Course: Social Insurance in Quantitative Macroeconomic Models with Heterogeneous Agents: Methods and Applications

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Term: Fall

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Office Hours: Upon request

Description:

This course guides you towards the techniques required to quantitatively address public finance research questions (mainly on social insurance) using modern techniques in quantitative (dynamic) macroeconomics. To set the stage, also in terms of notation and to provide an extreme benchmark case, we start by briefly discussing results in a perfect consumption insurance model. This provides the basis of a large literature on asset pricing, which is important to understand social insurance economics: the willingness to pay to avoid risk, or the excess return premium required on financial markets to compensate for holding risk, is closely related to the welfare benefits from being insured against risks. We then move on to solve household models in partial equilibrium, first using simple deterministic models followed by more complex stochastic applications. We will discuss (at least) two applications using these models. Finally, we will develop further into general equilibrium setups in models with idiosyncratic and, towards the end of the course, also aggregate risks. Those form the basis of many applications which we will discuss at the end of the course.

Outline:

The lecture will be based on my lecture notes “Heterogeneous Agent Models”, complemented by selected research papers.

A. Complete Markets and Consumption Insurance

Economics: Arrow Debreu versus sequential markets, perfect consumption insurance Techniques: Solution applying the Negishi method, handling micro data sets

Literature: Lecture Notes, Handouts.

B. Deterministic Multi-Period Life-Cycle Models

Economics: Endogenous labor supply responses over the life-cycle. Role of bequests for understanding life-cycle asset accumulation.

Techniques: Bridge recursive and sequential methods to implement in trivial numerical solutions. Simple univariate rootfinding problems.

Literature: Lecture Notes, Handouts.

C. Stochastic Multi-Period Life-Cycle Models

Economics: Precautionary savings, endogenous retirement decisions.

Techniques: Value function iterations, first-order methods with exogenous and endogenous grids, hybrid methods, discrete-continuous choice problems in a very simple environment with analytical and computational solutions. Comparison of methods.

Literature: Lecture Notes, handouts, selected papers.

D. Deterministic Multi-Period Overlapping Generations Models

Economics: Role of social security in deterministic environments, macroeconomic feedback. Techniques: Computational implementation of 1) steady state solution with rootfinding and fix point iterations., 2) simple calibration, 3) transitional dynamics (i) after unexpected policy reform with (ii) exogenous demographic transitions.

Literature: Lecture Notes, selected Papers.

E. Stochastic Two Period OLG Model

Economics: Precautionary savings, pecuniary externalities, social planner problem. Techniques: compare closed form analytical with computational solution; learn how to solve simple models with first-order iteration and value function iteration, including Howard's improvement algorithm.

Literature: Lecture Notes, selected papers.

F. Stochastic Multi-Period OLG Models with Idiosyncratic Risk

Economics: Aggregate effects of precautionary savings, endogenous retirement decisions, warm glow bequests and consequences for the equilibrium distribution of consumption and wealth.

Techniques: Combination of techniques in Section C and D.

Literature: Lecture Notes, handouts, selected papers.

G. Two-Period OLG Models with Aggregate and Idiosyncratic Risk

Economics: Welfare effects of social security / social insurance.

Techniques: Closed form solutions, comparison with Krusell-Smith method.

Literature: Lecture Notes, handouts, selected papers.

H. Multi-Period OLG Models with Aggregate and Idiosyncratic Risk

Economics: see part F.

Techniques: Krusell-Smith and, if time permits, other solution methods (Michael Reiter's method).

Literature: Lecture Notes, handouts, selected papers.

Various Applications

Grading:

6-7 Problem Sets (weight 50%), final project (weight 50%)