# Factor Investing & Analysis Guide:

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What is Factor Investing?

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We believe there are two main types of factors that have driven risk and return over time: **macroeconomic factors** and **style factors**. The former captures broad risks across asset classes while the latter seeks to explain risk within asset classes.
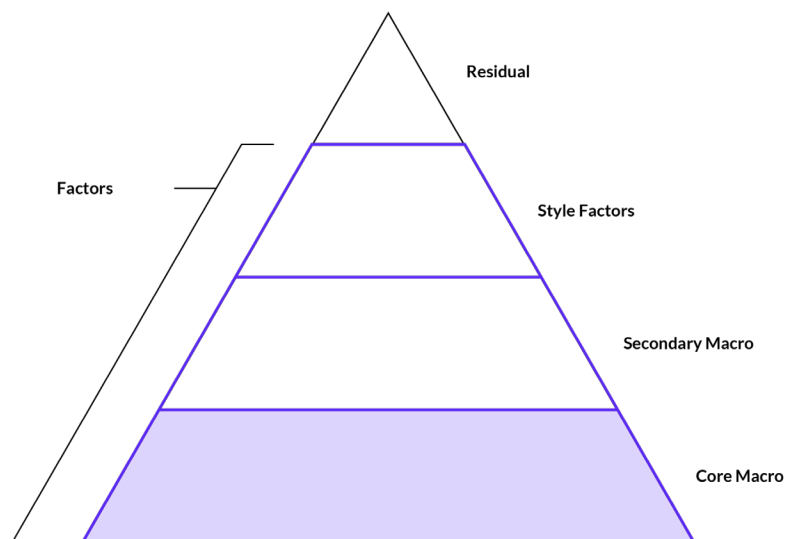
Want to dive into a different way to think about factors? **Read more about our "Bacon Factor" analogy.**

Why Use Factors?

Traditional asset allocation can hide risk in portfolios because different asset classes may have exposure to the same risk factors. For example, high yield corporate bonds and stocks have exhibited a long-run positive correlation due to each having exposure to the Equity risk factor (i.e., long-term economic growth and profitability of companies). By viewing portfolio risk through the lens of unique and independent risk factors, capital allocators can better understand what is driving risk and return, which may lead to more precise decision making.

In fact, an analysis done using Venn's Two Sigma Factor Lens™ of the SPDR Bloomberg High Yield ETF indicated that only 13% of the fund's risk was driven by the Credit factor, whereas an additional 33% of the risk was driven by the Equity factor.

You can even use factors to quantify the hype behind artificial intelligence, or to better understand the active bets of equity sectors.

More Factor FAQs can be found here.

What Are the Factors in the Two Sigma Factor Lens?

A factor lens represents a common language in which to view the investment landscape and multi-asset portfolios. It is often carefully constructed, but can vary meaningfully depending on different approaches or providers. For example, a factor lens could have hundreds of factors, or perhaps just focus on the most important drivers of return. It can be designed to be more useful for asset managers, or perhaps more geared toward asset owners.

The Two Sigma Factor Lens™, by Venn, uses a multi-factor approach consisting of 18 factors in four categories: Core Macro, Secondary Macro, Macro Style, and Equity Style. Venn decomposes risk into these factor categories, providing a clear understanding of how to better manage your multi-asset portfolio and use factor investing for diversification. This includes a unique factor selection process that further filters down our 18 factors to those most relevant for a specific investment or portfolio. The simplicity and intuitive output of the Two Sigma Factor Lens was designed with asset owners in mind, though there are many cases where asset managers can also leverage it for value (for example, fund of fund managers). Venn's factor analysis is designed to be:

HOLISTIC
...by capturing the large majority of cross-sectional and time-series risk for typical institutional portfolios.

PARSIMONIOUS
...by using as few factors as possible.

ORTHOGONAL
...with each risk factor capturing a statistically uncorrelated risk across assets.

ACTIONABLE
...such that desired changes to factor exposure can be readily translated into asset allocation changes.

Macro Factors

Macro Factors are risk factors shown to correspond to the principal drivers of asset class returns. Macro risk factors are broadly known, widely accessible at a relatively low cost, and often can explain significant amounts of risk in diversified institutional portfolios. They are common in institutional investors' portfolios due to their high liquidity and capacity.

CORE MACRO

- **Equity:** Exposure to the long-term economic growth and profitability of companies.
- **Interest Rates:** Exposure to the time value of money (interest rates and inflation risk).
- **Credit:** Exposure to corporate default and failure-to-pay risks specific to developed market corporate bonds.
- **Commodities:** Exposure to changes in prices for hard assets.

SECONDARY MACRO

- **Emerging markets:** Exposure to the sovereign and economic risks of emerging markets relative to developed markets.
- **Foreign currency:** Exposure to moves in foreign currency values versus the portfolio's local currency.
- **Local inflation:** Exposure to inflation-linked rates relative to fixed nominal rates within the local currency area.
- **Local Equity:** Exposure to home bias (the tendency to invest in domestic over foreign equity).

Style Factors

These are lower-capacity risk factors shown to correspond to sizable common risk drivers across individual securities, but with lower correlations to asset class returns. Academic research has identified multiple style factors that appear to have long-term return premia resulting from investor behavioral biases or risks associated with the respective exposure. In short, style factors correspond to sizable common risk drivers within asset classes, such as individual stocks or bonds. Style factors are associated with systematic alpha over time.

