the journal of PORTFOLIO management

Editor's Introduction for 2022 Special Issue on Factor Investing

Frank J. Fabozzi

INTRODUCTION

Volume 48 | Issue 2

This is the seventh special issue on factor investing. Of the 14 articles in this special issue, eight were contributed by practitioner teams, five coauthored by practitioner and academic teams, and one by an academic team.

In the opening article, "The Future of Factor Investing" by Dimitris Melas, the author discusses three emerging trends that are shaping the future of factor investing: (1) the ongoing evolution of traditional factor models and strategies, (2) recent innovation in data sources and modeling techniques, and (3) the potential disruption from integrating factor strategies into the asset allocation process. The author begins by describing the three distinct pillars of factor investing: factor models (empowering investors to understand and manage the sources of portfolio risk), factor strategies (allowing investors to seek to capture factor returns), and factor allocation (providing a framework in which factors drive asset allocation decisions). Factor models and strategies have evolved gradually over time as a consequence of the evolution of capital markets and advances in financial theory, data availability, empirical research, and investment practice. The focus of current innovation efforts in factor investing is on exploiting new unstructured data sources, applying new machine learning algorithms, and integrating sustainability and climate factors. By creating new opportunities for investors to express active investment views through a factor allocation process, Melas concludes that innovation in factor investing is reshaping the traditional asset allocation paradigm.

Do traditional business cycle indicators capture much of the large cyclical variation in factor returns? This question is addressed by David Blitz in "The Quant Cycle." He finds that major turning points of factors appear to be the result of abrupt changes in investor sentiment instead of traditional business cyclical indicators. Blitz infers a simple three-stage quant cycle from factor returns, consisting of a normal stage that is interrupted by occasional drawdowns of the value factor and subsequent reversals. Value factor drawdowns can occur in bullish environments as a result of growth rallies and in bearish environments due to crashes of value stocks. For the reversals, Blitz also distinguishes between bullish and bearish subvariants. Because his empirical evidence suggests that this simple three-stage model captures a considerable amount of time variation in factor returns, Blitz concludes that the focus of investors should be on better understanding the quant cycle as implied by factors themselves, instead

of traditional business cycles that based on his empirical analysis at best exhibit a weak relation with actual factor returns.

In "Investing in US Core Fixed Income with Macro and Style Factors" the author team of Eugene Pauksta, Karishma Kaul, Tom Parker, Scott Radell, and Andrew Ang explain three ways in which investors can efficiently capture risk premiums in U.S. core fixed income portfolios. The first way is by taking strategic overweight and underweight positions in certain macro factors. Strategic overweights to rates, or duration, and credit factors have resulted in the outperformance of fixed-income benchmarks. However, the authors find the long-duration Treasury sector to be the most efficient way to capture rates exposure, and short-duration corporate bonds maximize risk-adjusted returns for credit exposure. The second way to capture risk premiums in core fixed-income portfolios is by timing the allocation to rates and credit factors, along with changing high-yield and mortgage exposures. Applying style factors for selecting securities is the third way. The authors do so by incorporating a value tilt in Treasuries and value and quality factors in investment-grade and high-yield sectors. Incorporating factors in these three ways and constructing an optimized portfolio to control for deviations relative to the market index over the period January 2007 to March 2021 resulted in an information ratio of 1.67.

Price informativeness refers to how and when information is aggregated into asset prices. In "Price Informativeness with Equity Market Factors," Roger Clarke, Harindra de Silva, and Steven Thorley empirically investigate the price informativeness of realized earnings growth for the largest 1,000 US stocks from 1975 to 2019, using approximately 180,000 individual corporate net income observations. The authors focus on exposures to factors that have historically outperformed the market index. For example, they document that momentum stocks consistently have much higher realized earnings growth rates than the market average of 12% per annum, while value stocks consistently have much lower realized earnings growth rates, consistent with both the recent price increases that define momentum stocks and the lower price to earnings ratios that define value stocks. Clarke, de Silva, and Thorley then use their price informativeness regressions to decompose the active returns from the value, momentum, small size, low beta, and profitability factors into components that are explained and unexplained by earnings to further examine the anomalous nature of their positive market-relative performance. They find that active returns to (1) momentum stocks are largely attributable to the growth of realized earnings over the next several quarters, (2) low beta, small size, and profitability stocks have little of their active returns explained by realized earnings, and (3) value stock active returns explained by concurrent and future realized earnings are negative over the next several quarters. The results for low beta, small size, and profitability stocks suggest that the anomalies are associated with other drivers of stock returns such as changes in expected long-term earnings growth and discount rates.

