EUI Doctoral Program in Economics 2019
Quantitative Methods for Heterogenous Agent Economies

Syllabus

Kurt Mitman

Contact: kurt.mitman@iies.su.se

Aim of the course: The goal of the course is to equip you with the necessary tools to answer interesting questions at the frontier of Quantitative Macroeconomics, with a particular focus on solving and analysing heterogenous-agent general equilibrium frameworks. The first part of the course will focus on numerical methods for computing economic models on the computer. The second part will be to consider some frontier applications of these methods to interesting economic questions. The course will assume that students have working knowledge of a programming language (e.g. Matlab, Fortran, Python, Julia, C/C++, etc), or will teach themselves one over the course.

Office hours: By appointment

Assessment: The assessment with be a final project that will test both students knowledge of computation and economics. The assignment will be due by email to kurt.mitman@iies.su.se by 23:59 Florence time, April 6, 2019.

Course Outline

1. Introduction to Quantitative Macro
2. Basic Numerical Methods
    - Basics of numerical analysis, differentiation and root-finding
    - Optimization, numerical integration, quadrature
3. Numerical Dynamic Programming
    - Value function iteration: discretization and approximations
    - Pertubation methods
    - Projection methods

4. Numerical Representation of Distributions
5. Computation of Stationary Equilibria in Incomplete Markets Models
6. Computation of Equilibrium in the Aiyagari model with Aggregate Shocks
7. Computation of transition dynamics, application to models with aggregate risk a la Boppart, Krusell and Mitman
8. AiyaGalí - heterogenous-agent models with nominal rigidities