

Bayesian R packages for Econometrics

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Disclaimer: This list is certainly not complete as it is based on my own personal experience.

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1 MCMCpack: MCMC Package

This package contains functions to perform Bayesian inference using posterior simulation for a number of statistical models.

- Version: 1.3-3
- Depends: R ($\geq 2.10.0$), coda ($\geq 0.11-3$), MASS, stats
- Published: 2013-05-01
- Author: Andrew D. Martin, Kevin M. Quinn, and Jong Hee Park
- Maintainer: Jong Hee Park <jongheepark@snu.ac.kr>
- Basic reference: Maring, Quinn and Park (2011) MCMCpack: Markov chain Monte Carlo in R. *Journal of Statistical Software*, **42**, 2-21.

A few models in the MCMCpack:

- MCMCregress - MCMC for Gaussian Linear Regression (GLR)
- MCMChregress - MCMC for the Hierarchical GLR
- MCMClogit - MCMC for Logistic Regression
- MCMCmnl - MCMC for Multinomial Logistic Regression
- MCMCpoisson - MCMC for Poisson Regression
- MCMCtobit - MCMC for GLR with a Censored Dependent Variable
- MCMCprobit - MCMC for Probit Regression
- MCMCoprobit - MCMC for Ordered Probit Regression
- MCMCoprobitChange - MCMC for Ordered Probit Changepoint Regression
- MCMCfactanal - MCMC for Normal Theory Factor Analysis
- MCMCordfactanal - MCMC for Ordinal Data Factor Analysis
- MCMCquantreg - Bayesian quantile regression using Gibbs sampling

2 bayesm: Bayes for Marketing/Micro-econometrics

bayesm covers many important models used in marketing and micro-econometrics applications.

- Version: 2.2-5
- Depends: R (≥ 2.10)
- Published: 2012-05-16
- Author: Peter Rossi.
- Maintainer: Peter Rossi <perossichi@gmail.com>
- Basic reference: Rossi, Allenby and McCulloch (2005) *Bayesian Statistics and Marketing*. Wiley.

A few models in the bayesm:

- runireg - IID Sampler for Univariate Regression
- runiregGibbs - Gibbs Sampler for Univariate Regression
- rsurGibbs - Gibbs Sampler for Seemingly Unrelated Regressions
- rordprobitGibbs - Gibbs Sampler for Ordered Probit
- rnmixGibbs - Gibbs Sampler for Normal Mixtures
- rnegbinRw - MCMC Algorithm for Negative Binomial Regression
- rmvpGibbs - Gibbs Sampler for Multivariate Probit
- rmultireg - Draw from the Posterior of a Multivariate Regression
- rmnpGibbs - Gibbs Sampler for Multinomial Probit
- rmnlIndepMetrop - MCMC Algorithm for Multinomial Logit Model
- rivGibbs - Gibbs Sampler for Linear IV Model
- rivDP - Linear IV Model with DP Process Prior for Errors
- rhierLinearModel - Gibbs Sampler for Hierarchical Linear Model
- rbprobitGibbs - Gibbs Sampler (Albert and Chib) for Binary Probit

3 BayesLogit: Logistic Regression

The `BayesLogit` package does posterior simulation for binomial and multinomial logistic regression using the Polya-Gamma latent variable technique. This method is fully automatic, exact, and fast. A routine to efficiently sample from the Polya-Gamma class of distributions is included.

- Version: 0.2-4
- Depends: `R` ($\geq 2.14.0$)
- Published: 2013-11-12
- Author: Nicholas G. Polson, James G. Scott, and Jesse Windle
- Maintainer: Jesse Windle <jwindle@ices.utexas.edu>
- Basic reference: Polson, Scott and Windle (2013) Bayesian Inference for Logistic Models Using Pólya-Gamma Latent Variables. *Journal of the American Statistical Association*, **108**, 1339-1349.

4 bayesGARCH: GARCH(1,1) with Student-t errors

This package provides the `bayesGARCH` function which performs the Bayesian estimation of the GARCH(1,1) model with Student's t innovations.

- Version: 2.0.1
- Depends: `mvtnorm`, `coda`
- Published: 2014-01-07
- Author: David Ardia
- Maintainer: David Ardia <david.ardia@fsa.ulaval.ca>
- Basic reference: Ardia (2009) Bayesian Estimation of a Markov-Switching Threshold Asymmetric GARCH Model with Student-t Innovations. *Econometrics Journal*, **12**, 105-126. Also, Ardia and Hoogerheide (2010) Bayesian Estimation of the GARCH(1,1) Model with Student-t Innovations. *The R Journal*, **2**, 41-47.

5 `stochvol`: Bayesian inference for SV models

This package provides efficient algorithms for fully Bayesian estimation of stochastic volatility (SV) models via Markov chain Monte Carlo (MCMC) methods.

