

INTRODUCING

factorE

INSIDE:

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4. *factorE* for an investment analyst
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1. WHY WE CREATED *factorE*

For many years, we have been helping advisors and their clients integrate alternative investments into traditional portfolios. While access to alternative strategies has become mainstream, allocating wisely to alternative strategies is still done in a somewhat archaic manner (the classic “fill-in-the-stylebox” approach). The markets continue to evolve and portfolio analytics have not kept pace.

Most tools use some sort of simple single-factor backward looking model and dress it up with Monte Carlo simulations. While that kind of analysis may have seemed appropriate a decade ago, we know much more today about sources of returns (factors). Factor research has been widely popularized in the institutional space, yet there has not been direct access to the necessary tools to easily conduct such analysis in the advisor community.

We’ve strongly believed that many of the long-standing industry practices and approaches to money management today are outdated and lack the holistic, comprehensive understanding of risk necessary to help navigate client

portfolios in today’s financial markets. Similarly, AlphaCore was founded on the idea that the “easy button” 60-40 model was not best for our clients, and that there was a smarter way to manage money utilizing alternative strategies at the core of an asset allocation. After the firm’s founding, our team soon discovered that the investment tools made available to advisors have failed to deliver the comprehensive understanding of risk necessary to help navigate client portfolios, especially when portfolios include alternative strategies. When we couldn’t find the solution for our advisor clients, we decided to build our own tool. We are proud to announce the release of *factorE*, an analytics tool built for the purposes of bringing sophisticated institutional quality portfolio management and risk management into hands of the broader advisor community.

With our new launch, we wanted to take the opportunity to dive deeper into factor identification and the practical implementation of this type of analysis. The discussion is intended to provide some history behind factor investing as well as describe some of the ways *factorE* can be used.



2. BACKGROUND AND FACTOR RESEARCH

IN THE BEGINNING, THERE WAS ONLY ONE BETA

A great place for us to begin the discussion would be to re-familiarize ourselves with one of the most well-known asset pricing models in finance, the Capital Asset Pricing Model (CAPM), which provides a single factor framework to evaluating the equity risk premium.

The model assumes that a single overall market risk factor drives investment returns, and suggests that an investment's return is a function of its sensitivity (beta) to this market risk. Therefore, the expected return of an investment is equal to the risk-free rate of return plus some market premium. The premium is the excess return an investor can expect to earn above the R_f for bearing this additional market factor risk.

EXPERT NOTE: The CAPM Equation attempts to explain the return calculation of an asset using Market Beta:

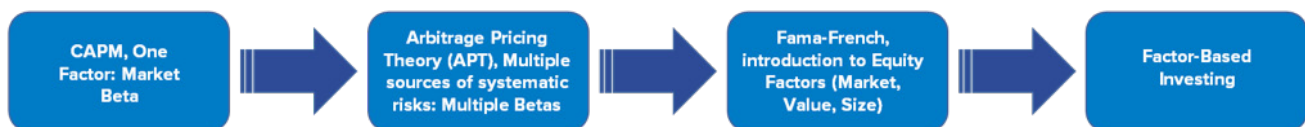
$$R_A = R_f + \beta_{A,Market} (R_M - R_f)$$

Since the introduction of CAPM, other asset pricing models have been developed to better explain asset returns by allowing for multiple sources of systematic risk. While CAPM provided a basic theoretical foundation to understanding an assets pricing and its associated factor risk, the single

factor model was too simple for real world application, where investment returns are driven by a variety of risk factors. Research that came afterwards would identify various anomalies that would conflict with the theory. For example, a size factor was identified by Banz in 1981, revealed that a portfolio of small cap stocks showed a higher risk adjusted return versus large cap stock portfolios.

A value anomaly has also been well documented, demonstrating that a portfolio of stocks with low book-to-market value ratios (relatively cheaper stocks) showed better risk adjusted performance versus a portfolio that had high book-to-market value ratios (relatively expensive stocks). The research findings and factor framework offered to us by Fama and French provided more precise explanations to asset returns, specifically stock returns. Their three-factor model highlighted that stock returns could be better explained by using a multi-factor approach rather than attributing returns to a single market factor. The Fama-French model suggests that a stocks return can be explained by its exposure to three factors- the market, value, and size. Since then, academics and practitioners have sought out a host of other factors, not only within equities, but across other assets classes as well.

