

Bayesian Econometrics

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Kiel University

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This course introduces to Bayesian estimation and inference techniques frequently used in applied research.

After the course, you understand the principles of Bayesian estimation.

You are able to estimate linear and nonlinear regressions with analytical and simulation-based Bayesian estimation techniques.

You can implement both analytical and simulation-based estimation and inference techniques in the econometric software Matlab.

You are competent to assess the advantages and limits of these estimation techniques and are able to choose an estimation method in accordance to the needs of a research questions.

1. Introduction to Bayesian statistics
2. Bayesian estimation of the linear regression model: closed form solutions
3. Bayesian estimation of the linear regression model: numerical solutions
4. Bayesian estimation of the nonlinear regression model: the Metropolis-Hastings algorithm
5. Bayesian estimation of VAR models
6. Advanced topics

- Prerequisites:
 - Advanced Statistics, particularly distribution functions
 - Econometric Methods and to some extent Time Series Econometrics are helpful
- Times (always check Olat and Univis for details or possible changes!):
 - Lecture (2 hours), Kai Carstensen, Wednesday 10:15-11:45
 - Tutorial (1 hour), Richard Schnorrenberger
 - Computer tutorial (1 hour), Richard Schnorrenberger
- *Voluntary* take home assignment
 - approximately after half of the semester
 - combination of theory and programming
 - allows to earn up to 6 bonus points for the exam
- Exam:
 - written exam: see Univis

Textbooks:

- **Gary Koop (2003) Bayesian Econometrics, Wiley.** This is the main reference for this course. We will closely follow the notation of this textbook. In addition, there is a [companion website](#) to the textbook that contains data and Matlab programs. It does not include Bayesian VARs, however.
- G. Koop, D.J. Poirier, J.L. Tobias (2007) Bayesian Econometric Methods, Cambridge University Press. Many solved exercises. This book nicely accompanies the tutorial. Matlab programs can be found [here](#).

Additional papers on Bayesian VARs (all available in OLAT):

- M. Banbura, D. Giannone, L. Reichlin (2010) Large Bayesian VARs, Journal of Applied Econometrics 25(1), 71-92.
- S. Karlsson (2012) Forecasting with Bayesian Vector Autoregressions, Handbook of Economic Forecasting, Vol 2.
- G. Koop (2011) Forecasting with Medium and Large Bayesian VARs, working paper.

All lecture slides, tutorial questions, many solutions etc can be found in OLAT. Preferably activate e-mail notifications. Feel free to pose questions in the Forum.

For Bayesian VARs, there are nice toolboxes available online:

- Ambrogio Cesa-Bianchi: <https://sites.google.com/site/ambropo/MatlabCodes>
- The BEAR toolbox: <https://www.ecb.europa.eu/pub/research/working-papers/html/bear-toolbox.en.html>