Advanced Topics in Macroeconomics

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Fall 2025

Information

Timing: 2025 Fall Semester

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Office hours: by appointment

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Web: Moodle

Goals

The purpose of the course is to acquaint students with advanced methods in macroeconomic analysis. These include the use of dynamic programming to solve macro models, and adding meaningful household heterogeneity to the baseline stochastic growth model. Programming is an integral part of the macro toolkit, and we will use Matlab and Julia for this purpose. Familiarity with the basic Real Business Cycle model, its log-linear representation and Dynare is assumed.

Readings

A very useful and detailed textbook (still not quite finished) is here. Detailed descriptions for the Aiyagari model can be found online, for example here. Classical reference books are Stokey-Lucas: Recursive Methods in Economic Dynamics, and Sargent-Ljungquist: Recursive Macroeconomic Theory. I will use a mixture of slides and whiteboard derivations, accompanied by lecture notes. These will be made available on Moodle.

Grading

Grading will be based on 4 homework assignments (50%) and a final exam (40%). Homework should be solved in groups of three, with only one solution submitted per group. Classroom participation and activity will also be taken into account (10%). Grades will be given according to the following scale: 86-100% = 5, 75-85% = 4, 64-74% = 3, 51-63% = 2.

Lectures

Week	Lecture	Topic
1	09/15	The neoclassical growth model: a recap
2	09/22	Dynamic programming: theory
3	09/29	Dynamic programming: computation
4	10/06	Stochastic dynamic programming
5	10/13	Equilibrium and market completeness
6	10/20	Asset pricing
7	11/03	The equity premium puzzle
8	11/10	Incomplete markets with two types
9	11/17	The Aiyagari model: theory
10	11/24	The Aiyagari model: computation
11	12/01	The Krusell-Smith model
12	12/08	Frictional labor markets

Detailed breakdown

1. The neoclassical growth model (1 lecture)
   (a) The sequence approach
   (b) Policy functions
   (c) Log-linear solution
2. Dynamic programming: theory and practice (3 lectures)
   (a) Stationarity
   (b) The value function and the Bellman equation
   (c) The fundamental theorem
   (d) Value function iteration
   (e) Computation: discrete dynamic programming
   (f) Stochastic dynamic programming
3. Competitive equilibrium
   (a) Arrow-Debreu and sequential markets
   (b) Market completeness
   (c) Asset pricing in complete markets
   (d) The Equity Premium Puzzle
4. Heterogeneity and inequality
   (a) Two-agent models
   (b) The Aiyagari model: theory
   (c) Aiyagari: computation

(d) Krusell-Smith: aggregate shocks

5. Frictional labor markets