The Progression of Factor Research:



A DIVE INTO FACTORS AND THE PROCESS

So, building on these concepts and findings, factors can then be considered underlying exposures that influence and help explain the specific risks of a holding. How does one measure the sensitivity of a factor risk? A widely-used method to measuring factor exposure is regression analysis, which is a statistical modeling process used to estimate relationships between a dependent variable (our portfolio's returns) and independent/explanatory variables (factor risks). As we can see with the examples of factor analysis conducted across equity investments, this type of risk factor analysis can be conducted on multi-asset portfolios that hold various risk factor exposures. Applying a similar framework utilized in the Fama-French model, a multi-asset portfolio's regression analysis should be conducted using a set of those risk factors that are implemented in the portfolio. In other words, if an investor's portfolio holds a combination of equity, fixed income, and commodity mutual funds across the style and sector spectrum, it would be appropriate to introduce factors inputs related to these types of holdings (e.g. equity, credit, duration, inflation, etc.).

EXPERT NOTE:

$$\text{Portfolio Returns} = \beta_1(\text{Factor 1}) + \beta_2(\text{Factor 2}) + \beta_3(\text{Factor 3}) + \dots + \beta_n(\text{Factor n}) + E$$

β , the factor coefficient or sensitivity implies a factor's magnitude of impact on a portfolio. In other words, the degree to which the portfolio has exposure to a particular factor.

Important Model Indicators:

R^2 , measures the explanatory power of your model.

EXPERT NOTE:

A factor input utilized in your model should be economically sound, and statistically significant, which implies that its behavior should impact your portfolio in a meaningful manner. Factor input selection should also satisfy the multivariate regression assumption of non-collinearity, meaning that those factors selected for your model should have low correlation with one another.

Both practitioners and academics will agree that factor selection does entail some level of judgment. There is no definitive industry wide list of factors for investors to rely on for these types of exercises. There are also many ways practitioners and academics define and construct factors and therefore it is important to note that even those factors attempting to capture the same economic phenomenon or risk exposure can result in different sensitivities due to their construction and underlying constituents. A key consideration in this type of analysis involves correctly identifying factors to measure against the portfolio. Therefore, factor inclusion needs to make intuitive sense and account for those factors that are present in the portfolio.



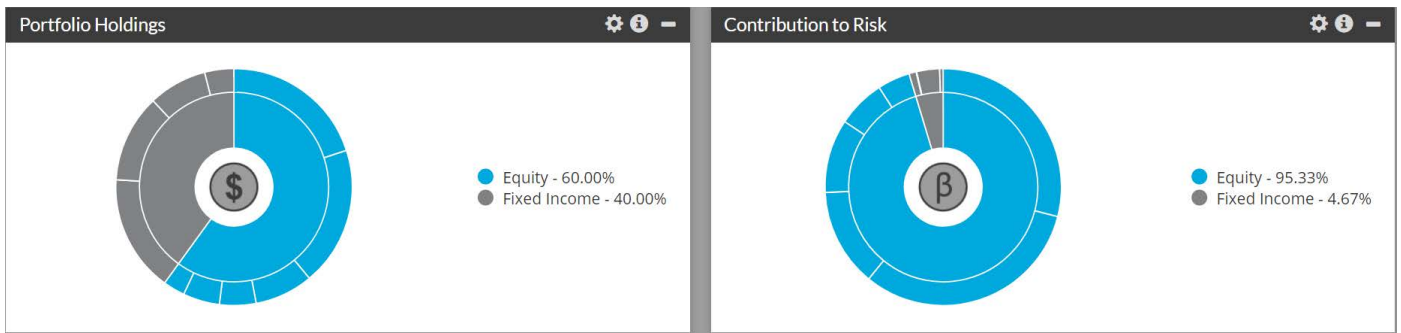


Figure 1: While a portfolio may be 60% equities and 40% fixed income (shown on left), the contribution to risk comes primarily from equities (shown on right). For illustrative purposes only. These charts represent a sample portfolio and do not represent an actual account.

