Benefits of Multi-factor Modeling:Part 1

#1) The Factors and Tracking Error Defined

07.28.23 ·
RETIREMENT AND FINANCIAL PLANNING

*I**n this 3-part blog series**, our investment management team provides research into the possible benefits of using multi-factor modeling to create investment strategies. Our first post will look at the definition of the factors and how tracking error impacts this type of strategy. The second post will dive in a bit further to look at each of the 5 factors both individually and collectively. Our final post will tie together all these elements to complete the story of utilizing multi-factor modeling.*

#1) The Factors and Tracking Error Defined

Most investors say they have a long investment horizon but often still focus on performance over a shorter time period of months or quarters. In an instantaneous world with CNBC blaring the latest headlines it can be hard to focus on longer investment timelines. It is easy to get sucked into a FOMO (fear of missing out) mindset. This is how bubbles can form.

From an investment lens, it is difficult to ignore the constant visual of how markets and personal investments have performed as it's often readily available at our fingertips. This makes it difficult to zoom out and focus on the bigger picture while making it easy to get sucked into short-term movements even in the face of big risks.

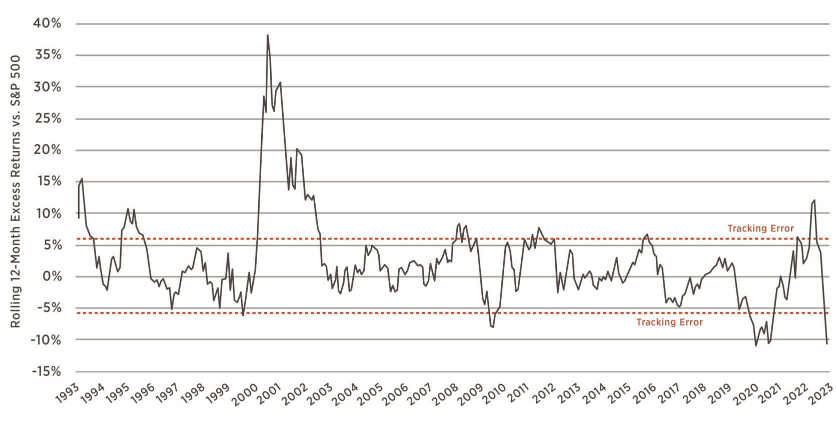
With this in mind, one measure we would like to present is 'tracking error' (or active risk). In its simplest terms, tracking error shows the variation in returns of one's portfolio relative to a benchmark. Put another way, it shows how much one should expect their portfolio's performance to deviate from a benchmark in any given year.

For example, if the benchmark index has an average historical return of 8% and your portfolio has a tracking error to this index of 5% that means that two-thirds of the time, your portfolio will have a return within 5% of the benchmark return (between 3% – 13%). Of course that also means that one-third of the time, your portfolio will have a return variance greater than 5%.

To illustrate this concept in practice, we have created a portfolio of 5 equally-weighted factors. This strategy is well-known throughout the industry and includes ample academic research supporting its use in constructing a portfolio. The securities underlying each factor, as defined below, are drawn from the largest 100 companies in the U.S.

Those factors used for illustrative purposes are:

> – **Low Beta:** Companies that move less than the market.
>
> – **High Momentum:** Companies that have performed well will likely continue to do so.
>
> – **Value:** Companies whose price relative to what they earn is low.
>
> – **Yield:** Companies that distribute a larger quantity of cash flows to their investors relative to their current price.
>
> – **Quality:** Companies that exhibit superior profitability



Source: Factset (Jan. 1991 – June 2019) as of June 30, 2019; Bloomberg (July 2019 – June 2023) as of June 30, 2023
Universe used to measure factor exposures is the S&P 100 Index. The 5 Factor Portfolio is equally-weighted with semi-annual rebalancing. Graphic represents the excess returns of the 5 Factor Portfolio against the S&P 500 Index on a rolling 12-month basis

The dotted lines illustrate the tracking error band in which we would reasonably expect about 2/3 of all annual returns to fall. As noted, anything above 0% means the 5-factor portfolio outperformed the benchmark over that 12-month period and anything below 0% was underperformance. What is peculiar about today is that the 5-factor portfolio is well outside of the tracking error band and thus represents performance that is historically more of an outlier – a similar event occurred during the COVID market in 2020.

