Syllabus
Macroeconomics II – PhD
Summer Term 2024
Instructor: Christian Bayer

Summary:
This is the second semester of the two-semester macroeconomics sequence for first-year doctoral students. The course focuses on models of consumption-savings decisions by households, investment decisions by firms as well as the role of financial frictions and the banking sector in macroeconomics. Methodologically, the familiarizes students with heterogeneous agent models in macroeconomics. It provides both an overview of theoretical concepts as well as the numerical methods required to study quantitatively the questions the theoretical part touches. Theory (Parts 1 and 2, see below) and numerical methods (Part 3) will be developed in parallel.

There are optional problem sets that give a bonus on the exam and that are discussed in a tutorial (every other week), as well as coding exercises some of which done in class some as problem sets.

Exam: Written, 120 min. Exercises grant up to 0.7 grade increase in the final exam.
Time (54 teaching hours):
      Tuesdays 8:30-10:00
      Wednesdays 14:15-15:45,
      no classes on May 15 and during Pentecostal break (May 20-24)
Place: HS F

Detailed structure

1. Consumption and Savings

    (a) A Short History of Thought: Early Theories of Consumption
    (b) Consumption Empirics
    (c) Consumption in Complete Markets
    (d) Optimal Taxation
    (e) Self Insurance: The Permanent Income Hypothesis
    (f) Bewley-Imrohoroğlu-Hugget-Aiyagari Models Models
    (g) Incomplete Markets and Aggregate Risk

2. Investment

    (a) A short History of Thought: Early Theories of Investment
    (b) Q-Models and Partial Adjustment

    (c) Fixed Costs of Adjustment, Irreversibility, and other Kinked Costs

    (d) Uncertainty and Investment

    (e) Mis-allocation

3. Methods

    (a) Dynamic Programming: An introduction

    (b) Solving and analyzing aggregate models and data

    (c) Efficient ways to solve single agent decision problems

    (d) Calculating equilibria of stationary heterogeneous agent economies

    (e) Heterogeneous agent economies with aggregate fluctuations

The *Methods* section will be developed parallel to the theory parts.

Suggested Reading (Textbooks):
Consumption and Savings

- Deaton, A. (1992). *Understanding consumption*. Oxford University Press

- Ljungqvist, L. and Sargent, T. J. (2018). *Recursive macroeconomic theory*. MIT press, Chapters 8, 16, 17, 18.

- Romer, D. (2018). *Advanced Macroeconomics*. McGraw-Hill Education, Chapter 7.

Investment

- Romer, D. (2018). *Advanced Macroeconomics*. McGraw-Hill Education: "Advanced Macroeconomics", Chapter 8.

- Stockey, N. (2008). *The economics of inaction*. Princeton University Press

- Dixit, R. and Pindyck, R. (1994). *Investment under Uncertainty*. Princeton University Press

Methods

- Heer, B. and Maussner, A. (2009). *Dynamic general equilibrium modeling: computational methods and applications*. Springer, Berlin Good overview, I broadly cover Ch. 1, 4, 7, 8

- Adda, J. and Cooper, R. W. (2003). *Dynamic economics: quantitative methods and applications*. MIT press, Cambridge Partial equilibrium only. Many applications with non-convex budget sets.

- Judd, K. L. (1998). *Numerical methods in economics*. MIT press, CambridgeTechnical overview of numerics for econ

Detailed further readings by topic as covered in the class. Follow up readings can be found on the slide set.

1. **Consumption, Income, and Wealth Facts**

- Attanasio, O. P. (1999). Consumption. *Handbook of macroeconomics*, 1:741–812

- Diaz-Gimenez, J., Quadrini, V., and Ríos-Rull, J.-V. (1997). Dimensions of inequality: facts on the U.S. distributions of earnings, income, and wealth. *Quarterly Review*, 21(Spr):3–21

- Heathcote, J., Perri, F., and Violante, G. (2010). Unequal we stand: An empirical analysis of economic inequality in the united states: 1967-2006. *Review of Economic Dynamics*, 13(1):15–51