3. factorE FOR A PORTFOLIO MANAGER/RISK MANAGER

Many advisors have traditionally understood risk exposures from a simple asset class perspective (e.g., equity, fixed income, alternatives, cash) which unfortunately results in a false sense of diversification, and lacks any true market color and context. A factor analysis on a traditional 60-40 equity/fixed income portfolio will quickly reveal that equity risk overwhelms the overall risk from a contribution to risk perspective.

In the day to day interactions within our advisory practice, we frequently find that advisors build their portfolios utilizing a variety of asset classes and fund strategies, but fail to realize that several of these holdings will share overlapping risk exposures. For example, we find that multi-alternative mutual funds are naively included into a traditional 60/40 equity/fixed income portfolio with the aim of improved diversification. Many advisors assume that a Multialternative Morningstar categorization will introduce low correlation relationships with their existing holdings, and believe this inclusion results in diversification benefits. The reality is that underneath the hood of many of these vehicles, you often find a much higher than expected correlation to both equity and fixed income markets.

Another example of naïve fund selection occurs with event-driven fund strategies, which are frequently marketed to deliver idiosyncratic risk exposures. However, if an investor uncovered some of the underlying risk exposures being sourced by the manager, they would soon discover that many of these strategies introduce inadvertent equity beta into a portfolio. A portfolio view through a factor lens helps look past the asset allocation, discarding traditional asset class categorizations of fund providers, and helps investors understand their true market risk exposures. We believe that this type of investment approach ultimately helps paint a

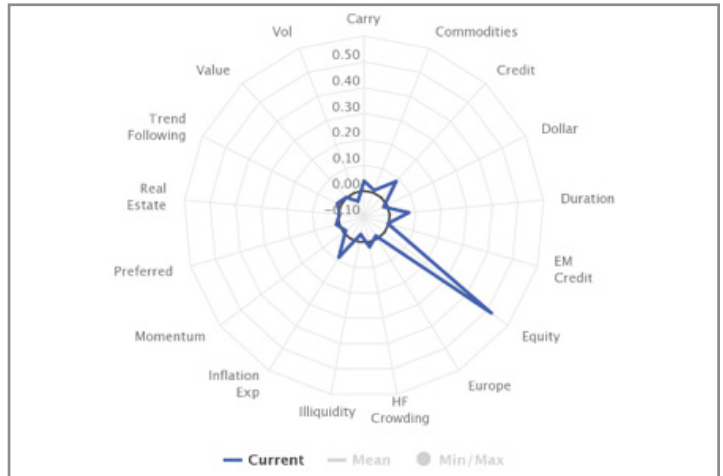


Figure 2: That same 60/40 portfolio has primarily equity risk. For illustrative purposes only.

better picture of how one’s portfolio is positioned to weather a variety of different market environments, which is critical when various asset classes/investment strategies become highly correlated in times of significant broad market distress.

A question that may have crossed your mind in all this factor talk is “what does the best factor positioning look like?” The answer to that question is that there is no perfect exposure, because there is no such thing as a “one size fits all” portfolio. Most important is the client’s portfolio mandate and tolerance for different kinds of risks. Given the cyclical nature of markets, the attractiveness for various assets will evolve over time, and in conjunction, specific factors will change. Exposures to these factor specific risks may want to be dialed up and down as one sees fit. Advisors can now utilize the factorE as a compass to navigate these changing opportunity sets to enhance their risk taking and risk reducing capabilities.

Factor based portfolio construction and analysis will help investors better understand the key risks of their underlying holdings, and their unique drivers of return. We believe that those who can understand their factor positioning may better be able to construct a truly diversified portfolio of independent risk factors.



4. *factorE* FOR THE INVESTMENT ANALYST:

Applications: Factor Regression Analysis Applied to Manager Selection

Factor regression analysis has other practical applications in an allocator's role of researching investment opportunities, serving as an analytical tool utilized during the manager evaluation and selection process. When exploring new investment opportunities, we can conduct this type of analysis to confirm a manager's stated strategy exposure biases overtime. In other words, we can test how disciplined a manager has been with their strategy historically. For example, if we were conducting a search for a value oriented long short equity manager, it would make sense to regress the manager's historical returns versus a host of equity factors such as value, size, quality, momentum, and the broad market. In the case of a long short manager, we would recommend analyzing the returns of both the long side, and short side of the portfolio in isolation. Doing so would allow for easier digestion of information, and more clearly show on which side of the book they are adding value. If analyzing a manager that remained true to their value oriented investment discipline, the regression output on the long side of the portfolio ought to show a high and statistically significant, positive sensitivity to the value factor, and a lower sensitivity to a momentum factor. Conversely, the short side of the portfolio should reveal a negative and statistically significant sensitivity to the value factor.

