannot account for risk factors that may affect the actual fund performance.
- Actual performance of the fund may vary significantly from hypothetical index performance due to transaction costs, liquidity or other market factors.

Index Name	Index Inception Date	Dates of Back-Tested Returns	1-Year
MSCI World Minimum Volatility (USD) Index	4/14/2008	5/31/1988 – 4/14/2008	9.75%
MSCI World Index	5/31/1986	12/31/1969 – 5/31/1986	13.59%
MSCI World Diversified Multi-Factor Index	3/19/15	11/30/98 – 3/19/15	20.06%
MSCI World Sector Neutral Quality Index	8/11/14	11/30/98-8/11/14	14.84%
MSCI World Enhanced Value Index	8/11/14	11/28/97-8/11/14	15.61%
MSCI World Equal Weighted Index	4/6/2011	6/1/94-4/6/11	14.58%
MSCI World Momentum Index	12/11/2013	6/1/94-12/11/13	25.44%

Index returns do not reflect any management fees, transaction costs or expenses. Indexes are unmanaged and one cannot invest directly in an index. Data for time periods prior to the index inception date is hypothetical and is provided for informational purposes only to indicate historical performance had the index been available over the relevant time period. Hypothetical data results are based on criteria applied retroactively with the benefit of hindsight and knowledge of factors that may have positively affected its performance, and cannot account for risk factors that may affect the actual fund performance. The actual performance of the fund may vary significantly from the hypothetical index performance due to transaction costs, liquidity or other market factors. Index methodology is available at www.msci.com.

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