A World of Factors: A good library requires a taxonomy

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Factors: A brief history from beta to blended factors
A factor is the generic term for any indicator or metric that captures a persistent influence on an individual stock or group of stocks. The “original” factor was Beta in William Sharpe’s Capital Asset Pricing Model (CAPM) in 1964 representing a security’s sensitivity to the overall market (i.e. macroeconomic cyclical risk). Building upon this concept, Stephen Ross opened the creativity channel by introducing the Arbitrage Pricing Theory (APT) in 1976. APT allows a security’s expected return to be modeled via various undefined factors. By not strictly defining factors, Ross cleared a path for market practitioners to identify any factor that helps explain expected returns. We believe the two most general types of factors, or schools of quantitative thought and practice, are Fundamental versus Statistical/Technical factors.

Fundamental Factors
In 1992, Fama and French popularized the use of fundamental factors with their three-factor model: 1) Beta, 2) Size, 3) Value. These factors are now widely accepted by academics and used by investors. Quantitative methods have become widespread among both systematic and discretionary active investors and numerous factors have been developed to try to better identify and quantify any influence on a security’s performance. Today, a large library of fundamental factors exists. It’s helpful to categorize these factors to understand the landscape. The following taxonomy is not meant to be absolute or exhaustive, but should help.

Statistical/Technical Factors
In contrast to Fundamental factors, Statistical/Technical factors are based more on statistics and price movement. Statistical factors are usually derived by statistical analysis of historical returns (e.g., principal component analysis on a group of stocks) and aren’t necessarily based on financial theory, which makes them non-intuitive and harder to justify. Technical factors are based on “market internals” such as volume, price, momentum, and flow metrics.

Common Pitfalls
A portfolio manager can’t simply combine factors without considering their interaction. It takes rigorous analysis to identify complementary factors while avoiding multicollinearity and spurious relationships. Applying one or a few factors across sectors or industry groups might not be sophisticated enough to discern inefficient stock valuations within such peer groups. One should be careful in weighting factors with strong backtests, but that lack conceptual merit or factors with conceptual merit, but not statistical significance. In this regard, we favor the scientific method: Formulate a well-reasoned hypothesis supported by empirical evidence.

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2 “The arbitrage theory of capital asset pricing”, Ross 1976
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Definitions

**Backtest** is the process of applying a trading strategy or analytical method to historical data to see how accurately the strategy or method would have predicted actual results.

**Beta** is the measure of the volatility or systematic risk of a security or a portfolio in comparison to the market as a whole and is used in the capital asset pricing model (CAPM).

**Capital asset pricing model (CAPM)** describes the relationship between risk and expected return and is used in the pricing of risky securities.

**Multicollinearity (also collinearity)** in statistics, is a phenomenon in which one predictor variable in a multiple regression model can be linearly predicted from the others with a substantial degree of accuracy.

**Quantitative methods** emphasize objective measurements and the statistical, mathematical, or numerical analysis of data collected through polls, questionnaires, and surveys, or by manipulating pre-existing statistical data using computational techniques.