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**ARE YOU READY  
FOR THE NEW ERA OF  
FACTOR INVESTING?**

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# Are you ready for the New Era of Factor Investing?

**Date:** April 2019

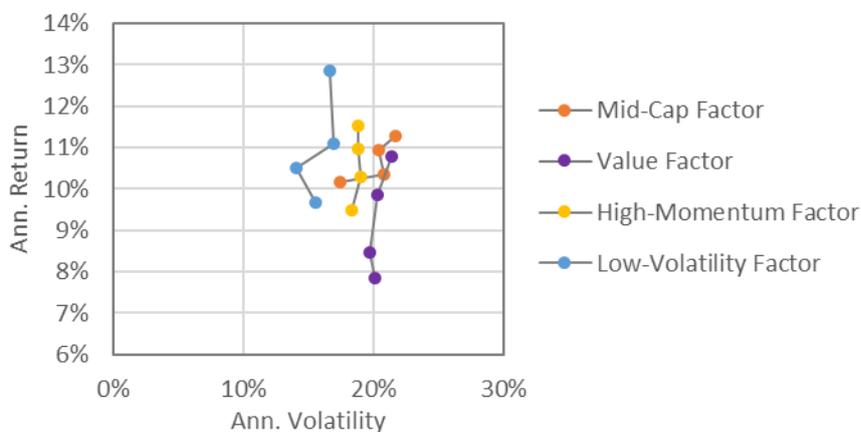
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Disappointed by the recurrent underperformance of many active funds struggling to justify their fees, more and more investors are turning to ETFs and the promise of passive investing (i.e. dramatically lower costs yet better returns). However, replication strategies are not without risks, and traditional market indices, generally seen as well-diversified because of the usually great number of securities involved, often lead to significant concentration risk resulting from their cap-weighted scheme. As a matter of fact, more than half of the S&P 500 Index is concentrated in the 50 largest companies. These market benchmarks also tend to exhibit the associated, unrewarded style biases. This observation has spurred researchers' interest for alternative drivers of return, potentially more efficient than the market beta, which are identified as 'smart betas' or 'factor investing'.

Since the first publication on the Fama-French factor model in 1992, hundreds of factors have been documented, both by academics and practitioners – there are so many that the term 'factor zoo' has been used to describe their proliferation and wild diversity. As a result, it has become critically important to differentiate robust, profitable factors, from redundant or unstable ones. Thus, it should be demonstrated that they are widely documented, both in the academic and industry literature and that they show robustness over time and space. Each of the four factors we have selected (Size, Low-Volatility, Value, Momentum) satisfies these prerequisites, with broad consensus on their definition: the Size factor is made up of the lowest market capitalizations, the Low-Volatility factor contains the least volatile stocks, the Value factor consists of stocks with the highest book-to-market ratios, and the Momentum factor comprises the best performers in the recent past.

Nevertheless, things get tricky when these theoretical factors must be translated into investable proxies. Indeed, we observe a huge diversity in the construction of factor indices from major providers. Indices aiming to reflect the same factor can differ widely, from the underlying investment universe to the methodology for selecting stocks, the number of constituents, the rebalancing frequency, and most importantly the weighting scheme. In the end, the high heterogeneity in the factor index construction results in contrasted returns, with significant spreads between the best and worst proxies for the same factor, reaching up to more than 3% annualized (as shown below).

Risk/Return of various factor indices (Universe: U.S. Large Cap Stocks)