- Kuhn, M., Ríos-Rull, J.-V., et al. (2016). 2013 update on the us earnings, income, and wealth distributional facts: A view from macroeconomics. *Federal Reserve Bank of Minneapolis Quarterly Review*, 37(1):2–73

- Storesletten, K., Telmer, C. I., and Yaron, A. (2001). The welfare cost of business cycles revisited: Finite lives and cyclical variation in idiosyncratic risk. *European Economic Review*, 45(7):1311–1339

- Storesletten, K., Telmer, C. I., and Yaron, A. (2004). Consumption and risk sharing over the life cycle. *Journal of monetary Economics*, 51(3):609–633

2. **Complete Markets Equilibria and Aggregation**

- Ljungqvist, L. and Sargent, T. J. (2018). *Recursive macroeconomic theory*. MIT press, Chapter 8.

- Alvarez, F. and Jermann, U. J. (2004). Using asset prices to measure the cost of business cycles. *Journal of Political economy*, 112(6):1223–1256

3. **Optimal taxation**

- Ljungqvist, L. and Sargent, T. J. (2018). *Recursive macroeconomic theory*. MIT press, Chapter 16.

- Chamley, C. (1986). Optimal taxation of capital income in general equilibrium with infinite lives. *Econometrica: Journal of the Econometric Society*, pages 607–622

- Judd, K. L. (1985). Redistributive taxation in a simple perfect foresight model. *Journal of public Economics*, 28(1):59–83

- Straub, L. and Werning, I. (2020). Positive long-run capital taxation: Chamley-judd revisited. *American Economic Review*, 110(1):86–119

4. **Self insurance**

- Ljungqvist, L. and Sargent, T. J. (2018). *Recursive macroeconomic theory*. MIT press, Chapter 17.

- Bayer, C. and Juessen, F. (2015). Happiness and the persistence of income shocks. *American Economic Journal: Macroeconomics*, 7(4):160–187

- Blundell, R., Pistaferri, L., and Preston, I. (2008). Consumption inequality and partial insurance. *American Economic Review*, 98(5):1887–1921

- Campbell, J. and Deaton, A. (1989). Why is consumption so smooth? *The Review of Economic Studies*, 56(3):357–373

- Flavin, M. A. (1981). The adjustment of consumption to changing expectations about future income. *Journal of political economy*, 89(5):974–1009

- Hall, R. E. (1978). Stochastic implications of the life cycle-permanent income hypothesis: theory and evidence. *Journal of political economy*, 86(6):971–987

- Kaplan, G. and Violante, G. L. (2010). How much consumption insurance beyond self-insurance? *American Economic Journal: Macroeconomics*, 2(4):53–87

5. **Incomplete Markets: Basic Models**

- Ljungqvist, L. and Sargent, T. J. (2018). *Recursive macroeconomic theory*. MIT press, Chapter 18.

- Aiyagari, S. R. (1994). Uninsured idiosyncratic risk and aggregate saving. *The Quarterly Journal of Economics*, 109(3):659–684

- Huggett, M. (1993). The risk-free rate in heterogeneous-agent incomplete-insurance economies. *Journal of economic Dynamics and Control*, 17(5-6):953–969

- Imrohoroğlu, A. (1989). Cost of business cycles with indivisibilities and liquidity constraints. *Journal of Political economy*, 97(6):1364–1383

6. **Incomplete Markets and Government Policies**

- Aiyagari, S. R. and McGrattan, E. R. (1998). The optimum quantity of debt. *Journal of Monetary Economics*, 42(3):447–469

- Davila, J., Hong, J. H., Krusell, P., and Ríos-Rull, J.-V. (2012). Constrained efficiency in the neoclassical growth model with uninsurable idiosyncratic shocks. *Econometrica*, 80(6):2431–2467

7.   Incomplete Markets and Aggregate Risk

- Bayer, C., Lütticke, R., Pham-Dao, L., and Tjaden, V. (2019). Precautionary savings, illiquid assets, and the aggregate consequences of shocks to household income risk. *Econometrica*, 87(1):255–290

