

University of Oregon – Economics 607. Winter 2015
Advanced Topics in Macroeconomics. TuTh 2pm – 3:50pm in 412 PLC
Professor George W. Evans

This course analyzes expectations and learning in modern dynamic stochastic macroeconomic models. We develop techniques for solving for the rational expectations equilibrium (REE) and examine whether agents following adaptive or statistical learning schemes will converge over time to RE. When there are multiple REE, we will be interested in determining which of them can be possible points of convergence under learning. We will also consider cases in which learning can lead to non-REE learning dynamics. A substantial part of the course will be devoted to studying the implications of learning for macroeconomic policy and to looking at a range of applications.

The course will initially focus on adaptive learning theory, in some standard set-ups, and will mainly be based on my book with Seppo Honkapohja, *Learning and Expectations in Macroeconomics*, (LEM), augmented by material that reflects recent research. A number of applications of learning will also be considered. A separate reading list will provide references to many of the large number of papers that have applied learning to macroeconomics. You will be expected to write a short paper that assesses a recent article or working paper in this area.

Lecture topics and reading

1. Introduction to expectations and adaptive learning. Convergence to rational expectations of least squares learning in the cobweb – Lucas model. Stochastic recursive algorithms. Expectational stability. Application to IS-LM-PC model.

LEM, Ch. 1, Ch. 2, Ch. 4.3.

“Learning and Macroeconomics,” G.W. Evans and S. Honkapohja, *Annual Review of Economics*, Vol. 1, 2009, 421 – 449.

“Learning as a Rational Foundation for Macroeconomics and Finance,” G.W. Evans and S. Honkapohja, Ch. 2 in *Rethinking Expectations: The Way Forward for Macroeconomics*, Roman Frydman and Edmund S. Phelps (eds.), Princeton University Press, 2013.

2. Variations: Learning with constant gain. Learning steady states in nonlinear non-stochastic models. Misspecified models and restricted perceptions equilibria.

LEM, Ch. 3, sections 3, 4 and 6

3. Application to OG-type models: Overlapping generations (OG) model with production; Increasing Social Returns (ISR) model. Hysteresis in policy.

LEM, Ch. 4, sections 1, 2 and 6 (4.6.1 and 4.6.2).

4. Learning in univariate dynamic linear expectations models. Minimal State Variable solutions and the full set of solutions. Models with lags. Weak and strong E-stability. Representations and sunspot stability.

LEM, Ch. 8.

G. W. Evans and S. and B. McGough, “Stable Stationary Sunspot Equilibria with Predetermined Variables,” *Journal of Economic Dynamics and Control* Vol. 29, 2005, 601-625.

5. Learning in nonlinear univariate models. Cycles. 2-state stationary sunspot equilibria (SSEs). Stochastic nonlinear models.

LEM, Ch. 12, Ch. 4.6.3-4.6.4, Ch. 11.

