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Factor Mixology: Blending Factor Strategies to Improve Consistency

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Factor strategies have dramatically increased in popularity in recent years. These strategies provide exposure to systematic investment factors or themes that many in the financial community believe offer the potential to deliver superior returns. Examples of frequently used factors include value, momentum, quality, size and low volatility.

Factor strategies combine the attractive features of both passive and active investing. Similar to capitalization-weighted indexes that are utilized for passive investing, factor strategies are constructed using objective, rules-based methodologies that are transparent. These strategies are reconstituted infrequently (typically only annually or semiannually) and are managed in a passive manner. Like passive investing, these strategies are typically offered at lower fees than the average traditional actively managed portfolio. But, since these strategies are designed to outperform capitalization-weighted indexes, they offer the potential excess returns of active management as well.

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Parametric offers single-factor and multifactor strategies that provide exposure to one or more of the above-mentioned factors. In this brief, we show the risk and return characteristics of these strategies relative to a capitalization-weighted benchmark. Further, we show that the excess returns of these strategies have low correlations with one another. As such, holding a combination of these strategies in a blended portfolio may provide a powerful source of diversification with stable expected excess return outcomes. We also observe that some of the single-factor strategies have higher total risk than the capitalization-weighted benchmark. It is our opinion that blending these single-factor strategies can help to lower the risk of the overall portfolio, and provide investors with an opportunity to gain exposure to systematic investment factors without bearing additional total risk compared to the benchmark index.

We also look at the performance of these strategies over four different full market cycles, with a "full market cycle" being defined as a long enough time period to cover both a bull and a bear market. We find that blending the strategies provides diversification benefits across all four full market cycles included in our research. In other words, we find that holding a combination of factor strategies in a blended portfolio has the potential to deliver more stable excess return outcomes.

Parametric Factor Strategies

Parametric uses an optimizer to construct diversified long-only factor strategies that offer exposure to desired factors, while controlling for unintended factor exposures and sector bets. The portfolios are reconstituted annually (with the exception of our momentum-based strategies, which are reconstituted semiannually) and so are designed to have high capacity with low levels of turnover and implementation costs. Figure 1 provides a description of the five single-factor strategies offered by Parametric in U.S. large-cap equities.

Figure 1. Single-Factor Strategies in US Large-Cap Equity

Factor	Description
Value	Exposure to companies with low price-multiple ratios
Quality	Exposure to profitable companies with stable earnings and low leverage
Momentum	Exposure to stocks with strong recent relative price performance
Dividend Yield	Exposure to companies with high dividend yield
Low Volatility	A minimum variance portfolio for equity exposure at lower levels of volatility

Figure 2 shows the backtested performance of these strategies. Returns shown are presented gross and net of 0.40% annual management fees, and gross of trading costs and expenses. All the single-factor portfolios outperformed the Russell 1000 benchmark on a gross, as well as net of fee, basis. Of the five strategies, the value and momentum strategies have higher total risk than the benchmark. However, all of the factor strategies offer better returns per unit of risk when compared to the benchmark. For each strategy, we calculated on a monthly basis the rolling three-year returns from 1997 to 2015. Based on the monthly time series of these rolling three-year returns, we calculated the percentage of times that the strategy outperformed its benchmark. We found that the factor strategies outperformed between 58% and 75% of the time, across all

the strategies.

Figure 2. Backtested Risk and Return of Single-Factor Strategies, January 1997 to December 2015

	Gross Return	Net of Fees Return	Volatility	Re-turn/ Risk Ratio	Net Excess Return	Track-ing Error	Informa-tion Ratio	Percentage of Times of Out-performance Over Rolling 3-Year Periods
Dividend Yield	8.3%	7.9%	15.1%	0.52	0.2%	4.8%	0.05	58.0%
Value	9.4%	8.9%	16.4%	0.54	1.3%	4.2%	0.30	57.0%
Momentum	9.3%	8.8%	17.3%	0.51	1.2%	6.1%	0.20	73.1%
Quality	10.2%	9.8%	15.3%	0.64	2.1%	3.6%	0.59	75.6%
Low Volatility	8.4%	8.0%	11.8%	0.68	0.3%	6.7%	0.05	64.8%
Russell 1000 (Benchmark)	7.6%		15.7%	0.49				

Sources: PPA and Russell, as of 12/31/2015. Hypothetical performance is provided for illustrative purposes only; it does not represent the actual returns of any investor and may not be relied upon for investment decisions. Actual client returns will vary. Performance reflects the reinvestment of dividends. Performance does not reflect the deduction of brokerage commissions and other expenses, which, if applied, would reduce the returns presented. All investments are subject to risk of loss. Back-tested performance is not indicative of future results. It is not possible to invest directly in an index; they are unmanaged and do not reflect the deduction of fees and expenses. Please review the Disclosures section for additional information.

