Factors’ Active Role in Portfolio Construction

By Raman Aylur Subramanian, CFA®
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As important systematic sources of risk and return, factors have a vital role to play in building, maintaining, and measuring actively managed equity portfolios. Investors and technology continue to grow more sophisticated, which has given rise to new ways of gathering, sorting, and analyzing information—and new investment approaches. Having a deeper understanding of the insights into funds and individual securities that are made possible by a factor-based approach can help investors take important steps forward and begin to think outside the style box.

Research by MSCI and others has continued to show that factors have been significant contributors to active returns (the return above or below the benchmark) in active equity portfolios. Specifically, we found that industry, country, currency, and style factors (such as value, size, or momentum) accounted for approximately 55 percent of the active return of a sample of 882 actively managed global mutual funds between September 2003 and December 2016, versus 45 percent for stock-specific contributions. Within the factor contribution, style factors, such as earnings yield or company market cap, made up the largest fraction of about 35 percent. Country and industry factors contributed about 25 percent each, and currency factors contributed 15 percent.

Despite the research, questions remain from investors, advisors, and fund managers alike.

- How has the introduction of factors affected the performance and characteristics of different investment strategies?
- Have factors enhanced active strategies without impairing the manager’s ability to select stocks and generate alpha?
- How can factors help investors and advisors compare mutual funds?

DECADES OF RESEARCH

ESTABLISHED FACTORS’ LONG-TERM VALUE

The foundations of factor investing can be traced to pioneering academic research that began nearly 70 years ago when Harry Markowitz established mean–variance optimization as a formal method for building portfolios by trading off risk and return. This was followed a little more than a decade later by William Sharpe’s introduction of the capital asset pricing model, which elegantly captured the idea that the market is the most important common driver of portfolio performance. The final leg of the foundational stool came in the 1970s when Stephen Ross extended the market model to include multiple factors that may exert common influences on asset prices and portfolio returns.

A substantial body of empirical research built on this foundational work over the next four decades. Researchers aimed to establish the precise nature of the common factors affecting risk and return in different asset classes and markets. They looked to explain why some of these factors may be prized and why assets and portfolios that emphasize these characteristics may earn positive excess returns.

In equities, eight factor groups have been documented and used extensively in portfolio risk models and active investment strategies: value, size, momentum, volatility, quality, yield, growth, and liquidity.

Value and size were established early on as potential sources of excess return. This was followed by research showing the existence of cross-sectional momentum in U.S. equities and documentation of the low-volatility effect, which established volatility as an important equity factor.

Other studies offered investors a finer slicing of the eight factor groups. Profitability and earnings quality, for example, often have been seen as different dimensions of the quality factor, as are leverage, earnings variability, and investment quality.

BUT INVESTORS FACE

CHALLENGES EVALUATING

STUDY RESULTS

Despite the large number of studies examining factors and demonstrating their potential to add value, investors have faced challenges incorporating them into portfolio construction.

One key reason is that investors have had difficulty evaluating the results of the research because of a lack of consistency in terms of data sources, definition of variables, portfolio construction
methodologies, geographical focus, etc. To help move the discussion beyond these obstacles, we examined different variables commonly used to quantify equity factors and estimated historical factor performance of equal-weighted quintile portfolios across three different, increasingly sophisticated settings that account for and help us understand the influence of all the important performance drivers. They do so by evaluating specific factors with and without the influence of other style factors, as well as other influences, such as countries or industries.

Although the level and consistency of excess return varied across factors, our findings may be particularly relevant to construction of active equity portfolios:

- The value, momentum, and yield factors we examined generated a positive information ratio (IR), a measure of risk-adjusted return, across all three settings; as did quality factors, except for low leverage.
- Size factors performed reasonably well in the simplest setting where we saw returns associated with a specific factor that includes the influence of countries, industries, and other style factors, while volatility factors produced only small gains in such instances.
- Growth, on the other hand, only produced positive IR when we isolated returns associated with a particular factor, net the effects of countries, industries, and other style factors. Liquidity factors experienced negative excess returns over our full testing period.