6. Solutions to linearized multivariate RE models. Basic RBC model and extensions. Farmer-Guo. Learning in multivariate models. Euler-equation learning.
Lecture Notes “Multivariate Stochastic Linear Difference Equations and Solutions to RE Models”
R.E.A. Farmer, *The Macroeconomics of Self-Fulfilling Prophecies*, 2nd ed., Ch. 1-3, 5.4,7.
LEM, Ch. 10.
Evans and McGough, “Learning to Optimize”
7. Persistent learning dynamics. Endogenous fluctuations in the ISR model. Sargent’s inflation model.
LEM, Ch. 14.1, 14.3, 13.2, 14.4
8. Monetary policy in New Keynesian models with learning
J. Bullard and K. Mitra, “Learning about monetary policy rules,” *Journal of Monetary Economics*, Vol. 49, 2002, pp. 1105-1129.
G. W. Evans and S. Honkapohja, “Expectations and the stability problem for optimal monetary policies,” *Review of Economic Studies*, Vol. 70, 2003, pp. 807-824.
G. W. Evans and S. Honkapohja, “Monetary policy, expectations and commitment,” *Scandinavian Journal of Economics*, Vol. 108, 2006, pp. 15-38.
G. W. Evans and S. and B. McGough, “Monetary Policy, Indeterminacy and Learning” (with Bruce McGough), *Journal of Economic Dynamics and Control*, Vol. 29, 2005, 1809-1840.
9. Monetary policy and perpetual learning
A. Orphanides and J. Williams, “Imperfect knowledge, inflation expectations and monetary policy” in *The Inflation -Targeting Debate*, eds. B. Bernanke and M. Woodford, U. Chicago Press, 2005, 1059-1095.
A. Orphanides and J. Williams (2007), “Robust Monetary Policy with Imperfect Knowledge,” *Journal of Monetary Economics*, Vol. 54, 2007, 1406-1435.
10. Recurrent hyperinflations and learning
A. Marcet and J. P. Nicolini, “Recurrent hyperinflations and learning,” *American Economic Review*, Vol. 93, 2003, pp. 1476-1498.
11. Infinite-horizon learning
Lecture Notes on “Infinite-horizon learning”
B. Preston, “Learning about monetary policy rules when long-horizon expectations matter,” *International Journal of Central Banking*, Vol. 1, 2005, 81-126.
K. Mitra, G.W. Evans, S. Honkapohja, “Anticipated Fiscal Policy and Adaptive Learning,” *Journal of Monetary Economics*, Vol. 56, 2009, 930-953.
Eusepi and B. Preston, “Expectations, Learning and Business Cycle Fluctuations,” *American Economic Review*, Vol. 101, 2011, 2844-2872.
12. Dynamic Predictor Selection
W. A. Brock and C. H. Hommes, “A rational route to randomness,” *Econometrica*, Vol. 65, 1997, 1059-1095.
LEM, Ch. 15.6.
C.H. Hommes, “The heterogeneous expectations hypothesis: some evidence from the lab,” *Journal of Economic Dynamics and Control*, Vol. 35, 2011, 1-24.
W. A. Branch and G. W. Evans, “Model uncertainty and endogenous volatility,” *Review of Economic Dynamics*, Vol. 10, 2007, 158-166.

13. Liquidity traps, deflation traps and stagnation.

G.W. Evans, E. Guse and S. Honkapohja, "Liquidity traps, learning and stagnation," *European Economic Review*, Vol. 52, 2008, 1438-1463.

J. Benhabib, G.W. Evans and S. Honkapohja, "Liquidity traps and expectation dynamics: fiscal stimulus or fiscal austerity?," *Journal of Economic Dynamics and Control*, Vol. 45, 2014, 220–238 .

Textbook Reference

George W. Evans and Seppo Honkapohja, *Learning and Expectations in Macroeconomics*, Princeton University Press, Princeton NJ, 2001. (LEM)

LEM is available from amazon.com if for some reason the UO bookstore does not get it in time.

Draft typed lecture notes will be provided on many topics once the lectures on that topic are completed.

Grading. There will be around three problem sets, a midterm exam and a paper. The midterm will count 40%, the problem sets will count 25%, and the paper will count 35% of the grade. You can work on problem sets together, but should write up your answers separately.

The paper should be based on an article or working paper connected with the course, i.e. a recent paper on macroeconomics and learning. The extended reading includes many good recent papers in this field, roughly grouped by topic. This reading list, though quite long, is incomplete. You should also look for a suitable paper by looking at the websites of relevant conferences. Links to a number of relevant conferences are included on the extended reading list. Your paper should be a critical assessment of the article or working paper, with indications of significant omissions and suggestions for useful extensions. Ideally your paper would include some additional original material, e.g. modest extensions of results in the paper or simulations that corroborate, extend or fail to verify results given in the article or working paper. The grade for the paper will be based in part on a short presentation during finals week, during a period that includes the scheduled final exam time, which is Monday, March 16, 12:30-2:30pm.