Economics 831: Empirical Methods in Macroeconomics

Aeimit Lakdawala

Spring 2019

Tu-Th 8:30 - 9:50 am, 106A Berkey Hall

Email: aeimit@msu.edu, **Office:** 203 Old Botany, Office hours by appointment

Course Description

This course aims to give an introduction to the issues involved in the estimation and interpretation of contemporary macroeconomic models. The goal is to provide a platform for conducting empirical research in macroeconomics. For the methods we will focus on Bayesian econometrics and related numerical techniques which have been extremely popular in recent empirical work. For the applications, we will focus on monetary policy topics.

Course website: *ec831.weebly.com*
Lecture notes are posted on the website but may be periodically updated

Course Requirements:

50%: Homework Assignments: There will be a handful of assignments that involve writing estimation code.

10%: Referee Report: Ideally, we will select a paper from the empirical macroeconomics spring seminar series. If there is no relevant paper then we will discuss alternatives.

40%: Research Paper of about 10-12 pages to be submitted by Friday April 26th. There will also be an accompanying in-class presentation towards the end of the semester.

Paper Proposal: The goal is to come up with an original research question and an outline of the exact estimation strategy that can be used to tackle the question. No data needs to be collected or actual estimation needs to be performed. The proposal should start with a literature review and motivation, followed by a detailed description of the estimation procedure. The quality of the writing in the proposal should be comparable to articles that would be submitted to journals. Credit will be given for clarity of explanation.

You must clear the topic with me before doing any significant amount of work.

Textbooks and Reading

James D. Hamilton, Time Series Analysis, Princeton University Press, 1994,

Chang-Jin Kim and Charles R. Nelson, State-Space Models with Regime Switching, MIT Press, 1999.

The above 2 textbooks will be used most extensively throughout the semester. The following textbook is useful for an introduction to Bayesian analysis.

Edward Greenberg, Introduction to Bayesian Econometrics, Cambridge University Press, 2008.

I will also assign readings from a number of different journal articles.

Course Outline

Each section has readings under "Methods" which will focus on the econometrics and "Applications" which will be important applied macro/monetary policy papers. This list is likely to get revised as the semester progresses.

Introduction to Bayesian econometrics

- Introduction to the Bayesian philosophy
- Bayesian inference in the univariate regression model
- Numerical Bayesian methods

Methods:
Edward Greenberg, Introduction to Bayesian Econometrics, Cambridge University Press, 2008.

James D. Hamilton, Time Series Analysis, Princeton University Press, 1994, Chapter 12.

Vector Autoregressions

- Bayesian analysis of VARs and structural VARs
- Using priors from DSGE models for VARs
- High-Frequency Identification

Methods:

Gary Koop and Dimitris Korobilis (2010) "Bayesian Multivariate Time Series Methods for Empirical Macroeconomics", *Foundations and Trends® in Econometrics*: Vol. 3: No 4, pp 267-358.

Marco Del Negro and Frank Schorfheide, "*Bayesian Macroeconometrics", in Handbook of Bayesian Econometrics.* 2011.

Marco del Negro and Frank Schorfheide (2004), "Priors from General Equilibrium Models for VARS," *International Economic Review* 45.

Applications:

Christiano, Lawrence J., Martin Eichenbaum, and Charles L. Evans. "Nominal rigidities and the dynamic effects of a shock to monetary policy." *Journal of political Economy* 113.1 (2005): 1-45.

Boivin, J and Giannoni, M. "Has Monetary Policy become less powerful?", Review of Economics and Statistics, 88. 2006

Faust, Jon, Eric T. Swanson, and Jonathan H. Wright. "Identifying VARs based on high frequency futures data." *Journal of Monetary Economics* 51.6 (2004): 1107-1131.

Gertler, Mark, and Peter Karadi. *Monetary policy surprises, credit costs and economic activity*. No. w20224. National Bureau of Economic Research, 2014.

