

bayes: dsge — Bayesian linear dynamic stochastic general equilibrium models

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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 `bdsogesim.dta`, and use a random-number seed for reproducibility

```
bayes, prior({rho}, uniform(0,1)) rseed(17) saving(bdsogesim): ///
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]
```

<i>options</i>	Description
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Advanced

<code>lintolerance(#)</code>	set tolerance used for linearity check; seldom used
<code>level(#)</code>	set credible level; default is <code>level(95)</code>
<code>noidencheck</code>	do not check for parameter identification; implied
<code>solve</code>	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.

<i>bayesopts</i>	Description
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Priors

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

Simulation

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

Blocking

<code>block(<i>paramref</i> [, <i>blockopts</i>])</code>	specify a block of model parameters; this option may be repeated
<code>blocksummary</code>	display block summary

Initialization

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

Reporting

<code>clevel(#)</code>	set credible interval level; default is <code>clevel(95)</code>
<code>hpd</code>	display HPD credible intervals instead of the default equal-tailed credible intervals
<code>batch(#)</code>	specify length of block for batch-means calculations; default is <code>batch(0)</code>
<code>saving(filename[, replace])</code>	save simulation results to <code>filename.dta</code>
<code>nomodelsummary</code>	suppress model summary
<code>chainsdetail</code>	display detailed simulation summary for each chain
<code>[no]dots</code>	suppress dots or display dots every 100 iterations and iteration numbers every 1,000 iterations; default is <code>nodots</code>
<code>dots(#[, every(#)])</code>	display dots as simulation is performed
<code>[no]show(paramref)</code>	specify model parameters to be excluded from or included in the output
<code>notable</code>	suppress estimation table
<code>noheader</code>	suppress output header
<code>title(string)</code>	display <i>string</i> as title above the table of parameter estimates
<code>display_options</code>	control spacing, line width, and base and empty cells

Advanced

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

*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

[stata.com](http://www.stata.com)

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

See *Methods and formulas* in [DSGE] **dsge** and [DSGE] **Intro 9**. See *Methods and formulas* in [BAYES] **bayesmh**.

Also see

[BAYES] **bayes: dsge postestimation** — Postestimation tools for bayes: dsge and bayes: dsge1

[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**

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