Investors are exposed to various macroeconomic factors. The first issue in portfolio construction that gives recognition to macroeconomic factors is to identify the key drivers of returns. Once identified, it is not straightforward to invest in those factors because they follow economic indicators that do not have corresponding investment vehicles that can be used to mitigate macroeconomic factor exposure. In "Macro Factor Investing with Style," by Alexander Swade, Harald Lohre, Mark Shackleton, Sandra Nolte, Scott Hixon, and Jay Raol, the authors propose constructing a macro factor–mimicking portfolios that is diversified across asset classes and style factors to deal with this risk control issue. Focusing on three major macroeconomic factors (growth, inflation, and defensive), they investigate macro factor strategies that aim at high diversification across these three macroeconomic factors and can control multiple economic scenarios that are of concern to a wide-range of investor groups. More specifically, they find that their approach to balance the sources of risk to these

three macroeconomic factors enhances the portfolios' risk–return profiles given the associated reduction in maximum drawdowns and factor completion enables a significant increase in effective bets and, hence, diversification.

A popular measure of factor risk is factor exposure, a measure constructed from stock characteristics. Because of its simplicity, factor exposure is widely used to assess factor products. Shaojun Zhang in "Factor Construction Zoo: Are Factor Exposures Created Equal?" addresses the information that is provided by factor exposures and whether factor exposures are equal. She argues that while factor exposure is informative, it is an incomplete picture for factor fund characteristics and has two limitations that investors should recognize. First, although factor exposure is constructed using stock characteristics, these characteristics are proxies for comovement with the factors, and consequently they are not the true underlying factor loadings. Second, although investors tend to interpret the factor exposure as a linear function of returns based on the assumption that the return is linear in factor loadings, factor returns and factor risk loadings are positively associated, but the relation is not always linear or monotone. Analyzing a comprehensive list of portfolio construction choices for value, momentum, and quality funds, the author addresses the tradeoffs at work, and provides a framework for the assessment of factor exposure efficiency. Zhang finds that various combinations of different portfolio construction methodologies can generate similar target factor exposures for the funds and that factor funds with similar target factor exposures can generate significant dispersion in expected returns, premium, and risk. Moreover, the dispersion increases with target factor exposures. She finds that the relation between target factor exposures and returns is non-linear and therefore it is important to account for non-linearity in constructing or evaluating factor funds.

Capital market assumptions (CMAs) play a critical role in portfolio management. Applying CMAs (i.e., long-term risk and return forecasts for asset classes) to build portfolios is challenging. In "Factor Investing Using Capital Market Assumptions," Redouane Elkamhi, Jacky S. H. Lee, and Marco Salerno demonstrate how despite the difficulties, CMAs are useful for building an investment portfolio using a factor approach. They provide a methodology to show that CMA returns can be cross-sectionally priced by a small set of underlying macroeconomic factors, suggesting that the CMA's risk and return assumptions follow a factor structure. They then show that these factors price the expected returns from CMAs and the mean–variance factor allocations are substantially more stable than the mean–variance asset portfolios. The authors outline a new approach to building an asset portfolio that respects a desired factor allocation. Their approach helps reduce the barrier to entry for factor-based portfolio construction by providing a procedure for building factor models and performing factor-based portfolio construction using publicly available CMAs.