Why does this matter? If you look at returns in any given year and are constantly comparing them to the benchmark, there will be instances where you feel really good and some where you don't. With a portfolio that has high levels of tracking error, one should expect large deviations in the short term. However, as we hope to illustrate in the forthcoming blog posts, tracking error over long investing horizons should be tolerated because, without it, there is no means of generating excess returns for the risks being taken.

Next up, we are going to look at how each of the 5 factors we used for this illustration individually have large tracking errors, but when combined, can be supportive in reducing the overall portfolio's level of deviation from its benchmark. Plus, you will not want to miss why, as an investor, you might consider seeking alpha.

The investment strategy presented may not be suitable for all investors. Please ***contact your financial advisor*** *and review important disclosures before making any investment decisions.*

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July 28, 2023
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Benefits of Multi-factor Modeling:Part 2

#2) The 5 Factors: Individually vs Collectively

07.31.23 ·
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#2) The 5 Factors: Individually vs Collectively

In our last blog post, we focused on understanding what tracking error means to an investor in his/her portfolio and illustrated how a portfolio of 5-Factors can deviate materially from the broader market in any given 12-month window. What we are going to show in this post is how combining that group of factors is beneficial from a portfolio risk-reduction perspective.

This table shows the individual tracking error against the S&P 500 for each of the 5 Factors we monitor. Clearly, at the single-factor level, each tracking error is higher than the portfolio combined. This is not a magic trick, but a result of combining factors that do not all move in unison.

Some zig while others zag. This is due to the diversifying nature of combining factors.

Factors	Beta	Momentum	Yield	Value	Quality	Portfolio
Tracking Error	11.5%	9.3%	10.2%	10.2%	8.0%	5.7%

Source: Factset (Jan. 1991 – June 2019) as of June 30, 2019; Bloomberg (July 2019 – June 2023) as of June 30, 2023
Universe used to measure factor exposures is the S&P 100 Index. The 5 Factor Portfolio is equally-weighted with semi-annual rebalancing. Tracking Error = Standard Deviation of Excess Returns

For math junkies, we've included the correlation table below to illustrate that the different factors vary with one another but, by and large, have higher levels of correlation to the S&P 500. This matters for diversification of risk and diversification simply comes by combining characteristics that are not perfectly correlated with one another (meaning a correlation of +1).

Correlations	Beta	Momentum	Yield	Value	Quality	Portfolio	S&P500
Beta	1.00						
Momentum	0.58	1.00					
Yield	0.80	0.59	1.00				
Value	0.64	0.66	0.85	1.00			
Quality	0.66	0.74	0.63	0.69	1.00		
Portolio	0.83	0.83	0.89	0.90	0.86	1.00	
S&P 500	0.66	0.84	0.77	0.84	0.93	0.93	1.00

Source: Factset (Jan. 1991 – June 2019) as of June 30, 2019; Bloomberg (July 2019 – June 2023) as of June 30, 2023
Universe used to measure factor exposures is the S&P 100 Index. The 5 Factor Portfolio is equally-weighted with semi-annual rebalancing.

In effect, by combining these characteristics, the portfolio's risk has been reduced. If it is challenging to stomach returns that could be 5-6% away from the benchmark in any given year, try owning a single-factor portfolio that could under- or outperform by 10% or more in a 12-month window!

Why should this amount of tracking error be tolerated? Now we are getting to the good stuff! This table illustrates major risk and return characteristics for each factor, the portfolio combining those factors, and the S&P 500. Without getting too deep into the weeds, what we want to focus on is alpha, or more simply, excess return. All investors would like alpha. It means you are earning more return relative to the risks that are being taken, so positive alpha is good! Over long periods of time, these 5 Factors have all delivered positive alpha, which translates into positive alpha for the portfolio as well. The reason this alpha exists, however, goes back to the willingness of an investor to tolerate short-term fluctuations exhibited by tracking error.

