A Primer on Bayesian DSGE Models

Summer 2018 Syllabus

CLASS	Instructor: Fei Tan, Saint Louis Univeristy
INFORMATION	E-mail: tanf@slu.edu
	Coordinator: Xin Gu, Zhejiang Gongshang Univeristy
	Time: 9:00am–11:00am (theory) & 1:00pm–2:00pm (practice)
	Location: TBA, Zhejiang Gongshang University

COURSE DESCRIPTION

This mini course covers a range of Bayesian techniques for estimating dynamic stochastic general equilibrium (DSGE) models. Using a prototypical new Keynesian DSGE model, we study how to solve a linear rational expectations model and compute impulse responses to structural disturbances. To link the model to data, we cast the model solution into the state space representation whose likelihood function can be evaluated with the standard Kalman filter or sequential Monte Carlo filters. This likelihood function is then combined with a prior to construct the parameters' posterior distribution and evaluate the model's empirical performance. Finally, we survey several advanced topics on DSGE applications. The key learning objective is for students to develop the *hands-on* technical and judgmental skills required to conduct macroeconometric research useful for economic and financial decision making.

PREREQUISITES

Although the lectures will be self-contained, student are assumed to have completed advanced level undergraduate courses in macroeconomics and econometrics. Students are also expected to be familiar with basic operations in MATLAB, a powerful program for numerical computation and visualization. No prior knowledge of DSGE modeling or Bayesian econometrics is required.

TEXTBOOKS

- **Required**: *Bayesian Estimation of DSGE Models*, by Edward Herbst and Frank Schorfheide, Princeton University Press.

- **Optional**: *Structural Macroeconometrics*, 2nd Edition, by David DeJong and Chetan Dave, Princeton University Press.

- **Online resources:** sites.google.com/a/slu.edu/tanf/courses (instructor's home page).

Course Outline

Part I	**Solving Linear Rational Expectations Models**
	1. DSGE Modeling
	2. Sims' (2001) Method
	3. Impulse Response Functions
	4. MATLAB Session

Part II	**Likelihood Evaluation of Linear DSGE Models**
	1. Linear State Space Models
	2. Kalman Filter and Derivation
	3. MATLAB Session

Part III	**Likelihood Evaluation of Nonlinear DSGE Models**
	1. Nonlinear State Space Models
	2. Particle Filter and Adaptation
	3. MATLAB Session

Part IV	**Bayesian Inference for DSGE Models**
	1. Markov Chain Monte Carlo Methods
	2. DSGE Application
	3. MATLAB Session

Part V	**Advanced Topics**
	1. DSGE Models with Student-t Shocks
	2. DSGE Models with Stochastic Volatility
	3. DSGE-VAR
	4. Regime-Switching DSGE Models
	5. Dynamic Prediction Pools