Collegio Carlo Alberto — Master of Finance
Portfolio Choice and Asset Pricing

Syllabus

Prof. Matthijs Breugem
Setup

- The course consists of 30 hours of lectures
- Teaching style: Introduction of new theory is alternated with in-class exercises to facilitate immediate understanding of the concept.
- Students should bring a laptop with Excel (or comparable software)

Grading

- Class participation: 3 points
- Homework set: 10 points
  - To be submitted in groups of 2-3 students
- Final Exam: 20 points
  - Individual, closed book
  - One A4 handwritten “cheat sheet” allowed
  - Duration: two hours

Content

- Lectures 1-4: Arbitrage-free markets and pricing by replication
  - Basic model of financial markets
  - Futures and options
  - Complete and incomplete markets
  - Law of one price and pricing by replication
  - Exploiting arbitrage opportunities
  - First fundamental theorem of asset pricing
  - Second fundamental theorem of asset pricing
  - Pricing kernel and risk-neutral pricing
  - Pricing on a binomial tree
  - Examples: pricing American options and convertible bonds
  - Case study 1: valuation of an executive stock options package

- Lectures 5-7: Modern portfolio theory
  - Lotteries and risk-aversion
  - Mean-variance preferences
  - Mean-variance portfolio optimization with a single and multiple risky assets
  - Mean-variance portfolio optimization without riskless asset
  - Minimum variance portfolio, capital allocation line, efficient frontier
  - CAPM (derivation and interpretation)
– Empirical test of CAPM
– Case study 2: CAPM and the cost of capital
– Pricing kernel consistent with mean-variance optimization
– Roll’s Critique

• Lecture 8: Multi-Factor Models
  – Parameters to estimate a factor models
  – Macro, fundamental and statistical factors
  – Fama-French 3-Factor model
  – Interpretation of factor models
  – Smart beta
  – 1-Factor CAPM data mining exercise

• Lecture 9-10: Consumption-based Asset Pricing
  – Utility theory and (Arrow-Pratt) risk aversion
  – Static portfolio optimization in complete and incomplete markets
  – Dynamic portfolio optimization in complete and incomplete markets
  – Dynamic Asset Pricing in complete and incomplete markets
  – Consumption CAPM
  – Equity Premium Puzzle

Prerequisite Knowledge and Skills

• Basic Linear Algebra
  – Elementary matrix and vector operations

• Statistics and Probability
  – Expected value, Variance and Covariance
  – Multivariate Gaussian Distribution

• Excel (or comparable spreadsheet program)
  – Basic operations
  – VBA is not required
  – The use of Matlab or other languages is allowed

Related Textbooks