

Bank of Japan Minicourse: Fiscal and Monetary Policy with Heterogeneous Agents

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This is a minicourse on fiscal and monetary policy in Heterogeneous Agent New Keynesian models. We will cover the following topics (one hour per lecture):

Lecture #	Topic
1	The standard incomplete markets model
2	The canonical HANK model
3	Fiscal policy in the canonical model
4	Monetary policy in the canonical model
5	The open economy
6	Endogenous portfolios and risk premia

Lecture 1 introduces the standard incomplete markets model in partial equilibrium. It reviews methods for solving the policy functions of the model, the distribution of agents, and macroeconomic aggregates, both in the steady state and under perfect-foresight dynamics. It then introduces the sequence-space Jacobian method for solving for linearized perfect-foresight dynamics. The model and this solution method will be the backbone of the rest of the lectures.

Lecture 2 embeds the model from Lecture 1 into New Keynesian general equilibrium. It discusses the special cases of the representative-agent model (RANK), the two agent model (TANK), and the zero liquidity limit of the model. It then shows how to use sequence-space Jacobians to obtain the general equilibrium solution numerically.

Lecture 3 studies fiscal policy in the model of Lecture 2. It derives the intertemporal Keynesian cross equation (IKC) that relates the the dynamic effects of changes in government spending or taxes to intertemporal marginal propensities to consume (iMPCs). It discusses evidence for iMPCs, why the data tends to favor HANK models over RANK or TANK models, and how all three models have very different implications for the level and persistence of the effects of deficit-financed fiscal transfers.

Lecture 4 studies monetary policy in the model of Lecture 2. It derives an equation analogous to the IKC for studying the effects of monetary policy, and the Werning result of equivalence between RANK and HANK for these effects under acyclical income risk. It then discusses empirical

evidence for countercyclical income risk and why this ingredient tends to amplify the effects of monetary policy and aggravate rather than solve the so-called forward-guidance puzzle.

Lecture 5 incorporates open economy dimensions (import and export demand as well as exchange rates) into the model of Lecture 2. For the small open economy, it derives an international IKC equation and uses it to study the effects of shocks to capital flows and monetary policy. It discusses the role of the real income channel in dampening or potentially overturning the expansionary effects of exchange rate depreciations.

Lecture 6 considers the explicit “zero-th order” solution of agent portfolios, first in the small open economy model of Lecture 5 (where risk premia are given), and then in the closed economy model of Lecture 2. It discusses the risk-sharing condition that optimal portfolios achieve and how to solve for risk premia in the closed economy. It explains the aggregate effects of portfolio choice, and those of portfolio constraints and incomplete markets.

References. Most of the high-level material for the lectures is discussed in:

*Auclert, A., Rognlie, M. and Straub, L. (2025b). **Fiscal and Monetary Policy with Heterogeneous Agents**. *Annual Review of Economics* 17(Volume 17, 2025):539–562

Additionally, for references regarding numerical solution methods, please see:

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

Auclert, A., Rognlie, M. and Straub, L. (2025a). **Determinacy and Large-Scale Solutions in the Sequence Space**. *Manuscript*

Below follows a list of relevant references for each class. The starred article are especially relevant for each lecture.

1. The standard incomplete markets model

*Lecture slides

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

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

2. The canonical HANK model

*Lecture slides

*Auclert, A., Rognlie, M. and Straub, L. (2025b). *Fiscal and Monetary Policy with Heterogeneous Agents*. *Annual Review of Economics* 17(Volume 17, 2025):539–562

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

Auclert, A., Bardóczy, B. and Rognlie, M. (2023). *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

*Auclert, A., Rognlie, M. and Straub, L. (2024b). *The Intertemporal Keynesian Cross*. *Journal of Political Economy* 132(12):4068–4121

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,

4. Monetary policy in the canonical HANK model

*Lecture slides

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. Monetary policy in the open economy

*Lecture slides

- *Auclert, A., Rognlie, M., Souchier, M. and Straub, L. (2021b). *Exchange Rates and Monetary Policy with Heterogeneous Agents: Sizing up the Real Income Channel*. Working Paper 28872, National Bureau of Economic Research,
- Aggarwal, R., Auclert, A., Rognlie, M. and Straub, L. (2023). *Excess Savings and Twin Deficits: The Transmission of Fiscal Stimulus in Open Economies*. *NBER Macroeconomics Annual* 2022 37:325–412
- Auclert, A., Monnery, H., Rognlie, M. and Straub, L. (2024a). *Managing an Energy Shock: Fiscal and Monetary Policy*. In: S. Bauducco, A. Fernández and G.L. Violante (eds.) *Heterogeneity in Macroeconomics: Implications for Monetary Policy*, no. 30 in Series on Central Banking, Analysis, and Economic Policies, pp. 39 – 108. Santiago, Chile: Banco Central de Chile
- Galí, J. and Monacelli, T. (2005). *Monetary Policy and Exchange Rate Volatility in a Small Open Economy*. *Review of Economic Studies* 72(3):707–734
- de Ferra, S., Mitman, K. and Romei, F. (2020). *Household Heterogeneity and the Transmission of Foreign Shocks*. *Journal of International Economics* 124:1–18

6. Endogenous portfolios and risk premia

*Lecture slides

- *Auclert, A., Rognlie, M., Straub, L. and Tapák, T. (2024c). *When do Endogenous Portfolios Matter for HANK?* *Manuscript*
- Bhandari, A., Bourany, T., Evans, D. and Golosov, M. (2023). *A Perturbational Approach for Approximating Heterogeneous-Agent Models*. *Manuscript*
- Tille, C. and van Wincoop, E. (2010). *International Capital Flows*. *Journal of International Economics* 80(2):157–175
- Devereux, M.B. and Sutherland, A. (2011). *Country Portfolios in Open Economy Macro-Models*. *Journal of the European Economic Association* 9(2):337–369
- Coeurdacier, N. and Rey, H. (2013). *Home Bias in Open Economy Financial Macroeconomics*. *Journal of Economic Literature* 51(1):63–115