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August 2017

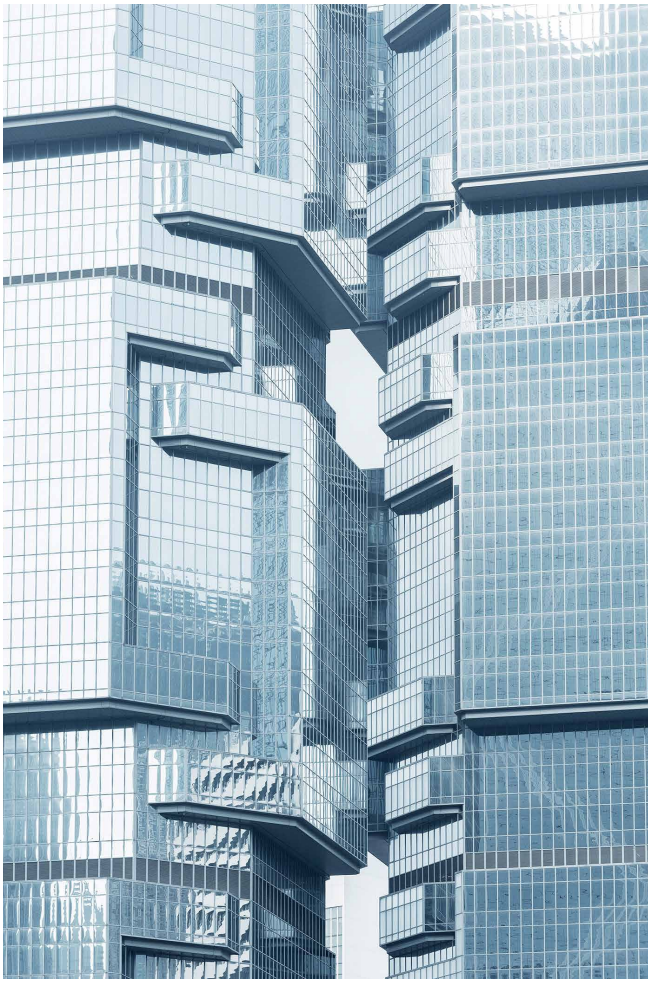
Indexing 360°

Multi-Factor Investing

UBS ETF Market Matters

- Factor-based equity investing (commonly referred to as 'smart-beta') continues to see rapid development with many novel index-based solutions entering the market and attracting inflows.
- While smart beta indices (value, low volatility, yield etc.) can be added to portfolios with a specific objective (e.g. reducing risk or enhancing return), multi-factor strategies aim to diversify across multiple factor risk premia. This approach avoids the need for timing single factor investments.
- Multi-factor investing has become the most popular factor strategy, representing 45% of inflows to all smart-beta ETFs in Europe in 2016.[1]
- This Market Matters provides more detail on a specific multi-factor index which combines six styles: value, momentum, yield, low volatility, quality and size. It has delivered an excess return of c. 150 bps per annum over the last decade, when compared to the market cap benchmark.

With the growing popularity of smart-beta investing and the many new solutions available on the market, potential buyers are considering ways to add these to their portfolios. One approach is to invest in single factors such as value, quality, dividend, low volatility etc., all of which are now available via passive vehicles including ETFs. They provide investors with flexibility to select one or several preferred factors and can also be used for timing or rotating between factors, along business cycles or as market valuation change. Alternatively, one can strategically invest into a larger number of factors, while holding such positions for the long term. This approach can also be accessed passively via multi-factor ETFs, which provide a well-balanced risk-return exposure and turnover efficiency.



Multi-factor investing

A multi-factor approach allows investors to harvest excess returns associated with individual equity factors, while diversifying across distinct sources of risks. Academic literature on single factors has thoroughly demonstrated that they outperform (historically) across different time periods and geographies. Moreover, combining smart beta styles can add diversification benefits as the corresponding excess returns are not highly correlated.

The multi-factor approach therefore has the potential to:
1. outperform the market
2. improve a portfolio's Sharpe ratio
3. limit drawdowns
4. deliver transparent return attribution,

all whilst benefiting from the cost efficiency of passive solutions.

