

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

- Cochrane (2010): “Asset Pricing”. ISBN: 978-8122431247
- Ang (2014): “Asset Management”. ISBN: 978-0199959327
- Pedersen (2015): “Efficiently Inefficient”. ISBN: 978-0691166193