

**Bayesian versus Classical
Approaches to Inference:
Theory and Applications**

Course Tutor

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Location

Date

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The Course

The course provides an introduction to Bayesian inference from the perspectives of a classically trained econometrician. Beginning with Bayes Theorem applied to random parameters, the material examines a number of key issues for classical estimation, and where appropriate considers the Bayesian analog. The material moves from the fundamental dichotomy between fixed and random quantities in classical estimation, and considers the role of the principle distinction between the two approaches - namely random versus fixed parameters. We examine how key notions such as convergence, and the use of simulation as an inference tool differs across the two approaches. The translation of fixed versus random effects panel data models into a Bayesian framework provides a convenient introduction to the use of hierarchical and non-hierarchical priors.

Course Outline

The course material will include

1. Introduction to Bayesian Inference
2. Simulation Methods in Classical and Bayesian Modelling
3. *Classical Simulation* An introduction to simulation-based inference in the context of discrete choice modelling. We begin with a very simple accept-reject (AR) procedure in the guise of the well known crude frequency simulator (CFS). Smoothed versions of this algorithm along with the Geweke, Hajivassiliou, Keane (GHK) simulator, the simulator of choice for many practitioners estimating multinomial probit model, are also introduced. We will refer to a number of texts including Van Dijk, Monfort, and Brown (1995) and Mariano, Weeks, and Schuermann (2000)
4. *Bayesian Simulation* We examine the curse of dimensionality in the context of Bayesian discrete choice models, and evaluate the use of data augmentation. The work of Albert and Chib (1993), and Chib and Greenberg (1996) is examined.
5. Bayesian Model Averaging: Applications from to financial crises and economic growth
6. Identifying Jointness in the effects of policy instruments
7. Bayesian Stochastic Frontier Panel Data Models.

References

ALBERT, J., AND S. CHIB (1993): “Bayesian Analysis of Binary and Polychotomous Response Data,” *Journal of the American Statistical Association*, 88, 669–679.

- CHIB, S., AND E. GREENBERG (1996): "Bayesian Analysis of Multivariate Probit Models," Research Paper, John M. Olin School of Business Washington University.
- MARIANO, B., M. WEEKS, AND T. SCHUERMAN (eds.) (2000): *Simulation Based Inference: Theory and Applications*. Cambridge University Press.
- VAN DIJK, H. K., A. MONFORT, AND B. W. BROWN (eds.) (1995): *Econometric Inference Using Simulation Techniques* Chichester, West Sussex, England. John Wiley and Sons.