Title

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bayes: mvreg — Bayesian multivariate regression

Description

`bayes: mvreg` fits a Bayesian multivariate regression to multiple continuous outcomes; see [BAYES] **bayes** and [MV] **mvreg** for details.

Quick start

Bayesian multivariate regression of `y1` and `y2` on `x1` and `x2`, using default normal priors for regression coefficients and Jeffreys prior for the covariance matrix

```
bayes: mvreg y1 y2 = x1 x2
```

Use a standard deviation of 10 instead of 100 for the default normal priors

```
bayes, normalprior(10): mvreg y1 y2 = x1 x2
```

Use uniform priors for the slopes and a normal prior for the intercept of the dependent variable `y2`

```
bayes, prior({y2: x1 x2}, uniform(-10,10)) ///
prior({y2:_cons}, normal(0,10)): mvreg y1 y2 = x1 x2
```

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

```
bayes, saving(simdata) rseed(123): mvreg y1 y2 = x1 x2
```

Specify 20,000 MCMC samples, set length of the burn-in period to 5,000, and request that a dot be displayed every 500 simulations

```
bayes, mcmcsize(20000) burnin(5000) dots(500): mvreg y1 y2 = x1 x2
```

In the above, request that the 90% 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** and *Quick start* in [MV] **mvreg**.

Menu

Statistics > Linear models and related > Bayesian regression > Multivariate regression

Syntax

`bayes` [, *bayesopts*] : `mvreg` *depvars* = *indepvars* [*if*] [*in*] [*weight*] [, *options*]

options	Description
Model	
`noconstant`	suppress constant term
Reporting	
display_options	control spacing, line width, and base and empty cells
`level(#)`	set credible level; default is `level(95)`

indepvars may contain factor variables; see **[U] 11.4.3 Factor variables**.

`fweight`s are allowed; see **[U] 11.1.6 weight**.

`bayes: mvreg, level()` is equivalent to `bayes, clevel(): mvreg`.

For a detailed description of *options*, see *Options* in **[MV] mvreg**.

bayesopts	Description
Priors	
*`gibbs`	specify Gibbs sampling; available only with normal priors for regression coefficients and multivariate Jeffreys prior for covariance
*`normalprior(#)`	specify standard deviation of default normal priors for regression coefficients; default is `normalprior(100)`
`prior(`*priorspec*`)`	prior for model parameters; this option may be repeated
`dryrun`	show model summary without estimation
Simulation	
`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	
*`blocksize(#)`	maximum block size; default is `blocksize(50)`
`block(`*paramref* [, *blockopts*]`)`	specify a block of model parameters; this option may be repeated
`blocksummary`	display block summary
*`noblocking`	do not block parameters by default
Initialization	
`initial(`*initspec*`)`	initial values for model parameters
`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

Adaptation	
adaptation(*adaptopts*)	control the adaptive MCMC procedure
scale(#)	initial multiplier for scale factor; default is scale(2.38)
covariance(*cov*)	initial proposal covariance; default is the identity matrix
Reporting	
clevel(#)	set credible interval level; default is clevel(95)
hpd	display HPD credible intervals instead of the default equal-tailed credible intervals
eform[(*string*)]	report exponentiated coefficients and, optionally, label as *string*
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
[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.

Options prior() and block() can be repeated.

priorspec and *paramref* are defined in [BAYES] **bayesmh**.

paramref may contain factor variables; see **[U] 11.4.3 Factor variables**.

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

Model parameters are regression coefficients {$depvar_1$:*indepvars*}, {$depvar_2$:*indepvars*}, and so on, and covariance matrix {Sigma,matrix}. Use the dryrun option to see the definitions of model parameters prior to estimation.

Multivariate Jeffreys prior, jeffreys(*d*), is used by default for the covariance matrix of dimension *d*.

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

Remarks and examples

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For a general introduction to Bayesian analysis, see [BAYES] **intro**. For a general introduction to Bayesian estimation using adaptive Metropolis–Hastings and Gibbs algorithms, see [BAYES] **bayesmh**. For remarks and examples specific to the bayes prefix, see [BAYES] **bayes**. For details about the estimation command, see [MV] **mvreg**.

For a simple example of the bayes prefix, see *Introductory example* in [BAYES] **bayes**.

Stored results

See *Stored results* in [BAYES] **bayesmh**.

Methods and formulas

See *Methods and formulas* in [BAYES] **bayesmh**.

Also see

[BAYES] **bayes** — Bayesian regression models using the bayes prefix

[MV] **mvreg** — Multivariate regression

[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**