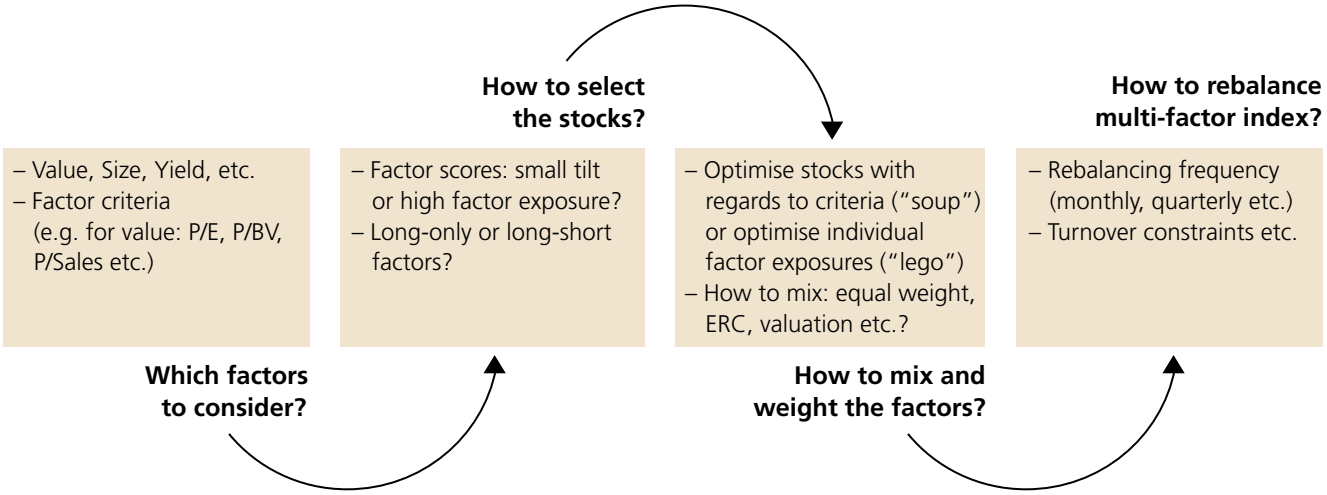
1 Smart Beta report by ETFGI, June 2017.

How to construct a multi-factor ETF

In our view, the most robust implementation of a multi-factor ETF is a portfolio with equal weights in the six most established equity factors (value, quality, momentum, low volatility, size and yield) with quarterly rebalancing. It takes advantage of diversification and maximizes the tradeoff between turnover (trading costs) and excess return potential.

For the US stock universe such an approach is used by the MSCI USA Select Factor Mix Index. It's worth looking at the rationale and construction methodology behind this index by going through the generic steps needed to create any multi-factor portfolio (Figure 1).

Figure 1: Constructing a multi-factor ETF: step-by-step diagram



Source: UBS Asset Management, data as of July 2017.

Which single factors to consider and how to select stocks?

The first step is deciding which smart-beta styles to use to form a multi-factor strategy. A multi-factor ETF is best positioned to take advantage of diversification if it includes all six of the most established equity factors rather than to choose only a few. This also mitigates data-mining concerns that would otherwise be associated with selecting (or overweighing) historically better-performing factors.

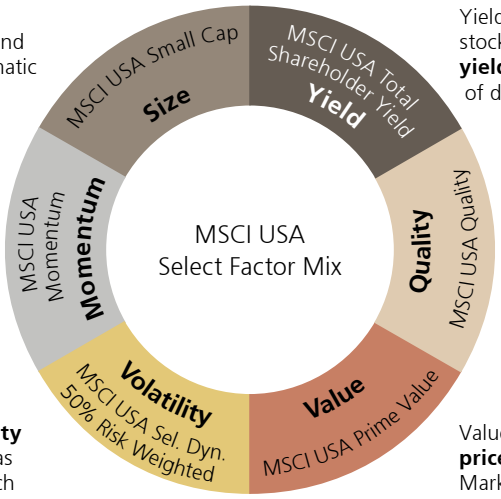
The choice of factors is rather clear, i.e. value, size and momentum are the cornerstones of smart-beta investing and academic research (Fama-French model), while low volatility, yield (dividend) and quality have also gained universal acceptance amongst investors and academics.[2] Hence, we believe that these six styles, described in more detail in Figure 2, should be included for a broad multi-factor portfolio.