While holdings based analysis provides an investor with a current snapshot of a manager's portfolio, a return based regression analysis using factors provides a more practical method of confirming a manager's changing exposures over time (a following section will contrast these two approaches in more detail, covering the overall process, their strengths, and their drawbacks).

By tracking a manager's factor betas on a rolling time window, investors can observe when, where, and why a manager may have shifted risk exposures in their portfolio. Such analysis is particularly useful in the alternatives space (e.g. hedge funds), where transparency with holdings information can still be a bit of a hurdle to obtain with certain managers. Hiring and firing decisions of underlying managers is not an easy task, and have numerous costs associated with such an action (transaction costs, travel costs for manager onsite visits, time spent underwriting the manager and strategy, etc.). Monitoring tools like factor regression analysis

provides more insights to a manager's true value-add. Such an exercise not only allows for exposure confirmation, but also helps uncover what investors are really paying for. The process may reveal that that a manager's returns can almost entirely be explained by identifiable systematic factors, which are cheap betas to access via ETFs, mutual funds, and other investment options. We believe that fees paid on investors capital should only be given to those managers that can truly deliver an idiosyncratic return stream.

EXPERT NOTE:

Be better at avoiding Type 1 and Type 2 Errors During Manager Selection with Factor Analysis:

The idea here is to optimize your manager hiring and firing decisions by minimizing errors in your selection process. Regression analysis can help with these sorts of decisions by empirically showing which of your managers is adding value, and earning their fees, and which ones are not.

EXPERT TIPS:

Type 1 Error: Rejecting the Null Hypothesis (Remember Null Hypothesis states that the manager is NOT adding value). In other words, the mistake of keeping a manager that is not adding value.

Type 2 Error: Failing to reject the Null Hypothesis, which is firing a manager that is adding value.



5. EXAMINING THE STRENGTHS AND WEAKNESSES OF HOLDINGS AND RETURNS BASED ANALYSIS:

As the old saying goes “there’s more than one way to skin a cat”, and it certainly applies to portfolio analytics tools. Practitioners have relied on a variety of tools and methods to run attribution analysis on their portfolios. When you drill down to the root of it, these tools have primarily relied on one of two major approaches: a holdings-based analysis, or a returns-based analysis.

A holdings based approach aims to analyze portfolios by observing the composition of the its underlying holdings. It entails a bottom-up look at the characteristics of the individual securities held in the portfolio. The information gathered from this type of analysis can be used to grasp a manager’s style for benchmark assignments, performance attribution purposes, and possibly forecast return expectations for the portfolio. For example, an equity mutual fund can be analyzed by a variety common stock metrics like market cap, dividend yield, P/E, P/B, earnings growth, sector classifications etc. These metrics are then aggregated at the overall portfolio level to draw investment style conclusions. The findings might suggest that the fund’s median P/E ratio is 12.5 and that its 5-year EPS growth rates is 7%. Compared to a broad market equity index that exhibits a P/E ratio of 15 and a 10% EPS growth rate, an investor might conclude that the fund’s manager is following a value investment style. Hopefully the findings confirm the stated mandate and the entire reason for their hiring.

There’s certainly insightful perspectives to gain from this type of approach, but it also comes with its strengths and drawbacks.

Strengths:

1. Analyzes and characterizes each individual holding.
2. Provides a current snapshot of the portfolio, and is therefore faster at identifying style drift.
3. By observing each security, it allows for individual position comparisons.

