Heterogeneous Agent Models in Macro

AA 2023/2024

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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 or to be able to work in policy institutions interested in quantitative analysis of monetary and fiscal policies.

On the methods side, we will cover the "sequence-space" approach to solving general equilibrium models with heterogeneous agents. We will go through the details of solving for steady states and impulse responses, as well as estimation methods for standard models.

Evaluation method: In class exam + take-home

Prerequisites. Knowledge of dynamic programming with discrete time methods (Bellman Equation, Contraction Mapping Theorem, and Blackwell's Sufficient Conditions, Numerical methods). Familiarity with Matlab. Basic familiarity with Python is required (useful Python resources are provided below) to run pre-written algorithms.

Python preparation. If you are relatively new to Python, we recommend having the Anaconda distribution of Python installed to make sure you have all necessary libraries. There are many outstanding resources you can find online, but two good introductory resources are the introductory lecture series at QuantEcon and the Python data science handbook (ignoring the machine learning content in the latter). For the in-class tutorials, you will need SSJ installed on your laptop. You can install both via pip.

Week 1: The canonical RANK model

- Course Introduction
- The representative agent NK model (RANK)
- Linearization tools to solve RANK models
- Tutorial: The transmission of monetary and fiscal policy shocks in RANK

References

- Sims (2001), "Solving Linear Rational Expectations Models", Computational Economics volume 20, pages 1–20 (2002)

- Galì, J. (2015): Monetary Policy, Inflation, and the Business Cycle: An Introduction to the New Keynesian Framework and Its Applications (Second Ed.), Princeton
- Christiano, Lawrence J., Martin Eichenbaum, and Charles L. Evans. "Nominal rigidities and the dynamic effects of a shock to monetary policy." *Journal of political Economy* 113.1 (2005): 1-45

Week 2: The canonical HANK model

- The standard incomplete markets model and methods
- The canonical HANK model
- Fiscal policy in the canonical HANK model
- Tutorial: fiscal policy analysis

References

1. The standard incomplete markets model and methods
- Deaton, A. (1992). Understanding Consumption. Oxford University Press, USA
- Carroll, C.D. (1997). Buffer-Stock Saving and the Life Cycle/Permanent Income Hypothesis. Quarterly Journal of Economics 112(1):1–55
- Aiyagari, S.R. (1994). Uninsured Idiosyncratic Risk and Aggregate Saving. Quarterly Journal of Economics 109(3):659–684
- Kaplan, G. and Violante, G.L. (2022). The Marginal Propensity to Consume in Heterogeneous Agent Models. Annual Review of Economics 14(1):747–775

2. The canonical HANK model
- Auclert, A., Rognlie, M. and Straub, L. (2023c). The Intertemporal Keynesian Cross. Working Paper 25020, National Bureau of Economic Research,
- Werning, I. (2015). Incomplete Markets and Aggregate Demand. Working Paper 21448, National Bureau of Economic Research,

3. Fiscal policy in the canonical HANK model
- Woodford, M. (2011). Simple Analytics of the Government Expenditure Multiplier. American Economic Journal: Macroeconomics 3(1):1–35
- McKay, A. and Reis, R. (2016). The Role of Automatic Stabilizers in the U.S. Business Cycle. Econometrica 84(1):141–194
- Hagedorn, M., Manovskii, I. and Mitman, K. (2019). The Fiscal Multiplier. Working Paper 25571, National Bureau of Economic Research, 5

Week 3: Monetary policy and non-rational expectations

- Monetary policy in the canonical HANK model
- Information frictions in HANK
- Tutorial: Monetary policy analysis

References

1. Monetary policy in the canonical HANK model

- Auclert, A. (2019). Monetary Policy and the Redistribution Channel. American Economic Review 109(6):2333–2367
- Kaplan, G., Moll, B. and Violante, G.L. (2018). Monetary Policy According to HANK. American Economic Review 108(3):697–743
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- Bilbiie, F.O. (2021). Monetary Policy and Heterogeneity: An Analytical Framework. Manuscript
- Acharya, S. and Dogra, K. (2020). Understanding HANK: Insights From a PRANK. Econometrica 88(3):1113–1158
- Doepke, M. and Schneider, M. (2006). Inflation and the Redistribution of NominalWealth. Journal of Political Economy 114(6):1069–1097

2. Non-rational expectations in the sequence space

- Auclert, A., Rognlie, M. and Straub, L. (2020). Micro Jumps, Macro Humps: Monetary Policy and Business Cycles in an Estimated HANK Model. Working Paper 26647, National Bureau of Economic Research,
- Guerreiro, J. (2022). Belief Disagreement and Business Cycles. Manuscript
- Michelacci, Claudio, and Luigi Paciello. "Ambiguous policy announcements." *The Review of Economic Studies* 87.5 (2020): 2356-2398.
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