Dimensionality Reduction and Factor modelling

Luiza Miranyan
Bloomberg - NY

Linear multifactor models are of great importance to portfolio construction and risk management: they allow the market dimensionality reduction, which has numerous useful implications. Particularly, linear factor models reduce dimensionality of covariance matrix needed to analyze large portfolios. Also they allow the identification of each factor`s contribution to the portfolio performance which results in intuitive performance attribution.

Three major types of models will be discussed: fundamental, econometric and statistical, along with practical issues (availability and quality of the market data), mathematical issues such as estimating the factor covariance matrix ensuring its stability over time while maintaining its responsiveness, measuring the quality of the model and much more.
Factor modeling keywords: time-series and cross-sectional factor models, CAPM, APT, principal components analysis, random matrix theory