

Continuous-Time Heterogeneous-Agent Models: Inequality and Financial Stability

Graduate Center Short Course

Speaker: Christos Koulovatianos (Luxembourg School of Finance)

Date and Time: 12 - 16 June 2023, 10h-12h & 13h-15h
14 June for Revision & Short Assignment, not in-person.

Place: Karl Popper, Room No. 2.3.020, DIW, Mohrenstr. 58, 10117 Berlin

Aims

This four-day course aims at giving tools to students for entering the frontier of research regarding two new lines of research: (a) models of wealth-inequality determinants and dynamics, and (b) models of financial stability. The focus will be on presenting general-purpose analytical and computational techniques that enable students to replicate and extend frontier-research papers in these areas. The course will focus on wealth-inequality/household portfolio models and on theoretical models of credit cycles, models of inside-money and liquidity, and models connecting endogenous financial-stability risk with macroeconomic performance.

Learning Objectives

Upon successful completion of this course students will be able to:

- Translate discrete-time models into their continuous-time counterparts through the use of simple continuous-time stochastic calculus.
- Use and develop numerical techniques of dynamic optimization (Matlab) for solving continuous-time models for addressing Economics/Finance questions.
- Work independently in order to expand the research frontier of Heterogeneous Agent models and modern financial stability toward new research questions in economics and finance.
- Develop novel thinking about the interplay between financial intermediaries and the real economy, through using micro-founded models of asset pricing that allow for crisis/misallocation pricing.
- Develop new policy-evaluation tools.

Outline

- Lecture 1 – Revision of stochastic calculus (Brownian motions, Poisson processes, Kolmogorov forward/backward equations, Hamilton-Jacobi-Bellman equations), and introduction to the finite-differences method for solving dynamic stochastic optimization problems.
- Lecture 2 – Numerically solving Heterogeneous-Agent models of inequality and pushing them to the portfolio-choice and policy frontier.
- Lecture 3 – Understanding credit-cycle and inside-money models of financial intermediation in discrete and continuous-time.
- Lecture 4 – Numerically solving continuous-time credit-cycle and inside-money models with endogenous growth.

Teaching approach

Demonstration of algorithm formation and Matlab coding in the class. Slides and practice problem sets will serve as guides and computer codes will be analyzed and distributed. Some guidance on studying new literature will be provided.

About the instructor

Christos Koulovatianos completed his PhD at the University of Rochester in 1999. Before joining Luxembourg, Christos has worked as Associate Professor/Reader at the University of Nottingham, as Assistant Professor at the University of Vienna, as Visiting Professor at the Goethe University Frankfurt, and as Lecturer at the University of Cyprus, while he had shorter stays at the University of Kiel and Exeter Business School.

Christos' research interests lie in the intersection between Finance and micro-founded Macroeconomics. He works on asset pricing, household finance, fiscal policy with emphasis on taxation, on determinants of foreign direct investment and sovereign-bond returns, on dynamic games, growth models and resource economics. His work has been published in outlets such as the Review of Economics and Statistics, the Journal of Economic Theory, the Journal of Public Economics, the Review of Economic Dynamics, the European Economic Review and the Journal of Business and Economic Statistics.

For additional information about Christos, please visit his webpage:

www.sites.google.com/site/christoskoulovatianos/home

If you want to join this short course, please register with the Graduate Center on a first-come, first-served basis: gradcenter@diw.de