

BACKGROUND INFORMATION:

What are the main categories of risk we should be concerned about when making any financial investment?

- Systematic & Unsystematic risk
- Inflation risk
- Sentiment risk
- Interest Rate risk
- Credit risk
- Currency risk
- Liquidity risk
- Event risk
- Political risk
- Operational risk
- Relative risk
- Gearing risk
- Non-diversification risk

MACROECONOMIC FACTORS AND STYLE FACTORS

There are two main types of factors that have driven returns: macroeconomic factors, which capture broad risks across asset classes; and style factors, which help to explain returns and risk within asset classes.

Macroeconomic factors:

1. Economic growth: Exposure to the business cycle
2. Real rates: The risk of interest-rate movements
3. Inflation: Exposure to changes in prices
4. Credit: Default risk from lending to companies
5. Emerging markets: Political and sovereign risks
6. Liquidity: Holding illiquid assets.

Style factors:

1. Value: Relatively inexpensive stocks. Captures excess returns to stocks that have low prices relative to their fundamental value
2. Low size (small cap): smaller companies. Captures excess returns of smaller firms (by market capitalization) relative to their larger counterparts
3. Momentum: rising stocks. Reflects excess returns to stocks with stronger past performance
4. Low volatility: lower risk stocks. Captures excess returns to stocks with lower than average volatility, beta, and/or idiosyncratic risk.
5. Dividend yield: cash flow paid out. Captures excess returns to stocks that have higher-than-average dividend yields
6. Quality: sound balance sheet stocks. Captures excess returns to stocks that are characterized by low debt, stable earnings growth, and other “quality” metrics
7. Growth: Measure of change in sales and earnings. Measures company growth prospects using historical earnings, sales and predicted earnings
8. Liquidity: Size-adjusted trading volume. Captures common variations in stock trading volumes relative to available shares trading.

SYSTEMATIC VERSUS IDIOSYNCRATIC RISK:

An investment's systematic risk is far more important than its unsystematic risk.

If the risk of an investment comes mainly from unsystematic risk, the investment will tend to have a low correlation with the returns of most of the other stocks in the portfolio, and will make a minor contribution to the portfolio's overall risk.

Diversification and Systematic Risk:

Systematic or non-diversifiable risk is not reduced even as we increase the number of stocks in the portfolio.

Systematic sources of risk (such as inflation, war, interest rates) are common to most investments resulting in a perfect positive correlation and no diversification benefit.

Large portfolios will not be affected by unsystematic risk but will be influenced by systematic risk factors.

LIMITATIONS OF MARKOWITZ PORTFOLIO OPTIMIZATION:

1. Too many inputs required

It Limit use to asset allocation or small-scale problems

2. Use of estimates can lead to “error maximization”

It Introduce additional “hard” constraints in optimization process. We need to Use “portfolio resampling” to find average optimal portfolio given range of possible estimates.

3. Reliance on historical data to obtain estimates

True parameters not only never known, but also not constant over time.

CAPM AND ARBITRAGE PRICING THEORY:

In the CAPM theory, the expected return on a stock can be described by the movement of that stock relative to the rest of the market. The CAPM is really just a simplified version of the APT, whereby the only factor considered is the risk of a particular stock relative to the rest of the market, as described by the stock's beta.

The problem with this is that the theory in itself provides no indication of what these factors are, so they need to be empirically determined. Obvious factors include economic growth and interest rates. For companies in some sectors other factors are obviously relevant as well - such as consumer spending for retailers.

The potentially large number of factors means more betas to be calculated. There is also no guarantee that all the relevant factors have been identified. This added complexity is the reason arbitrage pricing theory is far less widely used than CAPM.

MULTI FACTOR INVESTING MODELS:

As noted above, we have many challenges for Factor Investing

Our objective is to survey, study, and examine various facets and provide better solutions to overcome the challenges in Factor investing.

OUR MOST IMPORTANT BASIS OF FACTOR ANALYSIS:

A matrix that is factorable should include several sizable correlations.

If none of the correlations is significantly different from zero, then a parsimonious explanation CANNOT be found of the covariance structure and hence no factor analysis can be done.

Thus, if there are no correlations significantly different from zero, no interesting studies such as factor analysis etc. can be done on the variables.

In order to build a model for our favorite stock we will need to model supply, demand, sentiment, current and expected future earnings of the stock, news, interest rates, risk premium and many more and more. The list is literally endless. It's near impossible to calibrate such a complicated model! .This used to happen earlier and by using Factor Modeling we want to solve the problem of calibrating such a hugely complicated model as discussed.

Instead, factor investors assume that there are N numbers of important factors that drive a portion of the asset returns. They then say that at the portfolio level, asset specific movements can be averaged out, and only those N variables remain. Thus, to understand what drives the portfolio returns we only need to model the effect of that small number of factors.