Factors	Beta	Momentum	Yield	Value	Quality	Portfolio	S&P500
Annualized Returns	11.5%	11.0%	11.9%	12.1%	13.2%	12.3%	10.0%
Standard Deviation	11.8%	16.9%	14.8%	18.7%	15.1%	13.4%	15.1%
Sharpe Ratio	0.78	0.51	0.65	0.52	0.72	0.75	0.51
Beta	0.51	0.94	0.76	1.05	0.86	0.82	
Alpha	5.2%	1.4%	3.8%	1.8%	4.3%	3.7%	

Source: Factset (Jan. 1991 – June 2019) as of June 30, 2019; Bloomberg (July 2019 – June 2023) as of June 30, 2023
Universe used to measure factor exposures is the S&P 100 Index. The 5 Factor Portfolio is equally-weighted with semi-annual rebalancing. Sharpe Ratio = Factor Annual Return – Risk Free Return / Factor Std. Dev. Alpha = Factor Annualize Return – [Risk Free Return + Factor Beta x (S&P 500 Return – Risk Free Return)]*Risk Free Return is from the 1-3 month Treasury Bill Index from Bloomberg; Annualized Return from June 1993 – June 2023 = 2.3%

This table might raise the question as to why not just own the Low Beta factor, after all, it has generated substantial alpha over the past 30 years! And to that, we point you back to the individual factor tracking errors in which Low Beta over any given 12-month window has substantial deviations from the broader market at 11.5%. For many investors, that level of fluctuation on its own can be challenging to stomach.

In our next post, we will tie all of these elements together. Now that you have digested the appetizer (Blog #1) and main course (Blog #2), it is time for further indulgence and everyone’s favorite – dessert! (Blog #3).

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July 28, 2023
Andrew Mies, CFA
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Benefits of Multi-factor Modeling:Part 3

#3) Tying It All Together

07.31.23 ·
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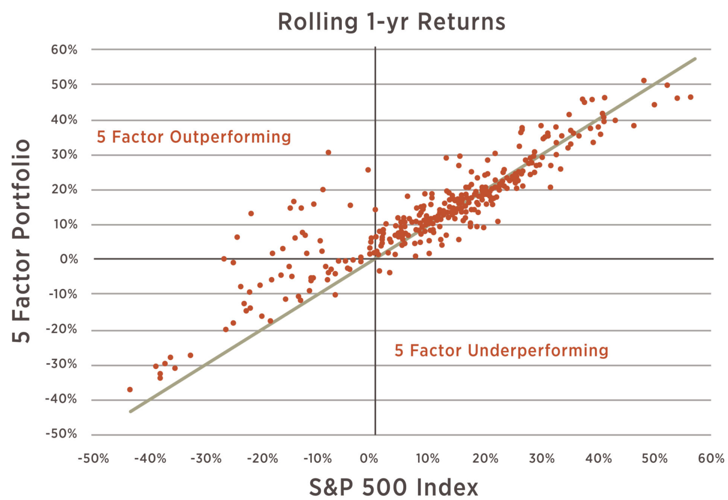
#3) Tying It All Together

We believe that equities, over time, are a great way to create wealth. Exposure to equities can be captured passively – which means you earn the return of the market – or actively. If an investor wants to earn excess return (aka alpha) – he/she needs both a long-time horizon and a willingness to deviate from the market (tracking error). If there is a way to generate alpha and take less risk, we consider that as an attractive opportunity to compound wealth over time.

We believe there are factors in the market that can deliver these results, and the data shown in the prior posts in this series support this conclusion. In the short term, large deviations are to be expected and investors should expect periods of underperformance; however, in the long term, there is opportunity to get paid for the risks being taken.

