

Two Day Course Outline on Advance Econometrics

For whom:

- Finance professionals
- Risk professionals
- Treasury managers
- Consultants/ researchers

Day 1: Portfolio Optimization

Session 1:

- Optimization: overview & types
- Linear programming: simplex & interiorpoint methods
- Quadratic programming
- Application in finance
- Return measure: log price relatives
- Risk measure: volatility of log price relatives

Session 2:

- Systematic and idiosyncratic risk; diversification
- Portfolio math
- Optimal portfolio & efficiency frontier
- Efficiency frontier with multi-asset portfolio
- Risk-free asset, Tobin's separation theorem, CML
- CAPM, SML and market portfolio

Session 3:

- Estimation of alpha & beta
- Equity beta vs. asset beta, effect of leverage
- EXCEL EXERCISES
- Risk, return calcs
- Efficiency frontier
- SML and CML
- Beta calculations
- Forecasting future price from CAPM
- QP for multi-asset constrained port optimization

Session 4: Forecasting

- Overview of forecasting methods
- Soft data methods: delphi, heuristic, simulation
- Hard data methods: time series, cross sectional
- Time series analysis: trend, seasonality, cyclical, randomness
- Autocorrelation, heteroscedasticity, multicollinearity
- MA, ESMA, ARCH, GARCH and its variations

Day 2 : Forecasting

Session 5:

- Multivariate GARCH, state space model
- Regression: linear and non-linear
- Logistic regression
- Factor analysis/PCA
- Discriminant analysis

Session 6:

- Application in finance
- Volatility forecasting
- EXCEL EXERCISES
- Volatility forecasting through various ARCH/GARCH models
- OLS regression
- Random numbers
- Random walk, Weiner process, marko property

Session 7:

- Geometric and arithmetic Brownian motion
- Forecast of future price
- Quasi random sampling
- Standard error and statistical inference
- Application to finance

Session 8:

- Forecast of future price
- Option pricing
- EXCEL EXERCISES
- Simulation of random numbers GBM and future price forecast
- Pricing Eu and Am options with control variate technique