Martin Schneider & Chris Tonetti

This course is about heterogeneous agent models in macro and finance. The first half introduces tools needed to compute and quantify such models. We start with single agent problems (savings/investment & portfolio subject to frictions) and then cover equilibrium models in which the agents interact. In the second half of the course, we discuss recent research and assist students on their original research.

Requirements

- There are 4 computational problem sets, assigned during weeks 2–7. The problem sets ask you to write code to solve canonical problems using common data sets that appear in many applications. The idea is that you will then have working code and familiarity with data that can be adapted to solve problems you encounter in your original research.
- There will be assigned readings. These readings will highlight how topics recently taught in class are used in current research. Students may be asked to present short (5 minute) presentations on the assigned papers.
- There is a course project:
  - by week 3, we would like one written paragraph on a general topic that you find interesting and that you might like to focus on for your course project; we can then point you to relevant literature.
  - by week 4, we would like a 1 page written outline of a specific problem that you find interesting and that can be tackled using the tools learned in the course.
  - in week 5 we will meet individually with students instead of meeting together as a class. Students will present their research proposal, and we will discuss the project and plan a course of action.
  - in week 10, we will have presentations of the course projects.
- In week 8–9, we will discuss recent papers at the research frontier. Topics will be determined in part by students' interests.
- Both problem sets and the course project may be done in groups of up to three people.

Course plan (10 weeks)

1. Macro/Finance with Heterogeneous Agents Overview
   - why use heterogeneous agent models?
   - optimal choice models
   - research areas: households, firms, investors
   - research strategies
2. Consumption & Saving with Labor Income Risk
   ("one tradable riskless asset, one nontradable asset")
   - data on household income & time series models
   - properties of behavior in simple consumption-saving problems
   - role of borrowing constraints
   - numerical methods for computing solutions to the income fluctuation problem

3. Portfolio Choice
   ("many tradable assets")
   - data on asset returns & time series models
   - computation of portfolio problems
   - role of non-separable preferences
4. Consumption, Savings & Portfolio Choice
   ("combining 2. and 3.")
   - data on household wealth positions, institutions' holdings
   - problems with multiple risks & various constraints
   - interaction of risk & tradability, collateral constraints
   - matching models and data
   - how to analyze and present results
5. Individual Meetings to Discuss Course Project
6. Equilibrium in Incomplete Market Economies
   - Aiyagari: Income fluctuation problem, aggregate production function, equilibrium in asset markets
   - Stationary recursive rational expectations equilibrium: existence, uniqueness
   - Computing an equilibrium and calibration
   - Applications: taxes—insurance vs. efficiency; government debt
   - Transition dynamics
   - Welfare
7. Equilibrium with Aggregate Risk
   - Krusell-Smith: Aiyagari + stochastic aggregate productivity
   - Computing an approximate equilibrium / accuracy of approximations
   - Near aggregation
8. Topics on Single Agent Models. E.g.,
   - housing (transaction costs, indivisibility, nontradable dividends)
   - entrepreneurial firms & financing constraints
   - non-standard preferences—model and measurement
9. Topics on Equilibrium Models. E.g.,
   - asset pricing
   - international capital flows
   - financial intermediaries
10. Presentation of course projects