Figure 2: Factor indices underlying MSCI USA Select Factor Mix

Different **market capitalization segments** perform differently over the business cycle, and smaller companies typically have more systematic risks, but they outperform in good times.

Momentum stocks aim to capitalize on continuance of **upward trends** in market prices (e.g. 6 or 12 month price changes).

The main goal is to **reduce** portfolio **volatility** and provide a tilt towards lower risk stocks (as measured by variation in market prices), which tend to be associated with positive excess returns.



Yield factor aims to capture excess returns of stocks stemming from **higher-than-average yield**, which can be measured as a combination of dividends, buybacks and debt reductions.

Quality stocks are typically identified by fundamental **quality characteristics** (e.g. high Return-on-Equity, low Debt-to-Equity and Earnings-Variability), which (historically) is associated with positive excess premia.

Value stocks trade at relatively **low market prices** relative to their fundamentals (e.g. low Market-to-Book Value or low Price-to-Earnings) and they tend to outperform expensive stocks.

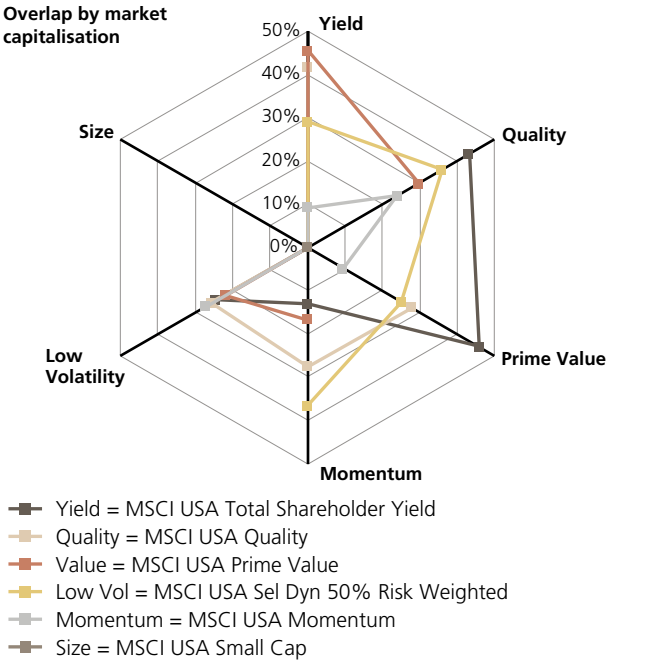
Source: MSCI, UBS Asset Management, data as of July 2017.

2 See MSCI publication "Foundations of Factor Investing" December 2013 for a comprehensive review of academic literature on factors.

The second step is settling on the criteria to define factors. It is prudent to choose the ones that are robust, economically justified, and widely applied in academic literature. For example, the quality style is defined based on return on equity, variability in earnings growth and financial leverage. Using a mix of several measures ensures the stability of factors, as some sectors may be affected by one ratio more than another (see Figure 3 for list of criteria). Moreover, we use non-overlapping criteria for different factors which further increases the diversification potential. The resulting overlaps between single factor constituents are limited (Figure 3).

The multi-factor exposure is ideally based on indices with strong factor exposures rather than modest tilts. Strong factor exposures imply an unconstrained approach with no tracking error limits imposed, which allows for harvesting higher excess returns whilst also benefiting from diversification in a multi-factor portfolio application. Noteworthy is that the individual smart beta indices behind the MSCI USA Select Factor Mix index have strong factor exposures as each selects only approx. 25 percent of the companies in the MSCI USA index with the highest factor criteria scores.[3] Thanks to this approach, the chosen smart beta indices have superior (historical) performance compared to other indices tracking the same types of factors (Figure 4).

