

Fiscal and Monetary Policy with Heterogeneous Agents

Adrien Auclert

KU Leuven Minicourse

May 19 and 22, 2023

Workshop objective: This workshop covers recent developments in the literature on monetary and fiscal policy with heterogeneous agents. The objective is twofold: 1) give you a solid understanding of the current state of literature 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.

Prerequisites. A solid grasp of macroeconomics at the level of a first-year PhD course (in particular dynamic programming, the standard 3-equation New Keynesian model, and the standard incomplete markets model) is essential. In addition, basic familiarity with Python is required.

Workshop material. I will post all workshop material at the following link. This is also where you can download tutorials for the class:

<http://web.stanford.edu/~aaucclert/kuleuvenmini/>

If you want to dig deeper, additional code and notebooks are available at:

<https://github.com/shade-econ/nber-workshop-2022>

Python preparation. If you are relatively new to Python, I 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](#).

If you are accustomed to Matlab or Julia, QuantEcon's [Matlab-Python-Julia cheatsheet](#) can be useful, as can [NumPy for Matlab users](#) (ignoring now-obsolete "matrix" class at the end).

Preparing for the first class. The first class will cover technical material on how to solve the standard incomplete markets model, including transition dynamics using the fake news algorithm. To prepare for this class, I recommend going through the material in "[Standard Incomplete Markets Steady State](#)" [notebook](#). If you want more advanced preparation, you should go through the [steady-state](#) and the [transition dynamics](#) slide notebooks.

For the in-class tutorials, you will need [SSJ](#) installed on your laptop.

Other preparation. Before each day, you are encouraged to read ahead the class lecture notes. The references provided in the syllabus may also be useful.

Class plan. The plan for each class is outlined below.

Time	Topic
<i>Friday May 19</i>	<i>Fiscal policy with heterogeneous agents</i>
8:45am	Welcome and overview
9:00am	Solving the standard incomplete markets model
10:15am	The canonical HANK model
11:30am	Fiscal policy in the canonical HANK model, part 1
2:00pm	Fiscal policy in the canonical HANK model, part 2
3:15pm	Tutorial 1: using SSJ for fiscal policy analysis
<i>Monday May 22</i>	<i>Monetary policy with heterogeneous agents</i>
9:00am	Monetary policy in the canonical HANK model
10:15am	Monetary policy topics in closed economies
11:30am	Tutorial 2 : using SSJ for closed-economy monetary policy analysis

Background reading

Useful literature overviews

Heathcote, J., Storesletten, K. and Violante, G.L. (2009). **Quantitative Macroeconomics with Heterogeneous Households**. *Annual Review of Economics* 1(1):319–354

Krueger, D., Mitman, K. and Perri, F. (2016). **Chapter 11 - Macroeconomics and Household Heterogeneity**. In: J.B. Taylor and H. Uhlig (eds.) *Handbook of Macroeconomics*, vol. 2, pp. 843–921. Elsevier

Kaplan, G. and Violante, G.L. (2018). **Microeconomic Heterogeneity and Macroeconomic Shocks**. *Journal of Economic Perspectives* 32(3):167–194

Galí, J. (2018). **The State of New Keynesian Economics: A Partial Assessment**. *Journal of Economic Perspectives* 32(3):87–112

Methods

*Auclert, A., Bardóczy, B., Rognlie, M. and Straub, L. (2021). **Using the Sequence-Space Jacobian to Solve and Estimate Heterogeneous-Agent Models**. *Econometrica* 89(5):2375–2408

Ahn, S., Kaplan, G., Moll, B., Winberry, T. and Wolf, C. (2018). **When Inequality Matters for Macro and Macro Matters for Inequality**. *NBER Macroeconomics Annual* 32(1):1–75

Reiter, M. (2009). **Solving Heterogeneous-Agent Models by Projection and Perturbation**. *Journal of Economic Dynamics and Control* 33(3):649–665

Day 1: Fiscal policy

1. The standard incomplete markets model

*Lecture slides 1

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*. Working Paper 30013, National Bureau of Economic Research

2. The canonical HANK model

*Lecture slides 2

*Auclert, A., Rognlie, M. and Straub, L. (2023b). *The Intertemporal Keynesian Cross*. *Manuscript*

Werning, I. (2015). *Incomplete Markets and Aggregate Demand*. Working Paper 21448, National Bureau of Economic Research,

Auclert, A., Bardóczy, B. and Rognlie, M. (2023a). *MPCs, MPEs, and Multipliers: A Trilemma for New Keynesian Models*. *The Review of Economics and Statistics* 105(3):700–712

Broer, T., Hansen, N.J.H., Krusell, P. and Öberg, E. (2020). *The New Keynesian Transmission Mechanism: A Heterogeneous-Agent Perspective*. *Review of Economic Studies* 87(1):77–101

3. Fiscal policy in the canonical HANK model

*Lecture slides 3

*Auclert, A., Rognlie, M. and Straub, L. (2023b). *The Intertemporal Keynesian Cross*. *Manuscript*

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,

Day 2: Monetary policy

4. Monetary policy in the canonical HANK model

*Lecture slides 4

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

McKay, A., Nakamura, E. and Steinsson, J. (2016). *The Power of Forward Guidance Revisited*. *American Economic Review* 106(10):3133–3158

Werning, I. (2015). *Incomplete Markets and Aggregate Demand*. Working Paper 21448, National Bureau of Economic Research,

5. Advanced topics in monetary policy

*Lecture slides 5

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

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,

Doepke, M. and Schneider, M. (2006). *Inflation and the Redistribution of Nominal Wealth*. *Journal of Political Economy* 114(6):1069–1097