

ECON0107 – Spring Term 2025 (1st half)

Instructor

Klaus Adam

Weekly class meetings: Thursdays 13:00-14:15 and 14:30-15:45

1st half of class: January 16 until February 13 (including)

Location & Room: Euston Road 222 G01

Grading

Students have to hand in weekly problem sets (group answers are allowed for groups up to a max of 3 people).

Problem sets have to be **handed to the TA by Wednesday 6pm, before the TA session** that takes place on Thursday morning. **Hand-in of the problem sets is mandatory** for passing the course!

Subject to having handed in the problem sets, the course grade will be determined by the final exam. In marginal cases when students are between two grades, the problem sets might determine which grade will be assigned.

Course content

Macroeconomics is about constructing, solving and estimating intertemporal models describing the evolution of the aggregate economy over time. Macroeconomists focus on general equilibrium settings and are concerned with explaining observed aggregate behavior and with evaluating the welfare and allocational implications of alternative policy choices.

This course introduces some of the fundamental techniques for constructing and solving dynamic stochastic equilibrium models. It also discusses basic approaches for conducting policy experiments and for evaluating their welfare consequences. Additionally, it outlines some fundamental connections between the solution of dynamic equilibrium models and econometric time series models.

Course Outline

Weeks 1+2: Linear Dynamic Rational Expectations (RE) Models

- social planning problems and market outcomes
- linearizing dynamic economic models
- determinacy and indeterminacy of RE equilibria, ‘sunspot’ equilibria
- solving linear RE models:
 - o undetermined coefficients approach
 - o QZ decomposition
- solving the stochastic real business cycle model

Required readings on solution techniques:

Stockey and Lucas, chapter 6.1-6.3
Blanchard and Kahn (1980)
Sims (2002)

Required readings on applications to business cycle modeling (for week 2):

Barro and King (1984)
Jaimovich and Rebelo (2009)

Week 3: Linear RE Models and Vector Auto-Regressions (VARs)

- state space representation of economic models
- VAR representation of observables, invertibility problems
- identification of economic shocks
- Kalman filtering

Required reading

Fernández-Villaverde et al (2005)
Fisher (2006)

Week 4: Linear Quadratic (LQ) Dynamic Programming

- solving LQ problems: Ricatti equation, invariant subspace methods
- stochastic problems and certainty equivalence
- linear quadratic approximation to optimal policy models

Required reading:

Ljungqvist and Sargent (2004), chapter 5

Week 5: Introduction to the New Keynesian Model and its Linear-Quadratic Form

Required reading:

Chapter 2 in Galí (2008)

Woodford (2011)

References

- Anderson, Gary (2006), 'Solving Linear Rational Expectations Models: A Horse Race', FEDS working paper No. 2006-26
- Barro, R. J., and R. G. King (1984), 'Time-separable Preferences and Intertemporal-Substitution Models of Business Cycles'. Quarterly Journal of Economics, 99(4), 817-839.
- Blanchard, Olivier J. and Charles M. Kahn (1980), The Solution of Linear Difference Models under Rational Expectations, Econometrica, Vol 48, pp.1305-1312
- Fernández-Villaverde, Jesús, Juan Rubio-Ramírez, and Thomas J. Sargent (2005) 'A, B, C's (and D)'s for Understanding VARs', NBER Technical Working Paper 308, <http://www.nber.org/papers/T0308>
- Fisher, Jonas D.M (2006), 'The Dynamic Effects of Neutral and Investment-Specific Technology Shocks', Journal of Political Economy, Vol. 114(3), pp. 413 - 451
- Galí, Jordi (2008), Monetary Policy, Inflation and the Business Cycle, Princeton University Press.
- Hansen, Lars P. and Thomas J. Sargent (undated), Notes on Linear Control Theory
- Jaimovich, Nir and Sergio Rebelo (2009), 'Can News about the Future Drive the Business Cycle?', American Economic Review, Volume 99, Number 4, pp. 1097-1118
- Judd, Kenneth L. (1998), Numerical Methods in Economics, MIT Press
- Ljungqvist, Lars and Thomas J. Sargent (2004), Recursive Macroeconomic Theory, 2nd edition, MIT Press
- Sims, Christopher A. (2002), Solving Linear Rational Expectations Models, Princeton University mimeo
- Stokey, Nancy L. and Robert E. Lucas (1989), Recursive Methods in Economic Dynamics, Harvard University Press
- Woodford, Michael (2011), Optimal Monetary Stabilization Policies, chapter in B.M. Friedman and M. Woodford (eds.), *Handbook of Monetary Economics*, vol. 3B.