

A Risk-Oriented Model for Factor Timing Decisions

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The market conditions of recent years have challenged a lot of quantitative investment strategies. Traditionally, these strategies rely on (static) style/factor weightings, as if stock-selection factors were factual and permanent. Stock-selection factors, however, contain timing risks. Depending on the investment horizon and market conditions, risk may dominate return. This has been evident in many instances following the 2007 to 2008 episodes. Cross-asset de-levering/sell-off, overcrowded investment strategies, and challenging macroeconomic conditions have resulted in significant style/factor volatility and in sudden and severe shifts of factor predictability (see Khandani and Lo [2011], Li and Sullivan [2011]).¹ The new environment has thus made it crucial that quantitative investors consider more dynamic approaches to their style/factor selection and/or weighting.

In this article, we develop a framework for dynamic factor weighting that is designed to accommodate sudden changes in factor predictability. Factor efficacy is related periodically through time to factor portfolio risk. We facilitate this premise through an appropriate econometric methodology and a broad set of sensible risk indicators/independent variables. Risk in our framework contains the systematic and macroeconomic risk of the factor portfolio, as well as factor

portfolio risk concentration. Recent works emphasise the importance of these facets of risk for monitoring equity market vulnerability (Berger and Pukthuanthong [2012], Kritzman et al. [2011], Sullivan and Xiong [2012]).

To quantify the effect of risk and other factor portfolio characteristics on factor predictability, we apply classification-tree analysis. This statistical approach determines the proper hierarchy and interaction of all independent variables, which is crucial for complex phenomena such as factor predictability. This complexity is evident in Daniel and Moskowitz [2013], who conclude that momentum crashes occur following market declines, when market volatility is high, and are contemporaneous with market rebounds.

Our study provides new and useful practical insights for active equity portfolio managers who use multi-factor equity selection models. We find that significant economic benefits accrue to dynamic factor weighting. A simple dynamic factor weighting approach results in an increase of the reward-to-risk ratio relative to a passive multi-factor portfolio from 0.12 to 0.33 in our sample, after transaction costs. Moreover, we find that the benefits can be magnified when dynamic factor weighting is pursued with a sophisticated model. The reward-to-risk ratio of a multi-factor portfolio that is constructed