

RoME: Dynamic Macroeconomics

Syllabus

Sara Casella

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1 Course Description

This is a class on quantitative macroeconomics with heterogenous agents models. Heterogenous agents models can be used to analyze a wide range of questions related to the business cycle, income distribution, consumption insurance, labor supply, asset pricing, the effects of monetary and fiscal policy... In this class, you will learn how to solve numerically and analyze this important class of macroeconomic models. The aim is that at the end of the course you will be able to use these models and methods in your own research.

Assessment The grade will consist of three components: 10% problem sets, 60% final project, 30% exam. The problem sets and the final project will be applied problems requiring you to code. It is encouraged to work in teams, but each person must turn in their individual answer.

2 Lectures Plan

Solving household problems with liquidity constraints

Weeks 1-2: Introduction. We learn numerical techniques to solve a consumption and savings model with exogenously incomplete markets and liquidity constraints. We discuss life cycle models and infinite horizon models.

- Value and policy function iteration. Discretization; grid generation; quadrature; interpolation. Speeding up computations. The curse of dimensionality.
- Topics: the impact of aging on asset demand.

General equilibrium, transitions and welfare

Weeks 3-4: We analyze the equilibrium of heterogeneous agents models with incomplete markets. We learn how to compute the transitional dynamics and how to measure correctly the welfare changes associated to policy reforms.

- The Aiyagari model. Solving for the steady state. Unexpected aggregate shocks, impulse response functions, and transitional dynamics. Welfare analysis. Efficient computation of transition paths: the Sequence Space Jacobian.
- Topics: Wealth inequality and the amplification of recessions. Optimal progressive taxation.

Adding aggregate risk

Week 5: We extend the model to add aggregate fluctuations. We learn how to solve and use this model. We discuss recent advances in computational methods.

- Aggregate risk and keeping track of the wealth distribution. Boppart-Krusell-Mitman method to simulate economies with aggregate risk. Krusell-Smith method to simulate economies with aggregate risk. Overview of recent advances in computational methods.
- Topics: Earnings risk over the business cycle.

Data and Additional Topics

Week 6: We discuss calibration and estimation techniques. We illustrate how to use this class of models to analyze different questions. Topics will be chosen depending on the interests of the class.

- Possible topics: Fiscal and monetary policy with heterogeneous agents. Family decision making and intra-household allocations. The role of unemployment and social insurance programs in stabilizing aggregate demand and output. Firm dynamics and industry equilibrium. Endogenously incomplete markets and bankruptcy. Heterogeneous impact

of inflation. Optimal policies with heterogeneous agents.