Once one sees the historical performance of factors, the next logical question is: What has been the importance of style factors in explaining active returns of portfolios and in portfolio construction?

**STYLE FACTORS’ EFFECT ON ACTIVE RETURNS**

To start answering this question, we backtested two sample hypothetical portfolios created from the large- and mid-cap MSCI World Index. The portfolios were designed to have nearly identical sector and country weights but significantly different factor exposures. We maximized exposure to the value factor in the “Blue Fund” and the volatility group for the “Red Fund,” relative to the MSCI World Index, keeping all other style factor exposures near zero and minimizing tracking error to the benchmark. We also constrained the active weights to industries and countries to be near zero in both portfolios.

In figure 1, we display the active returns of the Blue Fund and Red Fund. Over the roughly 10-year period from January 2007 to January 2017, the active return of the funds diverged by approximately 15 percentage points.

Looking to actual returns, we next explored which factors had the greatest impact on portfolio performance. Using MSCI’s Peer Analytics dataset, we examined the composition and performance drivers of active global funds through the lens of our Global Total Market Equity Model and found that price momentum, residual volatility, beta, dividend yield, and profitability were the most significant individual factors.

**HOW ACTIVE MANAGERS COULD HAVE INTEGRATED FACTORS VIA FACTOR TILTS**

Moving even further to the practical, we examined how discretionary managers could have enhanced their strategies by incorporating factor information while preserving their fundamental investment processes and the added value from security selection.

Again, we focused on the eight common factors that historically have affected risk and performance in equity markets. These factors are well-documented through empirical research and used extensively in portfolio risk models and active investment strategies. In addition, these factors also mirror some of the criteria used in fundamental security selection and sought by consultants, for example, attractive valuations (value), high earnings growth (growth), and high profitability (quality).

To address managers’ typical concerns about distorting investment processes or compromising their ability to generate alpha, we incorporated factors by reweighting portfolio holdings. This ensured that all existing securities remained in the portfolio following the integration of factor information, albeit with modified weights. Specifically, we increased the weight of holdings with above-average factor exposures and decreased the weight of stocks with
below-average exposures. As a result, we introduced a modest tilt toward rewarded factors across the portfolio.

We tested this method of integrating factors in active portfolios on a universe of 1,182 global and international (global ex U.S.) actively managed mutual funds from December 2008 to December 2017. We assessed the impact of factor tilts across all active funds and within groups of funds, sorted on historical five-year trailing performance, prior to the introduction of factors. For every month during the simulation period, we reweighted the portfolios in our dataset using this factor information.

**INTEGRATING FACTORS IMPROVED PERFORMANCE WITHOUT REDUCING STOCK SELECTION CONTRIBUTION**

The original portfolios achieved average annual outperformance of 0.73 percent, and countries and industries each contributed 20 basis points (bps). In fact, stock selection made the highest contribution across all four performance quartiles in the original active portfolios.

Adding factors improved performance substantially in absolute and risk-adjusted terms. Simulated modified portfolios had average outperformance of 1.63 percent with an IR of 0.39.

Further, performance attribution shows that the added return came from the factor tilts we introduced to the portfolios, and performance attributed to security selection remained virtually unchanged at 26 bps. So, tilting the portfolios toward rewarded factors added 90 bps to active return without altering the specific contribution or the manager’s ability to generate alpha from security selection. Also, the introduction of factors through this reweighting process did not increase the active risk of the simulated portfolios and was achieved with a relatively modest increase in turnover (see figure 2).
CREATING A COMMON LANGUAGE FOR FACTORS

To make sense of the ever-growing factor research, we created a framework for the classification of style factors: MSCI FaCS™.

FaCS is a factor classification standard as well as a framework for analyzing and reporting style factors in equity portfolios. It’s based on the factor structure in the MSCI Global Total Market Equity Model for Long-Term Investors (GEMLT). The style factors in GEMLT comprise 41 individual metrics or “descriptors,” combined into 16 factors, which we then combined into the eight factor groups mentioned throughout this article—value, size, momentum, volatility, quality, yield, growth, and liquidity.

