

F400 – Asset Pricing

Outline: The topics to be covered are:

1. Basic Concepts:
 - a) Absolute Risk Aversion
 - b) Relative Risk Aversion
 - c) Certainty Equivalence
2. Portfolio Analysis
3. The Capital Asset Pricing Model (CAPM)
4. Static Equilibrium Asset Pricing:
 - a) The Stock-Market Economy
 - b) Arrow-Debreu Securities
 - c) State Prices
 - d) Risk-Neutral Pricing
 - e) Consumption-Based Capital-Asset Pricing (CCAPM)
5. Dynamic Equilibrium Asset Pricing:
 - a) The Multiperiod Model
 - b) Dynamic Completeness
 - c) Risk-Neutral Pricing(d) Stochastic Discount Factor
6. Static Arbitrage Pricing:
 - a) Using Options to Increase the Asset Span
 - b) Butterfly Spreads
 - c) Arbitrage
 - d) The Law of One Price
7. Dynamic Arbitrage Pricing:
 - a) The Binomial Model
 - b) Arbitrage
 - c) European Call Options
8. Stochastic Calculus:
 - a) Wiener Process
 - b) The Wiener Process as a Limit of Random Walks

- c) Stochastic Differential Equations
 - d) Itô's Lemma
 - e) Geometric Wiener Process
 - f) Expected Discounted Values and Partial Differential Equations
9. The Black-Scholes Model:
- a) The Black-Scholes Equation
 - b) Forward Contracts
 - c) European Call Options
 - d) European Put Options
 - e) The Greeks
10. Exotic Options:
- a) American Options
 - b) Barrier Options
 - c) Lookback Options
 - d) Asian Options
11. Term Structure and Interest Rates:
- a) Models of Bond Prices
 - b) One-Factor Equilibrium Models
 - c) Models of the Affine Class
 - d) Vasicek Model
 - e) Cox-Ingersoll-Ross Model
 - f) Heath-Jarrow-Morton Model

Background Reading:

For those with less of a financial background, the early chapters of

- Hull, J.C.: "Options, Futures and Other Derivatives", any recent edition (e.g. 7th, 8th or 9th) may be helpful. For those with less of a mathematical background, the early chapters of
- Björk, Tomas (2009): "Arbitrage Theory in Continuous Time", any recent edition (e.g. 2nd or 3rd) would be useful preparation for the main course.

Main Textbooks for the Course:

The main textbooks for the course will be:

- Danthine, Jean-Pierre and Donaldson, John B. (2005): "Intermediate Financial Theory", 2nd edition, Academic Press. Chapters 1-13.

- Björk, Tomas (2009): “Arbitrage Theory in Continuous Time”, 3rd edition, Oxford University Press. For the applications, we will focus mainly on Chapters 7 (Arbitrage Pricing), 9 (Parity Relations and Delta Hedging), 16 (Dividends), 18 (Barrier Options), 22 (Bonds and Interest Rates), 23 (Short-Rate Models), 24 (Martingale Models for the Short Rate), 25 (Forward Rates). However, many students will want to refer back to some of the preceding chapters as the need arises.