Description

bayes: dsge fits a Bayesian linear dynamic stochastic general equilibrium model to continuous multivariate time series; see [BAYES] bayes and [DSGE] dsge for details.

Quick start

Autoregressive model of order 1 with uniform prior for the autoregressive coefficient \( \rho \)

bayes, prior(\{rho\}, uniform(0,1)): dsge (y = z) (F.z = \{rho\}*z, state)

Save simulation results to bdsgesim.dta, and use a random-number seed for reproducibility

bayes, prior(\{rho\}, uniform(0,1)) rseed(17) saving(bdsgesim): ///
   dsge (y = z) (F.z = \{rho\}*z, state)

Specify 20,000 Markov chain Monte Carlo (MCMC) samples, and set length of burn-in period to 5,000

bayes, prior(\{rho\}, uniform(0,1)) mcmcsize(20000) burnin(5000): ///
   dsge (y = z) (F.z = \{rho\}*z, state)

Estimate an Euler equation for variable \( y \)

bayes, prior(\{rho\}, uniform(0,1)) prior(\{sigma\}, beta(5, 5)): ///
   dsge (y = f.y - \{sigma\}*r) (F.r = \{rho\}*r, state)

In the above, request that a 90% highest posterior density (HPD) credible interval be displayed instead of the default 95% equal-tailed credible interval.

bayes, clevel(90) hpd

Also see Quick start in [BAYES] bayes.

Menu

Statistics > Multivariate time series > Bayesian models > Linear DSGE models
Syntax

bayes, prior(userparams,...) [bayesopts] : dsge eqlist [if] [in] [, options]

options Description

Advanced
lintolerance(#) set tolerance used for linearity check; seldom used
level(#) set credible level; default is level(95)
noidencheck do not check for parameter identification; implied
solve return model solution at initial values; implied

bayes: dsge, level() is equivalent to bayes, clevel(): dsge.
For a detailed description of options, see Options in [DSGE] dsge.
Options level(), noidencheck, and stable do not appear on the dialog box.

bayesopts Description

Priors
*igammaprior(# #) specify shape and scale of default inverse-gamma prior for standard
deviations of shocks; default is igammaprior(0.01 0.01)
prior(priorspec) prior for model parameters; this option may be repeated and is
required for all user-defined parameters userparams
dryrun show model summary without estimation

Simulation
nchains(#) number of chains; default is to simulate one chain
mcmcsize(#) MCMC sample size; default is mcmcsize(10000)
burnin(#) burn-in period; default is burnin(2500)
thinning(#) thinning interval; default is thinning(1)
rseed(#) random-number seed
exclude(paramref) specify model parameters to be excluded from the simulation results

Blocking
block(paramref[, blockopts]) specify a block of model parameters; this option may be repeated
blocksummary display block summary

Initialization
initial(initspec) specify initial values for model parameters with a single chain
init#(initspec) specify initial values for #th chain; requires nchains()
initall(initspec) specify initial values for all chains; requires nchains()
nomleinitial suppress the use of maximum likelihood estimates as starting values
initrandom specify random initial values
initsummary display initial values used for simulation
*noisily display output from the estimation command during initialization
Reporting

`clevel(#)` set credible interval level; default is `clevel(95)`
`hpd` display HPD credible intervals instead of the default equal-tailed credible intervals
`batch(#)` specify length of block for batch-means calculations; default is `batch(0)`

`saving(filename[, replace])` save simulation results to `filename.dta`
`nomodelsummary` suppress model summary
`chainsdetail` display detailed simulation summary for each chain
`[no]dots` suppress dots or display dots every 100 iterations and iteration numbers every 1,000 iterations; default is `nodots`
`dots(#[, every(#)])` display dots as simulation is performed
`[no]show(paramref)` specify model parameters to be excluded from or included in the output
`notable` suppress estimation table
`noheader` suppress output header
`title(string)` display `string` as title above the table of parameter estimates
`display_options` control spacing, line width, and base and empty cells

Advanced

`search(search_options)` control the search for feasible initial values
`corrlag(#)` specify maximum autocorrelation lag; default varies
`corrtol(#)` specify autocorrelation tolerance; default is `corrtol(0.01)`

*Starred options are specific to the `bayes` prefix; other options are common between `bayes` and `bayesmh`.

`priorspec` and `paramref` are defined in `[BAYES] bayesmh`.
`paramref` may contain factor variables; see [U] 11.4.3 Factor variables.
`collect` is allowed; see [U] 11.1.10 Prefix commands.

See [U] 20 Estimation and postestimation commands for more capabilities of estimation commands.

Model parameters are user-defined parameters `userparams` and standard deviations of shocks `{sd(e.exogstate)}`. Use the `dryrun` option to see the definitions of model parameters prior to estimation.

For a detailed description of `bayesopts`, see `Options` in `[BAYES] bayes`.

`nomleinitial` is assumed. Default parameter values are set to means of priors.

Remarks and examples

For a general introduction to Bayesian analysis, see [BAYES] Intro. For a general introduction to Bayesian estimation using an adaptive Metropolis–Hastings algorithm, see [BAYES] bayesmh. For remarks and examples specific to the `bayes` prefix, see [BAYES] bayes. For details about the estimation command, see [DSGE] dsge.

For a simple example of the `bayes` prefix, see Introductory example in [BAYES] bayes. For an introduction to and examples of Bayesian DSGEs, see [DSGE] Intro 9 and [DSGE] Intro 9a.

Stored results

See Stored results in [BAYES] bayes. Also see Stored results in [DSGE] dsge.
Methods and formulas


Also see

[BAYES] bayes: dsge postestimation — Postestimation tools for bayes: dsge and bayes: dsgenl
[BAYES] bayes — Bayesian regression models using the bayes prefix
[DSGE] dsge — Linear dynamic stochastic general equilibrium models
[BAYES] Bayesian postestimation — Postestimation tools for bayesmh and the bayes prefix
[BAYES] Bayesian estimation — Bayesian estimation commands
[BAYES] Bayesian commands — Introduction to commands for Bayesian analysis
[BAYES] Intro — Introduction to Bayesian analysis
[BAYES] Glossary