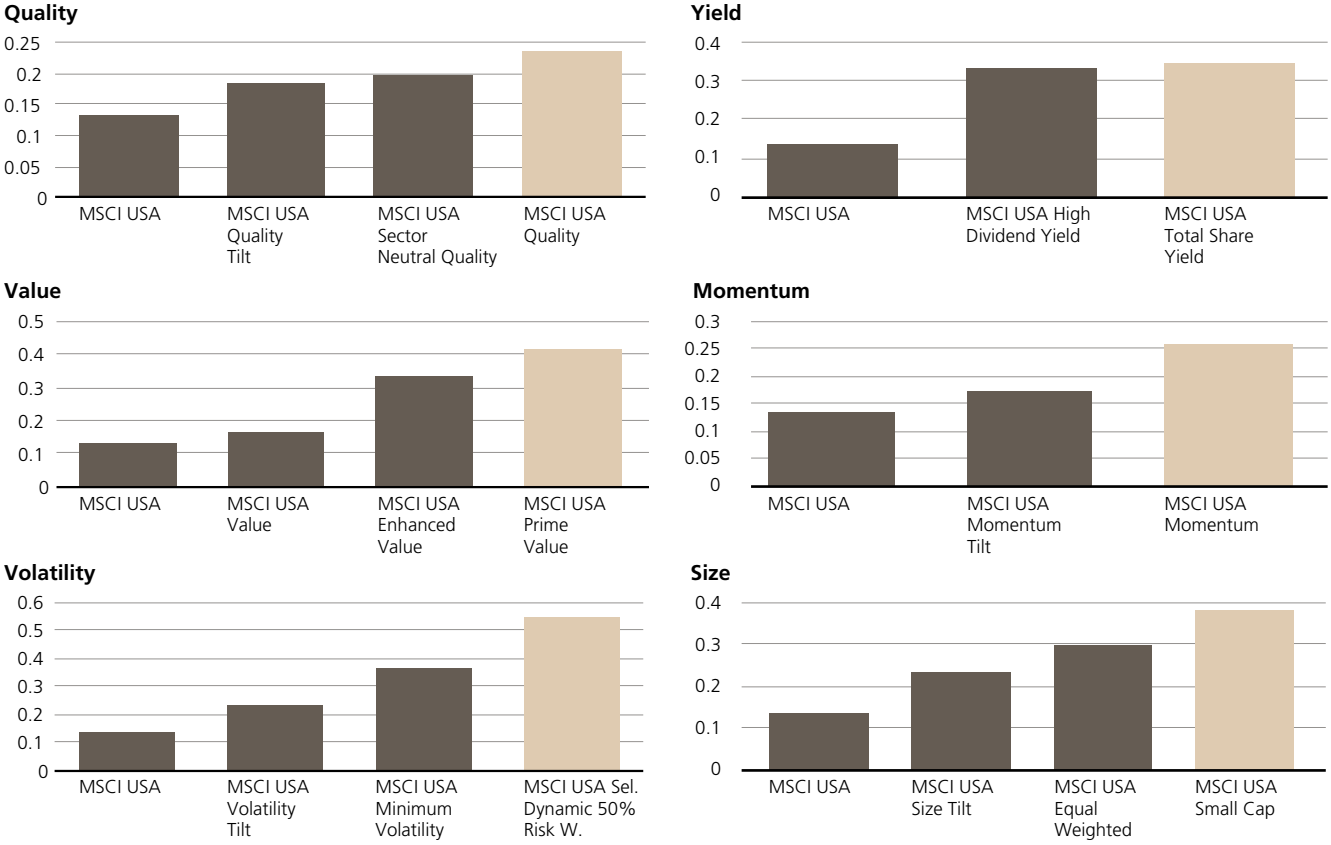
Figure 3: Criteria of selected MSCI single factor exposures and overlaps



Yield: dividend yield; buyback yield; debt reduction yield
Quality: return on equity; variability in earnings; financial leverage
Prime Value: price to earnings; price to book value; price to sales; price to cash
Low Volatility: 3Y realised volatility
Momentum: 6M and 12M price return
Size: market cap below USD 9bn

Source: MSCI, UBS Asset Management, data as of July 2017.