MACRO STYLES

- **Equity Short Volatility:** Negative exposure to moves in equity market volatility.

- **Fixed Income Carry:** Exposure to high-yielding 10-year bond futures funded by low-yielding 10-year bond futures.

- **Foreign Exchange Carry:** Exposure to high-yielding G10 currencies funded by low-yielding G10 currencies.

- **Trend Following:** Long-short exposure to multi-asset-class futures based on 6- to 12-month trailing returns.

EQUITY STYLES

- **Low Risk:** Long exposure to stocks with low market betas and residual volatility and short exposure to higher-risk stocks.

- **Momentum:** Long exposure to stocks that have outperformed recently and short exposure to recently underperforming stocks.

- **Quality:** Long exposure to stocks with low leverage and high profitability and short exposure to lower-quality stocks.

- **Value:** Long exposure to stocks with low prices relative to accounting fundamentals and short exposure to higher-priced stocks relative to fundamentals.

- **Small Cap:** Long exposure to stocks with smaller market caps and short exposure to larger-cap stocks.

- **Crowding:** Short exposure to U.S. stocks that are widely shorted by the investment community and long exposure to those stocks that are not as widely held short.

Read our most recent **Factor Performance report here**.

Residual

Residual represents idiosyncratic sources of risk (i.e., uncorrelated to other known factors). It is essentially the risk not captured by any factors in a factor model, and can be interpreted as the risk and return driven by unique manager skill.

However, not all residual risk generates a return premium, and investors should be careful when interpreting the sources behind residual risk and return when looking at historical performance.

Factors and Risk Premium

Factors with strong empirical evidence and/or fundamental justification for a long-term return premium are considered to have a "risk premium," which may reward investors for holding exposure to that risk factor over time. However, not all identifiable risk factors carry a corresponding risk premium.

A risk premium may compensate investors for bearing certain risks such as undiversifiable market risk, mandate constraints, operational complexity, or behavioral biases like risk/loss aversion, herding mentality, or recency bias.

The Equity factor, which represents exposure to fundamental risks such as macroeconomic growth and corporate profitability, is an example of a macro factor that has historically delivered a positive long-term return in excess of the risk-free rate.

The Momentum factor, not to be confused with Trend Following, is often thought to be driven by investor behavioral biases such as initial under-reaction to fundamental news about companies. This is an example of a style factor that has historically delivered a positive long-term return.

Factor Analysis to Review Portfolio Risk

A common Venn use case is reviewing a manager's factor analysis output to better understand their style and approach, and how it may lead to portfolio risk.

Sometimes the output can help confirm one's understanding of what the manager is doing, and other times it can lead to questions for the manager about portfolio management and potential exposure.

An example may be a manager that claims to invest in stocks based on value characteristics, but factor analysis output indicates a zero or negative Value factor exposure. This would be unexpected based on the mandate, so an investor might want to better understand what's driving that result.

Request a Demo to learn more about how our clients use the Two Sigma Factor Lens™ to view a rolling breakdown of risk, return, and factor exposures of different managers.

Read more about **manager evaluation**.

Using Factors for Stress Testing

Factors can also help in conducting hypothetical stress testing. For example, one might decompose their portfolio into its factor exposures today and then see how that portfolio might have performed if it existed in 2008. One might also translate well known market indexes into factors, such as the S&P 500 index or Bloomberg US Aggregate, to see how their portfolio might respond to a meaningful increase or decrease in these market indexes.

Additionally, understanding current factor exposures and historical factor returns opens up the opportunity to forecast portfolio metrics like return, volatility, tracking error, and more. Customizing these forecasts by changing exposure or return windows, or even starting from a place of capital market assumptions, can provide investors with important context for future possibilities.

Returns vs. Holdings Analysis

Venn offers returns-based analysis that helps our clients measure exposure to factors that cut across asset classes even when they do not have access to holdings level information in their portfolio. Returns-based analysis requires only a time series of manager or portfolio returns and the time series factor returns provided by Venn. This is designed to aid in the analysis of institutional investor portfolios whose investments span multiple asset classes, and where holdings data is more sparse. With that being said, holdings information can provide valuable context for returns-based analysis.

Venn and Factors

Venn leverages Two Sigma research and expertise in data science to help institutional investors better understand the risk composition of their portfolios and investments.

By using our regression based approach, Venn can help allocators learn more about the potential factor exposure of their portfolios (absolute or relative to benchmark) based on the return histories of their current portfolio holdings.

Venn displays the estimated exposures and contribution to risk and return for each factor identified in any return stream. Venn can also assist in allocation decisions by analyzing and estimating the historical marginal impact of adding, eliminating or reweighting an investment in your portfolio. This includes features to view private assets through a public lens, allowing for holistic analysis of a portfolio that includes not only multiple asset classes, but also private and public investments. These are a part of Venn's Private Asset Lab.

Our clients use Venn factor analysis to help them quickly answer critical investment and portfolio questions including:

- Which managers are providing differentiated exposure?

- What is a portfolio's sensitivity to macro and style factors?

- How might a portfolio react to certain market shocks or past events?

- Are individual investments and portfolios delivering the intended benefit?

- What do future capital markets expectations mean for the portfolio?

- How can a proposed change impact portfolio outcomes?

Contact us anytime at **venn.twosigma.com** or **vennsales@twosigma.com**