Factor Correlations

As summarized earlier in Figure 1, each of the factor strategies offer exposure to stocks based on a different set of characteristics. As a result, one would expect the risk and return characteristics of the strategies to be unique and different from each other. However, this may not necessarily be the case. For instance, it is possible that many stocks display more than one set of factor characteristics; for example, value and dividend yield. In that case, the returns to some of the factor strategies could be correlated with one another, as they would be likely to hold a number of stocks in common. Another scenario is that it is possible that the returns to some of the risk factors are driven by the same underlying systematic economic factor. Both scenarios can explain why the performance of some of the factor strategies may be correlated with one another.

We look at the long-term correlations in excess returns of the factor strategies to see how different they are from each other. The correlation numbers are presented in Figure 3. They show that most of the factor strategies have low correlations that are negative or close to zero. Only dividend yield has a material positive correlation of 0.46 to 0.5 with value and low-volatility

strategies. However, even at these levels of correlation, dividend yield is unique enough and not a redundant factor.

Figure 3. Backtested Net Excess Return Factor Correlations

	Dividend Yield	Value	Momentum	Quality	Low Volatility
Dividend Yield	1.00				
Value	0.46	1.00			
Momentum	-0.44	-0.24	1.00		
Quality	-0.17	-0.19	0.14	1.00	
Low Volatility	0.50	0.02	-0.24	0.11	1.00

Sources: PPA and Russell, as of 12/31/2015. Hypothetical performance is provided for illustrative purposes only; it does not represent the actual returns of any investor and may not be relied upon for investment decisions. Actual client returns will vary. Performance is presented net of 0.40% annual management fees, and gross of trading costs and expenses. The deduction of trading costs and other expenses would reduce the performance presented. Performance reflects the reinvestment of dividends. All investments are subject to risk of loss. Back-tested performance is not indicative of future results. Please review the Disclosures section for additional information.

Blended Portfolios

Each of the backtested factor strategies presented above outperformed their benchmark. While each of these strategies independently appears attractive, we suggest that investors consider investing in a blend of these strategies to take advantage of the low correlations in excess returns between these strategies. This is designed to help diversify the sources of excess returns and provide for a more stable excess return outcome[1].

To illustrate this, we examine the performance of blended portfolios that invest in two factors at a time. The blended portfolios invest equally in the two chosen factor portfolios and are rebalanced monthly to maintain equal weighting. From the five single-factor strategies, we can form 10 different blended portfolios that invest in two factors at a time. In this brief, we show the results for only three such portfolios – Dividend Yield & Quality, Value & Quality, and Momentum & Low Volatility. We chose these particular combinations for the following reasons. First, that they cover all five factors, so one can see how each factor works in a blended portfolio. Second, the chosen factors are negatively correlated with each other and so should be useful to illustrate the benefits of investing in diversified sources of excess return. And third, some of the factors complement each other and combining them can result in the blended portfolio exhibiting some desirable characteristics. For instance, the Momentum strategy has higher volatility than the benchmark. Combining it with a Low-Volatility strategy in a blended portfolio should bring down the volatility

[1] N. Amenc, et al. (2014) present an allocation framework for investing across multiple factor strategies. They state that reducing total risk, reducing tracking error or maximizing risk-adjusted returns are some of the reasons behind investing in a combination of factor strategies. Refer to N. Amenc, R. Deguest, F. Goltz and A. Lodh, "Risk Allocation, Factor Investing and Smart Beta: Reconciling Innovations in Equity Portfolio Construction," *EDHEC-Risk Institute Publication*, July 2014.

of the blended portfolio such that the investor gets exposure to the chosen factors without bearing additional total risk than the market.