Linear State-Space Models

- State-space representation and the Kalman filter
- Bayesian analysis of state-space models
- Markov Chain Monte Carlo (MCMC) methods for DSGE models

Methods:
James D. Hamilton, Time Series Analysis, Princeton University Press, 1994.

Dani Gamerman and Hedibert F. Lopes. Markov Chain Monte Carlo: Stochastic Simulation or Bayesian Inference, Chapman and Hall/CRC. 2006

Applications:
Lawrence J. Christiano, Martin Eichenbaum, and Charles L. Evans: " Nominal Rigidities and the Dynamic Effects of a Shock to Monetary Policy", *Journal of Political Economy*, Vol. 113, No. 1 (February 2005), pp. 1-45

Smets, F., Wouters, R. Shocks and frictions in us business cycles: A bayesian dsge approach. American Economic Review 97 (3). 2007

Marco del Negro, Frank Schorfheide, Frank Smets and Rafael Wouters, "On the Fit of New Keynesian Models", *Journal of Business and Economic Statistics, Vol. 25, Iss. 2, 2007*

Time-Varying Parameter Models

- Models with time variation in coefficients and variances
- MCMC methods for stochastic volatility models

Methods:
Kim, S., N. Shephard, and S. Chib. Stochastic volatility: Likelihood inference and comparison with arch models. The Review of Economic Studies 65 (3). 1998.

Applications:

Timothy Cogley, Thomas J. Sargent, Drifts and volatilities: monetary policies and outcomes in the post WWII US, Review of Economic Dynamics, Volume 8, Issue 2, April 2005, Pages 262-302

Sargent, T., N. Williams, and T. Zha. Shocks and government beliefs: The rise and fall of american inflation. American Economic Review 96 (4). 2006

Primiceri, G. E. Time varying structural vector autoregressions and monetary policy. Review of Economic Studies 72 (3). 2005
Primiceri, G. E Why Inflation Rose and Fell: Policy-Makers' Beliefs and U. S. Postwar Stabilization Policy *The Quarterly Journal of Economics (2006) 121 (3): 867-901*

Regime-Switching Models

- Introduction to regime switching models
- MCMC methods for regime-switching state-space models

Methods:
Chang-Jin Kim and Charles R. Nelson, *State-Space Models with Regime Switching*, MIT Press, 1999.

James D. Hamilton, Time Series Analysis, Princeton University Press, 1994.

Applications:
Sims, C. A. and T. Zha. Were there regime switches in u.s. monetary policy? The American Economic Review 96 (1), 2006.

Liu, Zheng, Waggoner, Daniel F. and Zha, Tao " Sources of macroeconomic fluctuations: A regime-switching DSGE approach" Quantitative Economics, Volume 2, Issue 2 251-301, 2011

Debortoli, Davide and Lakdawala, Aeimit. "How credible is the Federal Reserve? A Structural estimation of policy re-optimizations". American Economic Journal: Macroeconomics 2016(8) 3

Non-Linear Models

- Non-linear filtering techniques
- Sequential Monte Carlo methods

Methods:
Fernandez-Villaverde, J. and J. F. Rubio-Ramirez. Estimating dynamic equilibrium economies: linear versus nonlinear likelihood. Journal of Applied Econometrics 20 (7). 2005

Julier, S. J. and J. K. Uhlmann. A new extension of the kalman filter to nonlinear systems. 1997.

Simon, D. Optimal State Estimation, Kalman, H and nonlinear approaches. John Wiley and Sons, Inc. 2006.

Applications:
Lakdawala, Aeimit. Changes in Federal Reserve Preferences. JEDC. 2016

Fernandez-Villaverde, J., P. Guerron-Quintana, and J. F. Rubio-Ramirez. Fortune or Virtue: Time-Variant Volatilities Versus Parameter Drifting in U.S. Data. SSRN eLibrary. 2010