Topics in Bayesian Econometrics  
Fall 2011  
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Outline
The course present a self-contained exposition of Bayesian methods applied to reduced form models, to structural VARs, to a class of state space models (TVC models, factor models, stochastic volatility models, Markov switching models). It is assumed that participants are familiar with the following topics:
(a) Basic VAR techniques: in particular, the identification of shocks and calculation of standard errors of impulse responses.
(b) Filtering techniques.
(c) Current models used in dynamic macroeconomics.

In addition, a working knowledge of Matlab programming language is required to perform well in the course.

The lectures are based on chapters 9 to 11 of my book: Methods for Applied Macroeconomic Research, Princeton University Press, 2007 Lecture notes will be posted on my homepage www.crei.cat/people/canova together with homeworks and sample programs.

The course will include lectures and student presentation of papers that use the techniques discussed in class.
The grade will be based on a term paper (60 percent), on two homeworks (20 percent) and on the in-class presentations (20 percent).

Program
Week 1 (3-4 November) Introduction to Bayesian Methods, Estimation and inference.
Week 2 (10-11 November) Posterior simulators and robustness.
Week 3 (17-18 November) Bayesian methods for regression models.
Week 4 (24 November 2 classes this day) Bayesian methods for VARs models and univariate dynamic panels.
Week 5 (1-2 December) Bayesian methods for state space models.
1) Introductory methods

- Preliminaries: Bayes Theorem, Prior Selection, Nuisance Parameters.

- Inference, Uncertainty, Confidence Intervals, (Asymptotic) Normal Approximation, Multiple models, Testing models, Forecasting.

- Hierarchical and Empirical Bayes Models, Meta-analysis.

References


- Zellner, A. (1971) Introduction to Bayesian Inference in Econometrics, Wiley and Sons


2) Posterior Simulators

- Normal Approximations
- Acceptance and Importance Sampling
- MCMC methods (Gibbs sampler and Metropolis-Hastings)
- Prior Robustness

References

3) Regression models

- Linear regression model with two benchmark priors.
- Adding heteroschedasticity and autocorrelation
- Univariate dynamic regression models. BMA.
- Nonlinear univariate regression models
- Multivariate models. SUR.

References

4) Bayesian VARs

- Likelihood function for an M variable VAR(q)
- Priors for VARs (Minnesota (Litterman), General, DSGE)
- Structural BVARs
- Bayesian dynamic panels

References


5) **Bayesian State Space Models**

• State Space Models and Kalman filter
• Classical Inference in state space models
• Gibbs sampler for state space models
• Application 1: TVC-VARs
• Application 2: Factor models
• Application 3: Stochastic volatility
• Application 4: Markov switching models

**References**


• Sims, C. D. Waggoner, T. Zha (2008), Methods for Inference in Large Multiple-Equation Markov-Switching Models”, Journal of Econometrics, 146(2) 255-274


8) Papers for presentation


Students can also suggest papers for presentation which are related to the topics presented in class.