Figure 4. Backtested Risk and Return of Blended Factor Strategies, January 1997 to December 2015

	Gross Return	Net of Fees Return	Volatility	Return/ Risk Ratio	Net Excess Return	Tracking Error	Information Ratio	Percentage of Times of Outperformance Over Rolling 3-Year Periods
Dividend Yield & Quality	9.3%	8.9%	14.9%	0.60	1.2%	2.7%	0.45	68.9%
Value & Quality	9.8%	9.4%	15.6%	0.60	1.8%	2.5%	0.70	86.5%
Momentum & Low Volatility	9.0%	8.5%	13.9%	0.62	0.9%	3.9%	0.23	74.6%
Russell 1000 (Benchmark)	7.6%		15.7%	0.49				

Sources: PPA and Russell, as of 12/31/2015. Hypothetical performance is provided for illustrative purposes only; it does not represent the actual returns of any investor and may not be relied upon for investment decisions. Actual client returns will vary. Performance is presented net of 0.40% annual management fees, and gross of trading costs and expenses. The deduction of trading costs and other expenses would reduce the performance presented. Performance reflects the reinvestment of dividends. All investments are subject to risk of loss. Back-tested performance is not indicative of future results. It is not possible to invest directly in an index; they are unmanaged and do not reflect the deduction of fees and expenses. Please review the Disclosures section for additional information.

Figure 4 shows the performance of the three chosen blended portfolios. All three blended portfolios outperformed the benchmark and earned net excess returns ranging from 0.9% to 1.8%. The effect of diversifying the sources of excess returns can be seen by looking at the tracking error and information ratio numbers. The tracking error of the blended portfolios is much lower than that of their underlying single-factor portfolios. Similarly, the information ratio of the blended portfolios is much higher. Diversifying the sources of excess returns in these combinations translates into lower tracking error risk and higher expected excess returns per unit of tracking error risk. Also, the blended portfolios offer equity exposure at similar or lower levels of risk relative to the benchmark. Finally, the percentage of times that the blended models outperformed their benchmarks on a rolling three-year basis is high at 69% to 86% across all three blended portfolios shown.

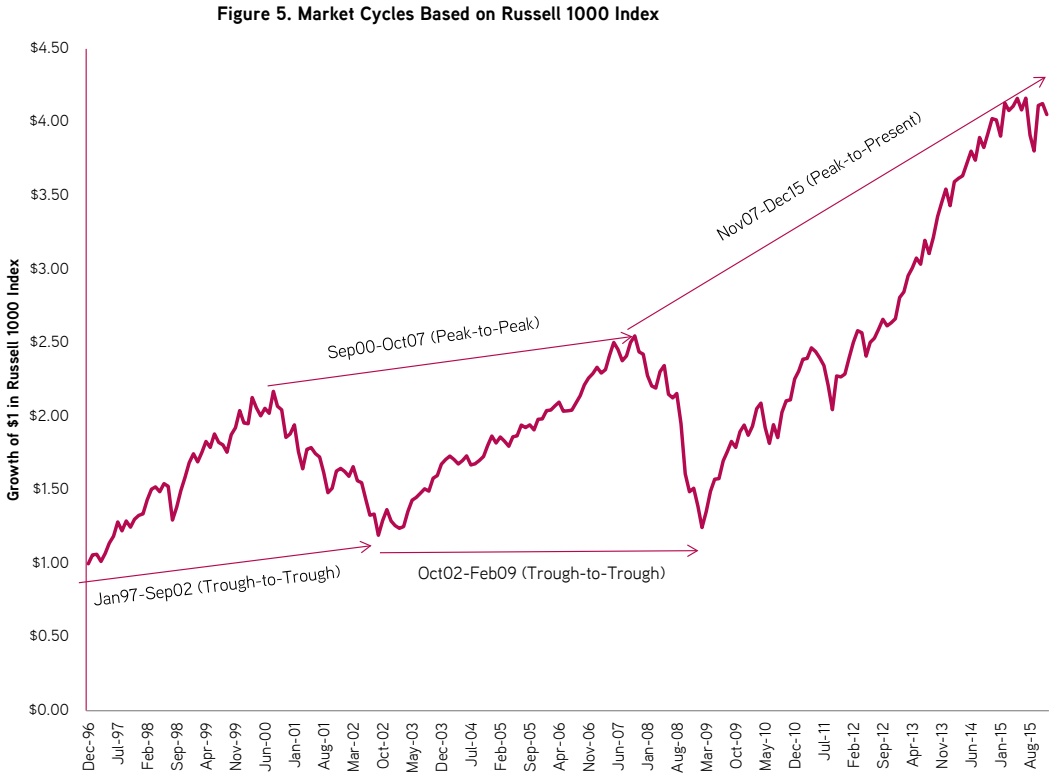
Performance Under Full Market Cycles

One question that comes to mind is how do the blended portfolios perform in different periods? Do they continue to reflect, over time, the benefits of investing in diversified sources of excess returns? To answer this question, we look at the performance of the portfolios over full market cycles, where a full market cycle includes both a bull and bear market. It has been suggested