Source: Bloomberg, Koris, data from Jul. 2001 to Feb. 2019

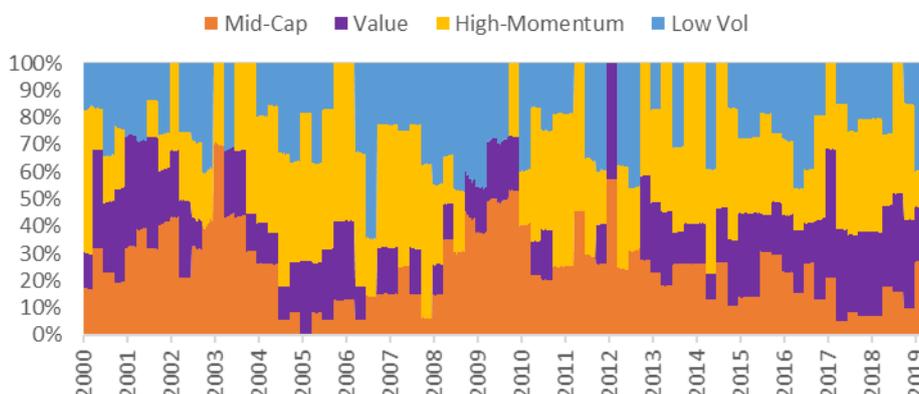
Best practices to build useful, reliable factor indices should give priority to diversification among the selected components while keeping a close eye on implementation constraints which can have a detrimental effect on returns. We argue the case for the Maximum Deconcentration approach, an optimization which tends to an equal-weight subject to constraints on turnover and liquidity, resulting in the lowest possible portfolio concentration. Another advantage of this approach is that it does not require any parameter estimation and is therefore free of estimation risk.

The robustness of factors built using Maximum Deconcentration leads to long-term outperformance relative to traditional cap-weighted benchmarks; however, over shorter timeframes, individual factors can face relative underperformance. Interestingly, these periods do not necessarily coincide for the four factors selected (Size, Low-Volatility, Value, Momentum), thereby offering a good opportunity to combine them in a well-diversified multi-factor portfolio. This could be done through a naive strategy (i.e. equally-weighted) which averages factors' returns and mitigates the effects of their cyclical nature, resulting in a shorter and less severe underperformance. However, there is another way to combine these factors which could be more profitable. This alternative solution takes advantage of factors' cyclical nature to increase the performance of the overall portfolio by tilting it towards the factors on an upward trend. This is the rationale behind this tactical multi-factor model.

We have observed and demonstrated that factors' performances depend on a limited set of explanatory macro, factor and market variables, which are statistically significant and whose combination leads to a good coefficient of determination ( $R^2$  or proportion of the variance in the factor performance that is predictable from this set of independent variables). To determine which factors should be favored at each rebalancing date, the model compares the current values of these variables with their medians. The result of this comparison triggers a binary signal, 0 or 1, depending on whether the differential towards the median is positive or negative. Once we have the signals for all variables, we can compute the signal intensity for each factor, which is the percentage of positive signals divided by its total number of explanatory variables. The final allocation to one factor is then equal to the signal intensity for this factor divided by the sum of the four factors' signal intensities. The portfolio is thus tilted towards the factors with the strongest signal intensity (i.e. factors which are expected to outperform the benchmark over the next period).

As shown in the graph below, the resulting target allocation is truly dynamic and sometimes excludes one or more factors (when none of their related variables send positive signals).

### Tactical Multi-factor Model Output (Backtest)



Source: Bloomberg, Koris, data from Jan. 2000 to Feb. 2019

Thanks to its efficient tactical tilts, the dynamic multi-factor portfolio is therefore able to outperform not only the standard benchmark (i.e. S&P 500 Index), but also an equally-weighted strategy based on the same four factors. Finally, as ESG criteria are increasingly considered by investors, the multi-factor strategy was then put to test using an ESG-compliant universe (exclusion of the stocks with the lowest SRI rankings following a best-in-class approach with a 20 percent cut, leaving no sector excluded). The backtest of the SRI filtered strategy demonstrates the robustness of the tactical model and the selected ESG approach. As shown below, the performance would not have been impaired over the last 10 years.

Risk & Return Statistics (Backtest)

<i>2000-2019</i>	Ann. Return	Ann. Volatility	Excess Drawdown
<b>Dynamic Multi-factor strategy</b>	<b>11.33%</b>	<b>19.05%</b>	<b>-3.38%</b>
Equally-Weighted Multi-factor portfolio	10.20%	18.87%	-5.09%
S&P 500 Index	5.47%	18.77%	-

<i>2007-2018</i>	Ann. Return	Ann. Volatility	Excess Drawdown
Dynamic Multi-factor strategy	7.94%	16.61%	-1.33%
<b>SRI Dynamic Multi-factor strategy</b>	<b>8.09%</b>	<b>16.78%</b>	<b>-1.22%</b>
S&P 500 Index	6.28%	16.22%	-

Source: Bloomberg, Koris, data from Jan. 2000 to Feb. 2019, ISR data from Jan. 2007 to Dec. 2018