The result is common language and definitions around style factors, for use by asset owners, managers, advisors, consultants, and investors.

COMPARING MUTUAL FUNDS THROUGH FACTORS

Managers and consultants also can use factors (through MSCI FaCS) to analyze and report factor characteristics for portfolios as a whole and for individual holdings. Investors and consultants can use the data to compare funds and monitor exposures over time using common definitions.

In our sample of more than 3,000 actively managed equity mutual funds, we examined the distribution of exposures to the target factor group in each group of funds to gauge how much exposures varied. For example, an investor seeking exposure to value could test whether the funds under consideration had the desired exposure to that factor. Data for these results are as of November 30, 2017.

We saw that out of 485 value funds, 40 (8.2 percent) had a negative exposure to the value factor group. Looking closely at the fund with the most negative exposure to value (-0.53), we found this fund had exposures of -0.65 to earnings yield and -0.14 to book-to-price, while it had +0.34 to long-term reversal and +0.10 to growth. Investors seeking exposure to value may wish to be aware of these characteristics.

We also counted how many funds had an exposure to their named factor group that was inconsistent (opposite in sign) to what we would expect based on the fund name. The large category had the greatest fraction of funds (19.3 percent) with this particular characteristic. However, the following were other examples, and investors may wish to be aware of these biases:

Volatility group: The one fund with positive exposure to the volatility group turned out to be a “managed volatility” fund that dynamically adjusted its beta exposure to changing risk environments instead of maintaining a consistent negative exposure to the volatility factor. Given that late 2017 (when these data were extracted) was clearly a low-risk, low-volatility environment, it is not surprising that the fund was tilted away from a traditional low-volatility stance.

Quality group: The one fund that had a negative (-0.03) exposure to the quality group was a “quality dividend” fund. Looking more closely at its exposures, we find it had a very high (+0.93) exposure to the yield group. Thus, at the time of this snapshot, it appears that the fund emphasized the high dividend yield more than the quality component of its strategy.

Growth group: Of 498 growth funds, 36 (7.2 percent) had negative exposures to growth. Looking more closely at these funds, we found that, on average, they had near zero exposure to value, momentum, and yield, but a significant positive exposure (0.21) to quality. That positive exposure to quality was also fairly pervasive—30 of the 36 had this positive exposure and most of the remaining six had only small negative exposures.

Overall, we found that a small percentage of funds had exposures that appeared inconsistent with their fund names, and that, with a little digging, and factor exposure data, it is often possible to uncover the likely drivers of these inconsistencies.

ASSESSING FUNDS’ STYLE DRIFT

To look at style drift and gain an understanding of the variability in factor exposures over time, we analyzed two large actively managed mutual funds, one from the growth category and one from the value category, tracing their MSCI FaCS factor group exposures over time (see figure 3). We see that the fund from the growth category experienced a significant change in some factor exposures around 2009 when the manager of the fund changed. From 2009 through November 2017, the exposures were fairly stable, with significant positive exposure to growth and volatility, and generally positive exposure to momentum. The fund also had significant negative exposure to value and yield.

In comparison, the value fund had positive exposure to value and yield but negative exposure to growth during this period. It also had variable, but mostly small, exposures to momentum and quality.

In short, examining these funds through the lens of factors shows how portfolio exposures varied over time and for numerous reasons, such as changing...
security exposures, rebalancing frequency, portfolio manager, or investment strategy changes, as well as macroeconomic shifts or news about specific stocks.

WHAT ABOUT INDIVIDUAL STOCKS?
Up to this point, we’ve focused on analyzing factor exposures of equity portfolios. But what about the stocks that make up those portfolios? How can factors help investors question industry or media “truths” about categorization when selecting stocks?