Figure 4: Sharpe ratios of selected MSCI factor indices (TR Net in USD vs 1M Libor, January '00 – April '17)



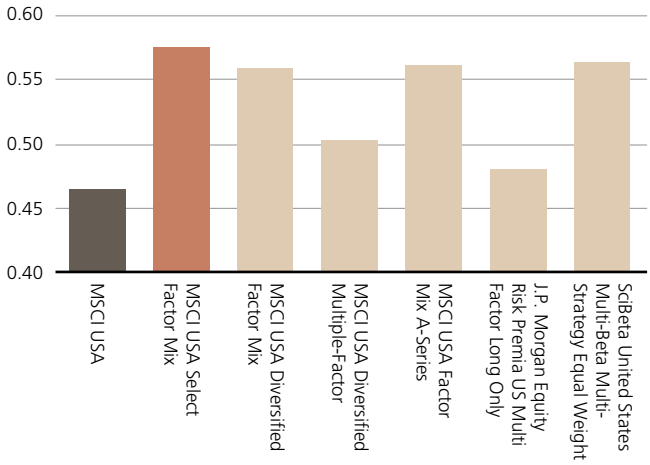
Source: MSCI, UBS Asset Management, data as of 28 April 2017.

3 The exception is the MSCI USA Small Cap Index which covers the small cap stock universe.

How to weight the factors and rebalance the multi-factor index

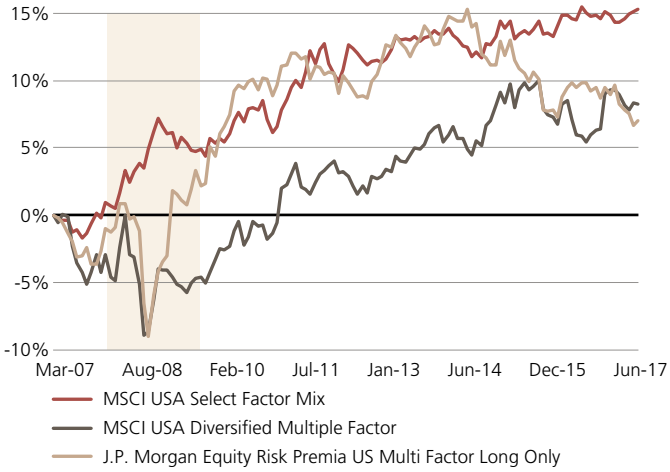
There are two alternatives. The first is the 'lego' approach (also known as mixed), which is based on a top-down allocation to single (standalone) smart-beta exposures. The second is the 'soup' approach (also known as integrated) that aims to select stocks which simultaneously score relatively high on criteria for several factors. The 'lego' approach has some key advantages. It is simpler and more transparent, and allows for straightforward return attribution to individual factors. Moreover, smart-beta investing was born out of academic literature which provides extensive evidence that factor indices provide excess returns relative to the market and that holds true across time periods and geographies. It is therefore a straightforward extension to combine factors in portfolios as is the case with the 'lego' approach.[4] By contrast, 'soup' multi-factor investing is supported by only a handful of academic studies based on a limited set of stock universes and time periods. These results are therefore less robust and must be discounted due to data-mining concerns. Finally, the 'lego' approach provides greater flexibility in adding single factors (best in class), which potentially are derived from different universes. But in the end, the selection of the 'lego' vs. 'soup' approach is largely an empirical question: Which is likely to perform better?

Figure 5: Sharpe ratios of selected MSCI factor indices (TR Net in USD vs 1M Libor, March '07 – June '17)



Source: MSCI, Bloomberg, UBS Asset Management, data as of 30 June 2017.

Figure 6: Excess returns on selected indices vs MSCI USA. (TR Net in USD vs 1M Libor, March '07 – June '17)



Source: MSCI, Bloomberg, UBS Asset Management, data as of 30 June 2017.