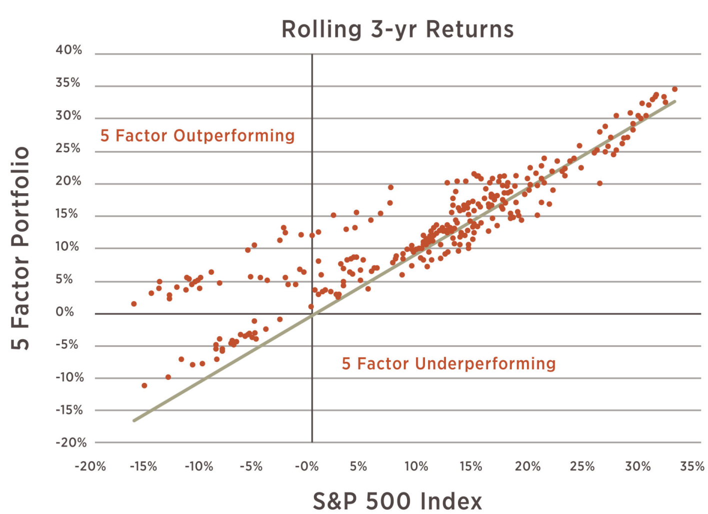
The last graphs we present show how the portfolio of the 5-Factors would align to the S&P 500 over varying time periods. Anything above or to the left of the diagonal line represents outperformance whereas anything below and to the right is underperformance. Importantly, as the timeframe increases, so too does the frequency of outperformance.

The 5-Factor Portfolio outperforms 60% of the time over 1-year period over the last 360 observations.



For Illustrative Purposes Only.
Source: Factset (Jan. 1991 – June 2019) as of June 30, 2019; Bloomberg (July 2019 – June 2023) as of June 30, 2023. Performance reflects backtested data using monthly return data from June 1992 – June 2023; 360 data points for the rolling 1-year performance chart. Information as of June 30, 2023

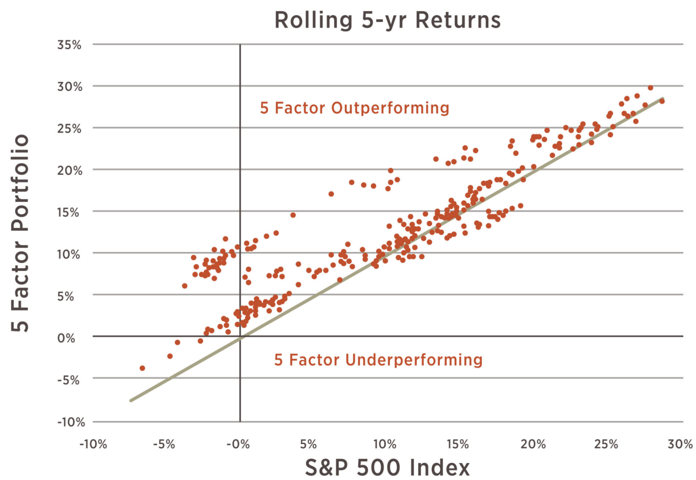
The 5-Factor Portfolio outperforms 74% of the time over 3-year period over the last 336 observations.



For Illustrative Purposes Only
Source: Factset (Jan. 1991 – June 2019) as of June 30, 2019; Bloomberg (July 2019 –

June 2023) as of June 30, 2023. Performance reflects backtested data using monthly return data from June 1992 – June 2023;

The 5-Factor Portfolio outperforms 80% of the time over 5-year period over the last 312 observations.



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In summary, hopefully, this series has been educational and insightful. We wanted to articulate that equities remain a pertinent piece of the puzzle to compounding wealth, but the ride may not always be smooth. Tracking error can be a psychological risk, in particular when it is not working in your favor. By understanding tracking error, investors will be better suited to understand the risks that come with an actively managed portfolio, in particular in the very short term. Deviations from a benchmark, namely those that are constantly being shown on TV (like the S&P 500), should be expected. With proper management, we believe that tracking error should be tolerated because it is the toll you pay to achieve alpha.

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