When choosing among factor investing strategies, investors will benefit from understanding the two principal approaches for measuring factor exposures: factor characteristics and factor betas. Characteristics quantify the fundamental tilts of a portfolio by aggregating financial metrics such as value, profitability, and momentum. Betas measure the co-movement of the returns of factor investing strategies with predefined factor portfolios. Chris Brightman, Forrest Henslee, Vitali Kalesnik, Feifei Li, and Juhani Linnainmaa in "Why Are High Exposures to Factor Betas Unlikely to Deliver Anticipated Returns?" address three issues associated with the use of factor characteristics and factor betas. First, they investigate how portfolios based on these two approaches have performed. Second, they look at how characteristics-based factors and beta-based factors relate to risk. Finally, they explain how investors may use both characteristics and betas to construct portfolios. They report that characteristics better predict excess returns, whereas betas provide better information for managing exposures to factor risks. They find that seeking to increase exposure

to factor betas is a misguided means of obtaining the returns available from factor investing, because exposure to factor betas captures more of the risks than returns. The authors conclude that the two approaches provide complementary information. When designing factor-based investment strategies, investors should seek exposure to the fundamental factor characteristics and use statistical measures of factor betas to manage factor risks.

An ongoing debate in the financial services industry is whether financial analysts add value to stock market investors. While there have been studies focusing on the informativeness of analysts' earnings forecasts and stock recommendations, Hamza Bahaji in "How Valuable Are Target Price Forecasts to Factor Investing?" investigates the issue by looking at the target price forecasts. These forecasts provide directions to quantitative (systematic) portfolio managers for the integration of signals provided by those forecasts in systematic and rule-based investment decisions. Although there are several studies that have looked at the issue by assessing the predictive ability of target price and its usefulness in portfolio management, the results are mixed at best. Using target price data from 1999 to 2019 in Europe and North America, the author first documents a decline in analyst opinion on the performance of most equity factors, finding that their forecasts are style biased. He shows that a long-only strategy that selects best-ranked stocks according to consensus target price implied expected returns (CTPER) generates substantial alpha within large-cap, low-idiosyncratic-risk, and noncyclical stocks. Embedding the CTPER signal into the momentum factor materially improves the risk and return profile, supporting the view that target price forecasts can be adequately used in designing top-down multifactor portfolio construction frameworks.

Factor investing in the presence of an environment, social, and governance (ESG) screening overlay is examined by Li Cai, Ricky Cooper, and Di He in their article "Socially Responsible Investing and Factor Investing, Is There an Opportunity Cost?" The authors provide insights for investors and fund managers on the question of whether there is an opportunity cost of being socially responsible in factor investing. They do so by empirically examining the impacts of ESG screening in factor investing by testing whether performance differences for unscreened benchmark factor portfolios and ESG-screened factor portfolios are statistically or economically significant using well-known factors. In constructing ESG-screened factor portfolios, they use two different methods for screening based on the Kinder, Lydenberg, and Domini (KLD) ESG scores: (1) positive screening, which allows companies with nonnegative ESG scores to be included in an ESG portfolio, and (2) negative screening, which eliminates ESG-negative companies but does keep nonrated companies. The results for the two ESG screening methods were different. When using negative-based ESG screening, the authors find that virtually no degradation in performance or turnover costs occur. However, severe risk-induced performance issues and high transactions costs occur when the screening process becomes more active and includes only companies that are ESG-forward. This finding holds for individually constructed factor portfolios, a composite benchmark of factor portfolios, and a stock selection model constructed from factor scores. Both ESG-screening methodologies produce significant improvement in ESG portfolio scores. They find very modest increases in turnover with the ESG screening of bad companies and significant costs with the more aggressive ESG screening techniques. The authors conclude that ESG screening of negative companies is a positive way forward for investors seeking to add ESG to their factor-based investment portfolios and that the method of implementing ESG makes a large difference in outcomes.

