Course Objectives

This course covers equilibrium and no-arbitrage asset pricing in discrete and continuous time. We will derive classic results in asset pricing theory, including the Capital Asset Pricing Model, Arbitrage Pricing Theory, Merton’s continuous time model, the CIR model, the Black-Scholes model, and rational expectations equilibrium models. The course will emphasize fundamental theory in order to prepare you to do research in financial economics. The focus will be models with symmetric information; models with asymmetric information will be introduced if time permits.

Reference Texts


Course Requirements

Problem sets will be distributed approximately every two weeks. Each individual should work on the assignments independently. There will also be a midterm exam and a final exam (3 hours, closed book, closed notes). The homework assignments determine 30% of the course grade; the remaining 70% is based on the exams (equal weights).


**Topics:**
The following is a list of topics that will be covered in the course along with the associated reading assignments.

Week 1, January 21
Course Organization and Introduction

Week 2, January 28
Martingale Pricing in the Single-Period Setting
- State contingent and Arrow-Debreu securities
- Arbitrage opportunity
- Complete markets
- Risk-neutral pricing

Cochrane, Chap. 3; Ingersoll, Chap. 1, 2

Week 3, February 4
Martingale Pricing in the Multi-Period Setting
- Relationship among no arbitrage, state prices, and equilibrium

Cochrane, Chap. 4; Huang and Litzenberger, Chap. 5, 6, and 7

Week 4, February 11
The Lucas Model and the Stochastic Discount Factor Model
- An investor’s problem and first order condition
- Relation to state preference theory
- Introducing the concept of stochastic discount factor
- The equilibrium solution and return distribution
- The equity premium implications

Cochrane, Chap. 1.1-1.2, 2.2-2.4, 21; Ingersoll, Chap. 10 and 11


Week 5, February 18
The Mean-variance Frontier and the Capital Asset Pricing Model (CAPM)
- Mathematics of the portfolio frontier
- Properties of frontier portfolios
Consistency with alternative assumptions
The Hansen-Jagannathan bound
The Sharpe-Lintner CAPM
The Black version of the CAPM

Cochrane, Chap. 5, 9.1,20.2; Huang and Litzenberger, Chap. 3 and 4
Ingersoll, Chap. 3 and 4


Week 6, February 25
The Arbitrage Pricing Theory (APT)
Pricing with zero residual risk
Asymptotic arbitrage
Bounding the error in the APT
CAPM v.s. APT
Issues related to extracting factors

Cochrane, Chap. 9.4; Ingersoll, Chap. 2 and 7


Week 7, March 4, — Midterm exam (3hr in class)

Week 8, March 11
Log-linearization Approach and Continuous Time Mathematics
Cochrane, Appendix; Ingersoll, Chap. 12 and 16


Week 9, March 25
The Intertemporal Capital Asset Pricing Model
The Merton model
The continuous time CAPM
A multi-beta pricing model
The Breeden’s consumption CAPM

Cochrane, Chap. 9.2; Ingersoll, Chap. 13 and 15


Week 10, April 1
The Black--Scholes Option Pricing Model
Black-Scholes derivation
An alternative approach
Equivalent Martingale measure
Solving Black-Scholes using Martingale approach

Cochrane, Chap. 17 and 18; Ingersoll, Chap. 14


Week 11, April 8
The Term Structure Model
An equilibrium model
The CIR term structure model
Affine term structure models
The equivalent Martingale approach

Cochrane, Chap. 19; Ingersoll, Chap. 18
Week 12, April 15
Rational Expectations and Informational Role of Prices

Week 13, April 22
Noisy Rational Expectations and Information Acquisitions

Week 14, April 29 — Final exam (3hr in class)