
Econometrics III

Doctoral Program in Business Economics
hedibertFL@insper.edu.br

Syllabus

Hedibert Freitas Lopes
www.hedibert.org

Objective

The main goal of the course is to make the student familiar with and able to implement univariate and multivariate time series models by using both frequentist and Bayesian approaches. All classroom examples and implementations as well as projects will be carried out by the open-source statistical software R.

Course description

Brief review of frequentist inference followed by the introduction of key ingredients of Bayesian inference, model selection and criticism. An introduction to the main Monte Carlo methods for Bayesian inference: MC integration, resampling, MCMC and sequential MC. Univariate time series models, including AR(F)IMA models, state-space models, Markov switching models, GARCH and stochastic volatility models. Multivariate time series models, including Bayesian VARs and factor-augmented VARs, dynamic factor models, time-varying covariance models.

Required bibliography

- Dani Gamerman and Hedibert F. Lopes (2006) *MCMC: Stochastic Simulation for Bayesian Inference*. Chapman & Hall/CRC. <http://www.dme.ufrj.br/mcmc>
 - Ruey S. Tsay (2010) *Analysis of Financial Time Series, Third Edition*. Wiley-Interscience, Probability and Statistics. <http://faculty.chicagobooth.edu/ruey.tsay/teaching/fts3>
 - Ruey S. Tsay (2014) *Multivariate Time Series Analysis with R and Financial Applications*. Wiley Series in Probability and Statistics, John Wiley. <http://faculty.chicagobooth.edu/ruey.tsay/teaching/mtsbk>
-

Additional bibliography

- Bauwens, Lubrano and Richard (1999) *Bayesian Inference in Dynamic Econometric Models*. Oxford University Press, Oxford.
- Berry, Chaloner and Geweke (1996) *Bayesian Analysis in Statistics and Econometrics, Essays in Honor of Arnold Zellner*. Wiley, New York.

- Doucet, de Freitas and Gordon (2001) *Sequential Monte Carlo Methods in Practice*. New York: Springer.
- Geweke (2005) *Contemporary Bayesian Econometrics and Statistics*. Wiley, New York.
- Greenberg (2008) *Introduction to Bayesian Econometrics*.
- Hamilton (1994) *Time Series Analysis*. Princeton University Press.
- Koop (2003) *Bayesian Econometrics*. Chichester: Wiley.
- Koop, Poirier and Tobias (2007) *Bayesian Econometric Methods*.
- Lancaster (2004) *An Introduction to Modern Bayesian Econometrics*. Blackwell Publishing.
- Press (2003) *Subjective and Objective Bayesian Statistics: Principles, Models, and Applications, 2nd edition*. Wiley, New York.
- West and Harrison (1997) *Bayesian Forecasting and Dynamic Models, 2nd edition*. New York: Springer Verlag.

Program

13/04, 13:00-14:30, Class 1: Likelihood and Bayesian ingredients
 15/04, 10:00-11:30, Class 2: Model selection and model criticism
 15/04, 13:00-14:30, Class 3: Approximate posterior inference: Monte Carlo integration and sampling
 20/04, 13:00-14:30, Class 4: Gibbs sampler, Metropolis-Hastings and other MCMC algorithms
 27/04, 13:00-14:30, Class 5: AR, MA, ARMA and ARIMA models
 29/04, 10:00-11:30, Class 6: ARFIMA and other integrated processes
 29/04, 13:00-14:30, Class 7: ARCH, GARCH and GAS models
 04/05, 13:00-14:30, Class 8: State-space models and the Kalman filter
 06/05, 10:00-11:30, Class 9: Forward filtering, Backward sampling and other filters
 06/05, 13:00-14:30, Class 10: Markov switching models
 11/05, 13:00-14:30, Class 11: Stochastic volatility models
 13/05, 10:00-11:30, Class 12: Bootstrap and auxiliary particle filters
 13/05, 13:00-14:30, Class 13: Particle learning filter
 18/05, 13:00-14:30, Class 14: Vector autoregressive (VAR) models
 20/05, 10:00-11:30, Class 15: Vector error correction (VEC) models
 20/05, 13:00-14:30, Class 16: Structural VAR, variance decomposition, impulse response functions
 25/05, 13:00-14:30, Class 17: Bayesian VAR and regularization priors
 01/06, 13:00-14:30, Class 18: Dynamic factor models
 03/06, 10:00-11:30, Class 19: Generalized dynamic factor models
 03/06, 13:00-14:30, Class 20: Factor-augmented VAR models
 22/06, 13:00-14:30, Class 21: Other large-scale VAR models
 24/06, 10:00-11:30, Class 22: Time-varying covariance models
 24/06, 13:00-14:30, Class 23: Cholesky SV models
 29/06, 13:00-14:30, Class 24: Final project