Weaknesses:

1. Extremely data intensive, and can get even more messy when we are analyzing multi-asset, multi strategy portfolios
2. Position level data transparency issues related hedge fund managers is not uncommon
3. Difficult to use this approach to see evolving trends over time
4. Requires specification of classification attributes

The other major approach to portfolio analysis is a returns-based analysis, also commonly used to confirm investment styles of fund managers. Again, the exercise is meant to reveal characteristics or risks of a portfolio by regressing a portfolio’s returns to a returns series of a style indices. To confirm a mutual funds stated style, in this example let’s say a large cap value strategy, a return based analysis would take the mutual fund’s returns and regress them against the returns of a set of style indices like the Russell 1000 Value, Russell 2000 Value, Russell 1000 Growth, and Russell 2000 Growth. Output results of a manager implementing their stated investment style should exhibit a high beta to the Russell 1000 Value Index, and lower betas to the other style indices. Like holdings based analysis, this approach also has its strengths and weaknesses:

Strengths:

1. Cost effective, and less data intensive
2. Effective at showing changing exposures over long periods of time
3. Grounded in statistical methods

Weaknesses:

1. The output results may be meaningless if the index inputs/factor choices are incorrectly defined or chosen
2. Given that this approach relies on past historical returns data, the exposure changes will be detected on a lag

EXPERT NOTE:

One could even consider style investing as a predecessor to factor based investing, with managers explicitly tilting their portfolio towards a group of stocks that exhibit a particular set of desired characteristics, say value stocks or a value factor.

Putting the Holdings vs Returns based analysis in the context of multi-asset portfolios:

| | Holdings-Based | Returns-Based |
|--|--------------------|---------------|
| Effectiveness in single-asset portfolios | Very effective | Effective |
| Effectiveness in multi-asset portfolios | Somewhat effective | Effective |
| Handles shorting | Not effective | Effective |
| Handles tactical managers | Not effective | Effective |
| Frequency of data points | Not frequent | Very frequent |
| Stability of factors | More stable | Less Stable |



QUANTITATIVE DOES NOT REPLACE QUALITATIVE

At this point, we've spoken at great length about helpful insights quantitative tools can provide when evaluating investment managers and their strategies. However, as allocators we must acknowledge that quantitative analysis alone falls short of a complete investment review. To be clear, quantitative factor based analysis is not a replacement for the qualitative due diligence component of one's investment program. After all, investment managers are people, and the qualitative assessment of this human element is critically important in finding intelligent, and high character managers that will act as stewards of your client's capital. AlphaCore's factorE is meant to be a new tool in the advisor toolbox to enhance your existing investment process. By no means should quantitative research replace the important role qualitative due diligence plays in the manager selection process. There is no replacement for qualitative due diligence when sourcing managers for implementation into a portfolio.

HOW TO PIECE IT ALL TOGETHER

As illustrated with many of the examples above, risk exposures can be analyzed both at a portfolio level, and at the manager level. We believe factor analysis plays a critical role in helping advisors correctly size the risks of the portfolio to arrive at an appropriate strategic asset allocation necessary to achieve the long-term objectives of a client portfolio. Not the other way around. We want to re-emphasize that insights gathered from factor assessments allow for our portfolio management team to stay dynamically engaged throughout investment process. The current portfolio's factor exposures are analyzed and any diversification deficiencies or an overconcentration to a specific risk may then be adjusted for by rebalancing the portfolio towards more appropriate allocation levels from a factor exposure perspective.

At AlphaCore, we strive to find a balance of qualitative and quantitative research to identify the right opportunities so that we may combine quality managers to construct thoughtful institutional portfolios. Finding the missing puzzle pieces to better diversify a portfolio, or rebalancing a heavily concentrated portfolio away from an excess risk of some kind is much easier to do with a tool like factorE. For example, adding a specific risk exposure (i.e. manager strategy) to a portfolio entails an extensive search across a vast fund universe that categorizes offerings by asset classes and strategies. There are a host of other filters that one would need to work through before narrowing the pool of potential candidates down to a manageable list of implementation options. From there, one would begin an extensive due diligence process involving a series of calls, onsite visits, strategy reviews, and a formal underwriting of the investment strategy. However, in our opinion, the ability to screen and source managers based on factor exposures offers an incredibly powerful way of searching for investment opportunities. Why waste time researching fund strategies that ultimately do not deliver the risks you are seeking?

We believe that having the ability to source managers with the help of a factor radar that easily charts historical risk exposures of managers empowers advisors to conduct their investment research and portfolio management duties in a smarter and more holistic way. FactorE is an extension of AlphaCore's commitment to bringing our clients, and the larger advisor community the independent thinking and unique perspective necessary to better assess risks, and invest more intelligently.



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