- Guerrieri, V. and Lorenzoni, G. (2017). Credit crises, precautionary savings, and the liquidity trap. *The Quarterly Journal of Economics*, 132(3):1427–1467

- Kaplan, G., Moll, B., and Violante, G. L. (2018). Monetary policy according to hank. *American Economic Review*, 108(3):697–743

- Krusell, P. and Smith, Jr, A. A. (1998). Income and wealth heterogeneity in the macroeconomy. *Journal of political Economy*, 106(5):867–896

- Ravn, M. O. and Sterk, V. (2017). Job uncertainty and deep recessions. *Journal of Monetary Economics*, 90:125–141

- Werning, I. (2015). Incomplete markets and aggregate demand. Technical report, National Bureau of Economic Research

8.   Investment: Introduction

- Hayashi, F. (1982). Tobin's marginal q and average q: A neoclassical interpretation. *Econometrica: Journal of the Econometric Society*, pages 213–224

9.   Investment: Lumpiness

- Caballero, R. J. and Engel, E. M. (1999). Explaining investment dynamics in us manufacturing: a generalized (s, s) approach. *Econometrica*, 67(4):783–826

- Cooper, R. W. and Haltiwanger, J. C. (2006). On the nature of capital adjustment costs. *The Review of Economic Studies*, 73(3):611–633

- Doms, M. and Dunne, T. (1998). Capital adjustment patterns in manufacturing plants. *Review of economic dynamics*, 1(2):409–429

- Khan, A. and Thomas, J. K. (2008). Idiosyncratic shocks and the role of nonconvexities in plant and aggregate investment dynamics. *Econometrica*, 76(2):395–436

- Khan, A. and Thomas, J. K. (2003). Nonconvex factor adjustments in equilibrium business cycle models: do nonlinearities matter? *Journal of monetary economics*, 50(2):331–360

- Thomas, J. K. (2002). Is lumpy investment relevant for the business cycle? *Journal of political Economy*, 110(3):508–534

10. **Investment: Uncertainty**

- Bachmann, R. and Bayer, C. (2013). 'wait-and-see'business cycles? *Journal of Monetary Economics*, 60(6):704–719

- Bloom, N. (2014). Fluctuations in uncertainty. *Journal of economic Perspectives*, 28(2):153–176

- Bloom, N., Floetotto, M., Jaimovich, N., Saporta-Eksten, I., and Terry, S. J. (2018). Really uncertain business cycles. *Econometrica*, 86(3):1031–1065

- Baker, S. R., Bloom, N., and Davis, S. J. (2016). Measuring economic policy uncertainty. *The quarterly journal of economics*, 131(4):1593–1636

- Jurado, K., Ludvigson, S. C., and Ng, S. (2015). Measuring uncertainty. *American Economic Review*, 105(3):1177–1216

11. **Misallocation**

- Hsieh, C.-T. and Klenow, P. J. (2009). Misallocation and manufacturing tfp in china and india. *The Quarterly journal of economics*, 124(4):1403–1448

12. **Methods**

- Tauchen, G. (1986). Finite state markov-chain approximations to univariate and vector autoregressions. *Economics letters*, 20(2):177–181

- Carroll, C. (2006). The method of endogenous gridpoints for solving dynamic stochastic optimization problems. *Economics Letters*, 91(3):312–320

- Hintermaier, T. and Koeniger, W. (2010). The method of endogenous gridpoints with occasionally binding constraints among endogenous variables. *Journal of Economic Dynamics and Control*, 34(10):2074–2088

- Young, E. R. (2010). Solving the incomplete markets model with aggregate uncertainty using the krusell–smith algorithm and non-stochastic simulations. *Journal of Economic Dynamics and Control*, 34(1):36–41

- Reiter, M. (2009). Solving heterogeneous-agent models by projection and perturbation. *Journal of Economic Dynamics and Control*, 33(3):649–665

- Bayer, C. and Luetticke, R. (2020). Solving discrete time heterogeneous agent models with aggregate risk and many idiosyncratic states by perturbation. *Quantitative Economics*, 11(4):1253–1288

- 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