To investigate this point, we turn to the so-called FAANG stocks, that is, Facebook, Apple, Amazon, Netflix, and Google. Together, they make up nearly 40 percent of the NASDAQ 100 index and smaller but significant weights in others. Commonly grouped as technology stocks or growth companies, it seems reasonable to assume they share many similar characteristics. However, when examined through the lens of performance-driving factors, we find their characteristics are far from homogenous.
FAANG FACTOR TILTS RELATIVE TO THE BENCHMARK

<table>
<thead>
<tr>
<th>Stock</th>
<th>Value</th>
<th>Low Size</th>
<th>Momentum</th>
<th>Quality</th>
<th>Yield</th>
<th>Low Volatility</th>
<th>Growth</th>
<th>Liquidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facebook</td>
<td>-0.39</td>
<td>-0.92</td>
<td>0.41</td>
<td>0.00</td>
<td>-0.96</td>
<td>-1.28</td>
<td>1.15</td>
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<tr>
<td>Apple</td>
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<td>-0.92</td>
<td>0.49</td>
<td>0.15</td>
<td>-0.14</td>
<td>-0.32</td>
<td>-0.10</td>
<td>-0.10</td>
</tr>
<tr>
<td>Amazon</td>
<td>-1.13</td>
<td>-0.92</td>
<td>1.45</td>
<td>-0.05</td>
<td>-0.96</td>
<td>-0.63</td>
<td>1.03</td>
<td>0.48</td>
</tr>
<tr>
<td>Netflix</td>
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<td>-0.92</td>
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<td>-0.96</td>
<td>-1.55</td>
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<tr>
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<tr>
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<td>0.33</td>
<td>-0.34</td>
<td>-0.61</td>
<td>0.16</td>
<td>0.10</td>
</tr>
</tbody>
</table>

More negative performance  More positive performance

Source: MSCI FaCS. The values are provided in units of standardized exposure, or how far away from the benchmark index (MSCI ACWI IMI), which has an exposure of zero, the given stock or portfolio is tilted. Individual company exposures typically vary from -3 to +3, and diversified portfolios typically are in the range of -1 to +1.

APPLE AND NETFLIX FaCS EXPOSURES

Breaking these big tech firms into smaller pieces through factor exposures shows significant variability (see figure 5). For example:

- **Quality**: Exposure ranged from ~0.05 for Amazon to 0.68 for Google.
- **Momentum**: All the FAANG stocks showed a positive exposure to momentum, but they varied from the very-near neutral 0.05 for Google to 2.53 for Netflix.
- **Value**: Apple was the only FAANG with a positive exposure.
- **Growth**: Apple had a slight negative exposure; Netflix a very large positive exposure.

The largest differences can be seen when we measure the exposures of Apple and Netflix. Low size exposure was equal between the two, but the other factors varied substantially.

Additionally, much like portfolios, factor exposures for individual companies have been quite dynamic and have changed over time. In figure 6, we take Apple as an example. Our analysis shows factor exposure over time, focusing on the quality, momentum, value, and growth factor groups.

Breaking the FAANGs into bite-sized pieces revealed the importance of analyzing portfolios and securities beyond questions of sector or value versus growth. These unique factor fingerprints offered improved understanding of critical drivers of portfolio risk and return.

Figure 4 displays the FaCS characteristics of the FAANG stocks, relative to the benchmark MSCI ACWI IMI, as of July 27, 2018.
SOME FINAL THOUGHTS

Decades of research have established the fact that factors historically have been important sources of risk and return for equity portfolios. Our research found that managers of active equity funds could have added factor tilts to their portfolios to lift performance without substantially changing the portfolio’s characteristics or the contribution from stock selection. Additionally, analyzing mutual fund portfolios through the lens of factors allows investors and consultants to compare funds, evaluate style drift, and assess characteristics of individual securities.

The move to factor investing in equities has been felt across the investment industry. As other asset classes follow, those building and measuring portfolios will require a new framework—and willingness—to understand the influence of factors on fixed income, real estate, and currencies in a multi-asset-class world.

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ENDNOTES


3. This report contains analysis of historical data, which may include hypothetical, backtested, or simulated performance results. There are frequently material differences between backtested or simulated performance results and actual results subsequently achieved by any investment strategy.

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