Quantitative Methods in Asset Allocation

Program Description: This training covers the latest trends in portfolio construction and asset allocation, putting them in context of 50 years of modern portfolio theory and practice. The approach of this course is top-down and practical, providing guidance for practitioners how to take their asset allocation activities one step further and delivering valuable insights for potential practical implementation of more advanced quantitative techniques. The program is designed to accommodate plenum discussions and features concept applications in six group exercises.

Target Audience: chief investment officers, quantitative analysts, investment committee members, senior management, investment analysts, portfolio managers

Materials: Participants will receive a) the slides presented as a PD, b) access to spreadsheets containing example calculations for all models and concepts discussed, c) a large collection of PDF papers and texts for further reading after the course, d) our Excel XLL add-in "Advanced Portfolio Analytics Library" free of charge during and after the course for educational purposes.

Delivery: Online, 6 sessions 2pm-6pm (UTC+2, Switzerland Time Zone)

Pricing: 2900 CHF per participant, 10% discount for two and more participants of the same institution.

Content:

Welcome and Introduction

- Contemporary Challenges
  - Financial Crisis of 2008
  - Low-Yield Environment
  - Coronavirus Pandemic of 2020

Review of Modern Portfolio Theory (MPT) & Going Beyond MPT

- From Mean-Variance Optimization to the CAPM: A quick summary of MPT
- Applications of MPT
  - Active Management
  - Liability-Aware Portfolio Construction
  - Asset Class Investing
  - "Passive" Investing
  - Core-Satellite Approaches
- Critical Assessment and Constructive Take-Aways from MPT
- Framework for Going "Beyond MPT"
  - The case for adaptive asset allocation in a dynamic world which is hard to forecast
  - Industry Trends: Factor Investing and Smart Beta

Expected Returns

- The importance of expected return in portfolio construction and challenges: estimation risk
- Do optimizers need expected returns? Spoiler alert: no, they don't
- Approaches to forecasting expected returns
  - Scenario-based methods: Markov regime switching and practitioner's approaches
  - Deriving returns from scores and ranks
  - Building allocations from scores and ranks without optimizers
  - Incorporating active views: relative forecasts
  - Bayesian methods: the Black/Litterman model and noise filtering using shrinkage methods (James Stein estimator)

Risk-Based Investment Strategies & Estimating Risk

- Risk-based approaches to investing: minimum variance, risk parity, risk budgeting, equal-weighting, maximum diversification
- Drivers of success of risk-based strategies
- ML (machine learning) & AI (artificial intelligence)
  - Waterfall allocations based on hierarchical clustering
  - Hierarchical risk parity
  - Some general comments on ML, AI in portfolio construction
- Time-varying risk characteristics, empirical risk anomalies
  - Autocorrelation and volatility clustering, GARCH models
  - The positive relationship between equity risk and return over time
  - The relative importance of volatilities and correlations
- Estimation of the covariance matrix
  - Sample covariances, EWMA and GARCH estimators
  - Bayesian shrinkage estimators: Ledoit-Wolf
  - Filtering noise in covariances: Random Matrix Theory
  - Modelling and tweaking correlations: consistency issues & solutions, correlation scenarios and stress testing

Estimation Risk and Estimation Risk Management

- Estimation risk as risk in input parameters
- A scenario-based approach to estimation risk management
- The stochastic nature of efficient frontiers: confidence bands, the Resampled Efficient Frontier™
- Distortions in risk and return estimates: the impact of liquidity and survival biases, statistical unsmoothing approaches, evidence-based multiplier approaches
- Framework for an estimation-risk-aware mean-variance portfolio construction process
- Robust portfolio construction: modelling uncertainty, regret minimization

Portfolio Construction Beyond Mean and Variance

- Risk measurement for non-normal assets: LPM/UPM, VaR/CVaR, Drawdown risk

- Higher Moments: interpretation, uses and challenges
- Behavioural portfolio construction: implementing insights from Prospect Theory
- CVaR and LPM optimization: exact methods and approximations
- Understanding optimization algorithms: threshold accepting, simulated annealing, evolutionary methods
- The many uses of random portfolios
- Multi-criteria optimization: case study calculating sustainability-efficient portfolios and frontiers

Tail Risk Management

- The two types of normal distribution assumptions in Finance
- Interesting non-normal distributions: non-normal mixture, NIG and Cornish-Fischer distributions
- Non-Normal Risk Budgeting based on Modified VaR/CVaR
- Building non-normal portfolios from elliptical distributions
- Drawdown Risk Management
    - Tail risk versus drawdown risk
    - CPPI 2.0

Diversification in a Non-Normal and Non-Linear World

- Diversification is more than correlation: overdiversification, diworsification
- Taking into account correlation asymmetries in portfolio construction: a closer look at equities, bonds and gold
- Non-linear correlation measures and their limitations: the case of the Spearman rank correlation coefficient
- Introduction to Copula Theory: potential and current limitations

Summary & Outlook