A popular investment style to achieve market-like equity returns, but with less risk than that of the broader market, is low volatility investing. This strategy, deeply rooted in various asset pricing anomalies, involves investing more in low beta and volatility

stocks seeking to enhance risk-adjusted returns. A reevaluation of the low volatility investing strategies focusing on their tax efficiency is provided by Shaojun Zhang in "Toward Tax-Efficient Low-Volatility Investing." Explicit tax management can greatly improve the strategy performance because among low volatility strategies, those with lower volatility carry lower returns, but incur higher turnover and tax burdens. However, the record keeping requires that a large initial infrastructure be established as well as continuous staff input to accurately keep track of tax lots. Consequently, efficient tax management is not a free lunch as it may require increased operation costs that can factor into management fees. Given the operational challenges associated with tax management, Zhang proposes two sets of tax-managed low volatility investing strategies that require a different amount of record keeping. The objective of the first strategy, which she calls the "net-taxable-gain-aware strategy", is to minimize a weighted sum of the portfolio volatility and taxable gains. The only information needed to account for net taxable gains is the cost basis of each position. The objective of the second strategy, which Zhang refers to as the "tax-aware strategy", is to minimize a weighted sum of the portfolio volatility and tax liability. In order to differentiate short-term and long-term gains, the calculation of tax liability requires detailed information of the cost basis as well as the timing of each tax lot. Zhang finds that these two tax-managed strategies generate a sizeable improvement over the baseline tax-unaware strategy on an after-tax basis, conditional on portfolio risk.

Although the majority of empirical studies on factor premiums have focused on the equity market, several recent studies have examined factors in the bond market. Of particular interest is the government bond market, one of the world's major asset classes which is approximately 30% of overall market capitalizations across asset classes. In "Factor Investing in Sovereign Bond Markets: Deep Sample Evidence," Guido Baltussen, Martin Martens, and Olaf Penninga empirically investigate factor premiums across sovereign bond markets addressing which factors are present in government bond markets, whether they are persistent over time, and whether they add value. Their study covers the period January 1800 to December 2020 for all major government bond markets. The factors that the authors identify, which have been reported in other studies (including those of the authors) that have looked at bond market factors, are value, momentum, and low risk. They find that (1) the three factors do in fact offer attractive premiums in bond markets for the 221 years covered by their study, (2) bond factor premiums are robust in sample and out of sample, across periods of rising or declining yields, and in other market or macroeconomic states, and (3) a combined multifactor bond strategy delivers strong value-added to a passive sovereign bond portfolio.

Factor models are categorized as fundamental, macroeconomics, and latent models. For practitioners using latent models, determining the number of latent factors in a dataset is an unresolved problem. Using several of the most commonly cited methods to determine the number of relevant factors in developed equity markets, Ross French in "Latent Factors in Equity Returns: How Many Are There and What Are They?" reports that there are typically between 10 and 20. The author goes on to examine economic interpretations of the latent factors and compare the efficacy of the modeled correlations in applying minimum-variance portfolio construction. For the latent factors, factor 1 is found to be the market factor, factors 2–4 regional factors, and factors 5–20 primarily factors that reflect the geographic factors with a few industry-oriented factors. Compared to the method of determining the number of latent factors by estimating realized correlations, Ross finds that the information criteria and random matrix theory approaches provide the best results. The findings also suggest that compared to using the sample correlation matrix when estimating correlations, filtered correlation matrixes provide only a marginal advantage.

A methodology for selecting value stocks based on the concept of "relative value" across firms is proposed in my article with Bijon Pani, "Finding Value Using Momentum." Using data for the period January 1965 to December 2019, we find that using multiple value ratios as foundation blocks provide better risk-adjusted returns than using a single ratio, as used by the Fama–French HML factor. Analyzing trends in fundamental ratios allows the capturing of value in a stock portfolio in a new way. The trend in value metrics ranks firms that are not just cheap compared to the cross section but also those that have become cheaper over time. The results show that this relative value method proves effective for individual value parameters and when combined to create a composite value model. Trends carry incremental information not captured by common factor models and control variables. We construct a composite value model that uses trends in six value ratios (book equity value scaled by the market value of the firm, EBITDA to market value of the firm, cash flow to price ratio, earnings-to-price ratio, profit margin-to-price ratio, and sales-to-price). Momentum when combined with value generates enhanced return performance, as documented in the literature. We extend the discussion on the combination of momentum with value using three different methods.

Frank J. Fabozzi
Editor