[2] See R. Leggio, and S. Romick, "The Importance of Full Market-Cycle Returns", *Journal of Portfolio Management,* Fall 2015, pp. 5-6.

that investors look at performance of their portfolios over full market cycles to get a better understanding of how their portfolios perform[2]. Figure 5 shows our definition of full market cycles based on peak-to-peak and trough-to-trough levels in the Russell 1000 Total Return Index.

Figure 5. Market Cycles Based on Russell 1000 Index



Sources: PPA and Russell, as of 12/31/2015. Index performance is provided for illustrative purposes only. It is not possible to invest directly in an index; they are unmanaged and do not reflect the deduction of fees and expenses.

We find four full market cycles over our sample period. Each full market cycle incorporates a bull and a bear period. Also, the four full market cycles overlap each other.

Figure 6 shows the performance of the three blended portfolios and their underlying single-factor strategies in each of the four full market cycles. Starting with dividend yield and quality, we see that the single-factor strategies had net excess returns ranging from -0.9% to 4.6% over the different market cycles. However, in three of the four market cycles, when one factor underperformed, the other outperformed. This is a reflection of the negative correlation between the two factors. As a result, the blended portfolio, which combines dividend yield with quality, had a much more stable net excess return outcome ranging from -0.1% to 3.1%. A similar pattern can be seen when combining value with quality or momentum with a low-volatility strategy. The blended portfolios provide more stable net excess returns in those cases as well. In these

examples, we see diversification at work providing a more stable excess return outcome across the four full market cycles.

Figure 6. Backtested Annualized Net Excess Return in Different Market Cycles

	Dividend Yield	Quality	Dividend Yield & Quality	Value	Quality	Value & Quality	Momentum	Low Volatility	Momentum & Low Volatility
Jan97-Sep02 (Trough-to-Trough)	1.3%	4.6%	3.1%	3.0%	4.6%	3.9%	1.4%	0.2%	1.1%
Sep00-Oct07 (Peak-to-Peak)	2.6%	-0.6%	1.0%	3.4%	-0.6%	1.4%	-2.3%	3.1%	0.5%
Oct02-Feb09 (Trough-to-Trough)	-0.7%	0.5%	-0.1%	2.1%	0.5%	1.3%	1.2%	2.7%	2.0%
Nov07-Dec15 (Peak-to-Present)	-0.9%	2.9%	1.0%	-1.7%	2.9%	0.6%	1.5%	1.3%	1.5%

Sources: PPA and Russell, as of 12/31/2015. Hypothetical performance is provided for illustrative purposes only; it does not represent the actual returns of any investor and may not be relied upon for investment decisions. Actual client returns will vary. Performance is presented net of 0.40% annual management fees, and gross of trading costs and expenses. The deduction of trading costs and other expenses would reduce the performance presented. Performance reflects the reinvestment of dividends. All investments are subject to risk of loss. Back-tested performance is not indicative of future results. Please review the Disclosures section for additional information.

The two-factor blended portfolios considered here illustrate the potential benefits of investing in factor strategies with low correlations. Combining more than two factor strategies at a time, or combining strategies using a weighting scheme other than equal-weighting, also provide opportunities for investors to build portfolios that are likely to exhibit more stable excess return outcomes.

Conclusion

We looked at the backtested performance of Parametric's single-factor strategies, each of which provides exposure to one of the following factors – value, momentum, quality and low volatility. We found that each of these strategies outperformed the benchmark index, net of management fees. We also observed that the excess returns associated with these strategies have low long-term correlations with one another. As a result, combining these strategies in a blended portfolio has the potential to diversify the sources of excess returns and deliver a more stable net excess return outcome. We also demonstrated that the benefits of investing in blended portfolios can be seen in the long term as well as across different full market cycles. While some of the single-factor strategies have higher total risk than the benchmark index when combined with other single-factor strategies in a blended portfolio, the total risk of the blended portfolio can be brought down to similar or lower levels than the benchmark index.

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