

Heterogeneous Agent Models in Macro

(Preliminary Syllabus)

AA 2023/2024

Prof. Luigi Paciello

Course objective: This course covers recent developments in the literature on heterogeneous-agent macroeconomics. The objective is twofold: 1) give you a solid understanding of the current state of the literature on macroeconomics with heterogeneous agents and, through this application, 2) introduce you to state-of-the-art solution methods for general equilibrium heterogeneous-agent models. The hope is to equip you with the necessary knowledge and tools to conduct your own research in the area.

On the methods side, we will cover the “continuous-time” approach to solving general equilibrium models with heterogeneous agents. We will go through the details of solving for steady states and impulse responses.

On the application side, we will cover models of heterogeneous firm dynamics with financial or labor market frictions.

Evaluation method: Take-home exam + homework

Week 1: The Tools

- Why continuous time?
- Continuous-time Bellman (HJB) and Kolmogorov Forward (KF) equations
- Textbook heterogeneous-agent model (Hopenhayn 1992)
- Numerical solution of HJB and KF equations
- Numerical solution of textbook heterogeneous-agent model

Resources:

- Candler (1999), “Finite-Difference Methods for Dynamic Programming Problems.” In Computational Methods for the Study of Dynamic Economies., ed. Ramon Marimon and Andrew Scott. Cambridge, England: Cambridge University Press.
- Kushner and Dupuis (1992), “Numerical Methods for Stochastic Control Problems in Continuous Time”, Springer New York
- Hopenhayn, Hugo A, 1992. "Entry, Exit, and Firm Dynamics in Long Run Equilibrium," *Econometrica*, Econometric Society, vol. 60(5),
- Moll, B. (2020). Hopenhayn model in continuous time. Available at <https://benjaminmoll.com/wp-content/uploads/2020/06/hopenhayn.pdf>.
- Sims (2001), “Solving Linear Rational Expectations Models”, *Computational Economics*
- Very useful resources: <https://benjaminmoll.com/codes/> , <https://quantecon.org/>

Week 2: Financial frictions

- Firm borrowing under limited commitment and limited liability
- Heterogeneous firm dynamics under limited commitment and limited liability
- Numerical solution of heterogeneous firm dynamics models with default
- On the optimality of subsidising firm investments and business entry

Resources:

- DeMarzo, P. M. and Z. He (2021). Leverage dynamics without commitment. *Journal of Finance* 76 (3),
- DeMarzo, P. M., Z. He, and F. Tourre (2023). Sovereign debt ratchets and welfare destruction. *Journal of Political Economy* (forthcoming).
- Crouzet, N. and F. Tourre (2021). Can the cure kill the patient? Corporate credit interventions and debt overhang. Available at https://www.kellogg.northwestern.edu/faculty/crouzet/html/papers/CreditInterventions_latest.pdf.
- Buera, F. J. (2009). A dynamic model of entrepreneurship with borrowing constraints: theory and evidence. *Annals of finance* 5,
- Aguiar, M. and M. Amador (2020). Self-fulfilling debt dilution: Maturity and multiplicity in debt models. *American Economic Review* 110 (9)
- Admati, A. R., P. M. Demarzo, M. F. Hellwig, and P. Pfleiderer (2018). The leverage ratchet effect. *Journal of Finance* 73 (1),
- Cuciniello, Michelacci, Paciello (2023) Subsidizing Business Entry in Competitive Credit Markets, CEPR WP

Week 3: Labor market frictions

- Search and matching frictions
- Firm dynamics with labor market frictions
- A GE model of equilibrium unemployment with micro-founded labor market dynamics
- The implications of labor market frictions for inflation

Resources:

- Bilal, A., Engbom, N., Mongey, S., & Violante, G. L. (2022). Firm and worker dynamics in a frictional labor market. *Econometrica*, 90(4), 1425-1462.
- MOSCARINI, GIUSEPPE, AND FABIEN POSTEL-VINAY (2013): "Stochastic Search Equilibrium," *Review of Economic Studies*, 80 (4), 1545–1581.
- MOSCARINI, GIUSEPPE, AND FABIEN POSTEL-VINAY (2016): "Did the Job Ladder Fail After the Great Recession?" *Journal of Labor Economics*, 34 (S1),
- POSTEL-VINAY, FABIEN, AND JEAN-MARC ROBIN (2002): "Equilibrium Wage Dispersion With Worker and Employer Heterogeneity," *Econometrica*, 70
- Blanco, J., Drenik, A., Moser, C., & Zaratiegui, E. (2023). A theory of non-coasean labor markets.