Figure 7: Excess annual returns on selected factor indices, along with MSCI USA annual return (absolute) for comparison. (TR Net in USD, December '01 – December '16)

	Excess Returns over MSCI USA							Annual Return
	MSCI USA Quality	MSCI USA Sel. Dyn. 50% Risk W.	MSCI USA Total Share. Yield	MSCI USA Prime Value	MSCI USA Momentum	MSCI USA Small Cap	**MSCI USA Select Factor Mix**	**MSCI USA (absolute return)**
2001	2.63%	12.56%	8.33%	19.37%	–5.23%	28.99%	12.18%	**–12.39%**
2002	3.26%	13.69%	10.10%	0.85%	10.46%	–0.24%	5.63%	**–23.09%**
2003	–8.85%	–7.39%	–5.56%	–0.70%	–2.77%	25.20%	–0.62%	**28.41%**
2004	–0.49%	6.62%	–1.41%	7.16%	6.26%	8.79%	4.68%	**10.14%**
2005	–3.13%	–0.38%	–4.28%	5.63%	13.65%	0.28%	2.61%	**5.14%**
2006	–3.24%	3.81%	4.87%	3.73%	–4.28%	–0.36%	0.63%	**14.67%**
2007	4.61%	–8.70%	–2.22%	5.44%	11.91%	–8.73%	0.29%	**5.44%**
2008	6.94%	9.48%	5.75%	4.94%	–3.55%	1.39%	3.77%	**–37.57%**
2009	4.78%	–8.29%	–3.36%	–0.79%	–9.14%	12.81%	–0.61%	**26.25%**
2010	–2.85%	–0.39%	–4.40%	0.55%	2.99%	12.71%	1.53%	**14.77%**
2011	6.36%	9.83%	10.08%	4.43%	4.11%	–4.79%	5.26%	**1.36%**
2012	–2.07%	–4.32%	–0.86%	–3.29%	–1.03%	2.19%	–1.43%	**15.33%**
2013	0.97%	–7.12%	0.85%	6.61%	2.23%	5.85%	2.57%	**31.79%**
2014	–1.44%	6.69%	–2.39%	0.45%	1.56%	–5.62%	–0.19%	**12.69%**
2015	5.78%	3.15%	–1.55%	–8.08%	8.02%	–4.79%	0.00%	**0.69%**
2016	–3.55%	1.13%	4.10%	5.63%	–6.26%	8.26%	1.56%	**10.89%**

Source: MSCI, UBS Asset Management, data as of 28 April 2017.

4 While an investor can also use single-factor ETFs to combine them in a portfolio and rebalance periodically, the multi-factor approach provides substantial turnover efficiency due to trade netting when some companies drop out of one factor and move to another.

How about performance?

The MSCI USA Select Factor Mix index has had the best historical performance (back-tested) compared to five other multi-factor indices, see Figure 5 for Sharpe ratios from March 2007 to June 2017. In particular, it outperforms the MSCI USA Diversified Multiple Factor Index, which represents the integrated approach to multi-factor investing (4-factor strategy). Hence, the MSCI USA Select Factor Mix index is not only simple, transparent and less prone to data-mining, it also has had better performance. Moreover, we can see in Figure 6 that the MSCI USA Select Factor Mix Index provides a smoother path of outperformance relative to other indices and it has delivered an excess return of 153 bps per annum relative to the standard MSCI USA index over the last decade. The live-track record from 16 January through 7 July of 2017 is even better with an annualized outperformance of 255 bps. It also had very good relative performance in the crisis years, whereas the competing frameworks substantially underperformed the MSCI USA parent index. It is further seen in Figure 7 that since 2001, the MSCI USA Select Factor Mix has outperformed the market in 14 out of 18 years, while the relative underperformance in the remaining four years was very small. The figure also shows that the chosen single factors indeed have diversifying properties with respect to one another and incorporating all six factors together brings value for investors. To sum up, the historical and live performance of the MSCI USA Select Factor Mix is very strong and brings a unique value proposition in terms of transparency and performance.

Expand your portfolio with UBS ETFs

Fund Name: UBS ETF (IE) MSCI USA Select Factor Mix UCITS ETF	
Fee: 0.30%	**NAV ccy:** USD
Replication: Physical	**Distribution:** Yes
ISIN: IE00BDGV0308	**Bloomberg:** USFM LN

Source: UBS Asset Management, data as of 29 June 2017.

Past performance is not indicative of possible future returns.

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