Syllabus

15.472 Advanced Asset Pricing

This course focuses on theoretical and empirical tools and results in macro-finance, asset pricing, and portfolio choice. The lectures will be a blend of theory, econometric and computational methods, and a critical review of empirical studies. The course will cover topics that include cross-sectional and time-series models in asset pricing; consumption-based models; heterogeneous agent models; intermediary asset pricing; liquidity and asset prices; and an introduction to continuous-time finance. Please see “Course Schedule and Readings” for the precise topics to be covered in the course this year. The course is designed to jump-start PhD dissertations; there is no final exam, but there is a term paper with a presentation requirement, and graded assignments.

Class Schedule
The class meets twice per week: Tues. and Thurs. 2:30 – 4:00pm, E62-687.

Recitations
The TA will hold recitations where class material will be reviewed and additional applications and exercises presented. The TA is J.R. Scott justinsc@mit.edu. Recitation sessions will take place on Mondays 6:00 – 7:30pm in E51-372.

Course Website
The course website is on Canvas (https://canvas.mit.edu/courses/9800 and all teaching materials and class announcements will be posted no this site. In addition, class announcements will be posted there.

Office Hours
Daniel Greenwald: Flexibly by appointment, set up by email
Eben Lazarus: Thursday 4:00 – 5:30pm in E62-633 or by appointment
Deborah Lucas: Flexibly by appointment, set up by email

Administrative Assistant
Ann Johnston, E62-671, ajohns@mit.edu, phone: 617-715-4178
Prerequisites
This course is intended for M.I.T. finance and economics Ph.D. students. The students who are taking this course should have already taken econometrics, microeconomics and introductory financial economics. In particular, we will assume familiarity with large-sample theory for least-squares, generalized method of moments, and maximum likelihood estimation methods. Knowledge of macroeconomics will be helpful but not required. The computational assignments can be done in Matlab, Python, R or Julia. Using alternative programming languages may be allowed by request.

Course Requirements and Grading
There is no final exam. The following weighting scheme will be used to determine each student’s course grade:
- Regular attendance and class participation: 20%.
- Homework assignments: 40%.
- Research note/paper: 40%. (Proposal due November 4; paper due on December 7; in-class presentations December 9.)

Course Materials
Class Notes, Problem Sets, and Recitation Notes: These will be available on the course website.

Textbook: The recommended textbooks for this course are


In addition, the classes will cover journal articles that are listed below with the individual classes. These will be subject to revision.

Sloan Values
You are responsible for upholding Sloan’s code of conduct, which mandates zero tolerance for cheating and plagiarism. For more details on Sloan’s academic policies, please read the document “Classroom Values in Practice,” which is available on the course website.
Course Schedule

This is an approximate schedule for the course; some material may take longer or shorter to cover than the time allotted.

Week 1: Introduction and Stylized Facts (9/9)
Instructors: Greenwald, Lazarus, Lucas
Topics: Overview of course objectives; time-series and cross-sectional stylized facts; review of Euler Equations, discount rates, APT and role of models.

Readings:
- Optional: Cochrane (Chapters 3, 4, 5, and 6 for review), Goyal and Welch (2008), Brunermeier et. al. (2021), Campbell (2003) handbook article on consumption-based pricing, panel discussion at the fall 2019 NBER AP meeting on the present and future of AP (https://doi.org/10.1093/rfs/hhaa129).

Week 2: Overview of Representative Agent Consumption-Based Asset Pricing (9/14 & 9/16)
Instructor: Deborah Lucas
Topic: Consumption-CAPM, puzzles, habits, and long-run risks part 1

Readings:
- Required: Cochrane (Chapter 2, 9.1), Campbell (Chapter 6), Parker and Julliard (2005), Bansal, Kiku, and Yaron (2012), Benzoni, Collin Defresne, and Goldstein (2007)
- Recommended: Campbell and Cochrane (1999), Lettau and Ludvigson (2009)

Week 3: Representative Agent Models continued, and Intro to Heterogeneous Agent Models (9/21 & 9/23)
ASSIGNMENT 1, DUE 9/30
Instructor: Deborah Lucas
Topic: More on long-run risk; disasters; beliefs; sources of heterogeneity

Readings:
Week 4: Heterogeneous Agents, continued; Liquidity (9/28 & 9/30)

Instructor: Deborah Lucas

Topics: limited participation; implications for portfolio choice and asset pricing; aggregation revisited

Readings:
- Required: Campbell 10.1, 10.2; 11.1, 11.2

Week 5: Liquidity continued, and Institutional Asset Pricing (10/5 & 10/7)

ASSIGNMENT 2 DUE 10/14

Instructor: Deborah Lucas

Topic: Trading costs, asymmetric information; heterogeneous beliefs; financial institutions and asset prices; collateral & endogenous liquidity; liquidity in fixed income markets; microstructure

Readings:
- Required: Campbell (chapter 11.3, 11.4); Campbell (Chapter 12); Berk and Green (2004)
- Recommended: Berk and van Binsbergen (2017); Parker, Schoar, and Sun (2020)

Week 6: Computational Methods 10/12 & 10/14

Instructor: Daniel Greenwald


Readings:
Week 7: Term Structure Models 10/19 & 10/21

Instructor: Daniel Greenwald

Topic: Term structure models in discrete time

Readings:
- Recommended: Lettau and Wachter (2011).

Week 8: Estimation (I/II) --- 10/26 & 10/28

Assignment 3 Due 10/28

Instructor: Daniel Greenwald

Topic: GMM for cross-sectional asset pricing

Readings:
- Required: Cochrane (Chapters 10 and 11)

Week 9: Estimation (II/II) 11/2 & 11/4

Paper Proposal Due 11/4

Instructor: Daniel Greenwald

Topic: Cross-sectional asset pricing tests, estimation of linear factor models, cointegration, false discovery rate control

Readings:
- Required: Cochrane (Chapters 12 and 13)

Week 10: Asset Pricing in Continuous Time (I/III) 11/9

Instructor: Eben Lazarus

Topics: Introduction to continuous-time mathematics and methods

Readings:
Week 11: Asset Pricing in Continuous Time (II/III) 11/16 & 11/18

ASSIGNMENT 4 DUE 11/16

Instructor: Eben Lazarus

Topics: Arbitrage and martingales, Black-Scholes, portfolio choice

Readings:

Week 12: Asset Pricing in Continuous Time (III/III) 11/23

Instructor: Eben Lazarus

Topics: Incomplete markets and applications

Readings:
- Required: He and Krishnamurthy (2013), Brunnermeier and Sannikov (2014)

Week 13: More Continuous Time, with Recent Advances and Applications (I/II) 11/30 & 12/2

ASSIGNMENT 5 DUE 11/30

Instructor: Eben Lazarus

Topics: Intermediary pricing, belief heterogeneity, learning and asymmetric information

Readings:
Week 14: Recent Theoretical Advances and Applications (II/II) 12/7

Instructor: Eben Lazarus

Topics: Risky term structures, derivatives, wrap-up

Readings:

- Recommended: Cochrane (2021), Gormsen and Lazarus (2021), Kogan and Papanikolaou (2012), Brunnermeier et al. (2021)

Paper/note due December 7

Last class, December 9: Students’ Research Presentations