- Version: 0.8-1
- Depends: R (≥ 2.14), coda
- Imports: Rcpp ($\geq 0.9.10$)
- Published: 2014-02-07
- Author: Gregor Kastner
- Maintainer: Gregor Kastner <gregor.kastner@wu.ac.at>
- Basic reference: Kastner and Frühwirth-Schnatter (2013) Ancillarity-sufficiency interweaving strategy for boosting MCMC estimation of stochastic volatility models. *Computational Statistics and Data Analysis*.

6 `dln`: Bayesian and Likelihood Analysis of DLM

Maximum likelihood, Kalman filtering and smoothing, and Bayesian analysis of Normal linear State Space models, also known as Dynamic Linear Models

- Version: 1.1-3
- Published: 2013-03-26
- Author: Giovanni Petris.
- Maintainer: Giovanni Petris <GPetris@uark.edu>
- Basic reference: Petris (2010) An R Package for Dynamic Linear Models. *Journal of Statistical Software*, **36**, 1-16. Also, Petris, Petrone, and Campagnoli (2009) *Dynamic Linear Models with R*. Springer.

7 Other Bayesian packages in R

- `BayesCR`: Censored linear regression models with SMN distributions
- `Bayesianbetareg`: Beta regression: joint mean and precision modeling
- `BayesLCA`: Latent Class Analysis
- `bayesmix`: Mixture Models with JAGS
- `bayesQR`: Quantile regression
- `BAYSTAR`: Threshold autoregressive model
- `bayesSurv`: Survival Regression with Flexible Error and Random Effects
- `Bayesthresh`: Thresholds mixed-effects models for categorical data
- `BayesTree`: Tree Based Models
- `BayesVarSel`: Variable selection in Linear Models
- `bfa`: Factor Analysis
- `BGLR`: Generalized Linear Regression
- `BLR`: Linear Regression
- `BMA`: Bayesian Model Averaging
- `Brq`: Quantile regression models
- `BRugs`: R interface to the OpenBUGS MCMC software
- `blme`: Linear Mixed-Effects Models
- `CCAGFA` : Canonical correlation analysis and group factor analysis
- `conting`: Bayesian analysis of contingency tables
- `DIRECT`: Clustering of Multivariate Data Under the Dirichlet-Process Prior
- `DPpackage`: Bayesian nonparametric modeling in R
- `evdbayes`: Bayesian Analysis in Extreme Value Theory
- `FacPad`: Sparse Factor Analysis for pathways responsive to drug treatment
- `factorQR`: Bayesian quantile regression factor models
- `ivbma`: IV Estimation/Model Determination via Conditional Bayes Factors
- `mlogitBMA`: Bayesian Model Averaging for Multinomial Logit Models
- `MSBVAR`: Markov-Switching, Bayesian, Vector Autoregression Models
- `spikeSlabGAM`: Variable selection and model choice for GAM models
- `spTimer`: Spatio-Temporal Bayesian Modelling Using R
- `survBayes`: Proportional hazards model to time to event data

8 http://en.wikipedia.org/wiki/Comparison_of_statistical_packages

Product	Windows	Mac OS	Linux	Unix
EViews	Yes	Yes	No	No
MATLAB	Yes	Yes	Yes	No
R	Yes	Yes	Yes	Yes
RATS	Yes	Yes	Yes	Yes
SAS	Yes	No	Yes	Yes
Stata	Yes	Yes	Yes	Yes

Product	OLS	WLS	2SLS	NLLS	Logistic	GLM
EViews	Yes	Yes	Yes	Yes	Yes	Yes
MATLAB	Yes	Yes	Yes	Yes	Yes	Yes
R	Yes	Yes	Yes	Yes	Yes	Yes
RATS	Yes	Yes	Yes	Yes	Yes	Yes
SAS	Yes	Yes	Yes	Yes	Yes	Yes
Stata	Yes	Yes	Yes	Yes	Yes	Yes

Product	LAD	Stepwise	Quantile	Probit	Cox	Poisson	MLR
EViews	Yes	Yes	Yes	Yes	No	Yes	Yes
MATLAB	Yes	Yes	No	Yes	Yes	Yes	Yes
R	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RATS	Yes	Yes	Yes	Yes	No	Yes	Yes
SAS	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Stata	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Product	ARIMA	GARCH	Unit root test	Cointegration test	VAR	MGARCH
EViews	Yes	Yes	Yes	Yes	Yes	Yes
MATLAB	Yes	Yes	Yes	Yes	Yes	No
R	Yes	Yes	Yes	Yes	Yes	Yes
RATS	Yes	Yes	Yes	Yes	Yes	Yes
SAS	Yes	Yes	Yes	Yes	Yes	Yes
Stata	Yes	Yes	Yes	Yes	Yes	Yes