

bayes: glm — Bayesian generalized linear models
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Description

`bayes: glm` fits a Bayesian generalized linear model to outcomes of different types such as continuous, binary, count, and so on; see [\[BAYES\] bayes](#) and [\[R\] glm](#) for details.

Quick start

Bayesian generalized linear model of `y` on `x1` and `x2`, using the Gaussian family and log link and using default normal priors for regression coefficients

```
bayes: glm y x1 x2, family(gaussian) link(log)
```

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

```
bayes, normalprior(10): glm y x1 x2, family(gaussian) link(log)
```

Use uniform priors for the slopes and a normal prior for the intercept

```
bayes, prior({y: x1 x2}, uniform(-10,10)) ///
prior({y:_cons}, normal(0,10)): ///
glm y x1 x2, family(gaussian) link(log)
```

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

```
bayes, saving(simdata) rseed(123): ///
glm y x1 x2, family(gaussian) link(log)
```

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, mcmcsample(20000) burnin(5000) dots(500): ///
glm y x1 x2, family(gaussian) link(log)
```

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
```

Fit a logit model and display results as odds ratios

```
bayes: glm z x1 x2, family(binomial) eform
```

Display odds ratios on replay

```
bayes, eform
```

Also see [Quick start in \[BAYES\] bayes](#) and [Quick start in \[R\] glm](#).

Menu

Statistics > Generalized linear models > Bayesian generalized linear models (GLM)

Syntax

```
bayes [, bayesopts] : glm depvar [indepvars] [if] [in] [weight] [, options]
```

<i>options</i>	Description
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Model	
<u>family</u> (<i>familyname</i>)	distribution of <i>depvar</i> ; default is <code>family(gaussian)</code>
<u>link</u> (<i>linkname</i>)	link function; default is canonical link for <code>family()</code> specified

Model 2	
<u>noconstant</u>	suppress constant term
<u>exposure</u> (<i>varname</i>)	include $\ln(\textit{varname})$ in model with coefficient constrained to 1
<u>offset</u> (<i>varname</i>)	include <i>varname</i> in model with coefficient constrained to 1
<u>collinear</u>	keep collinear variables
<u>asis</u>	retain perfect predictor variables
<u>mu</u> (<i>varname</i>)	use <i>varname</i> as the initial estimate for the mean of <i>depvar</i>
<u>init</u> (<i>varname</i>)	synonym for <code>mu(varname)</code>

Reporting	
<u>eform</u>	report exponentiated coefficients
<u>display_options</u>	control spacing, line width, and base and empty cells
<u>level</u> (#)	set credible level; default is <code>level(95)</code>

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

depvar and *indepvars* may contain time-series operators; see [U] 11.4.4 **Time-series varlists**.

fweights are allowed; see [U] 11.1.6 **weight**.

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

For a detailed description of *options*, see *Options* in [R] **glm**.

<i>bayesopts</i>	Description
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Priors	
* <u>normalprior</u> (#)	specify standard deviation of default normal priors for regression coefficients; default is <code>normalprior(100)</code>
<u>prior</u> (<i>priorspec</i>)	prior for model parameters; this option may be repeated
<u>dryrun</u>	show model summary without estimation

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

Blocking	
* <u>blocksize</u> (#)	maximum block size; default is <code>blocksize(50)</code>
<u>block</u> (<i>paramref</i> [, <i>blockopts</i>])	specify a block of model parameters; this option may be repeated
<u>blocksummary</u>	display block summary
* <u>noblocking</u>	do not block parameters by default

Initialization

<u>initial</u> (<i>initspec</i>)	initial values for model parameters
<u>nomleinitial</u>	suppress the use of maximum likelihood estimates as starting values
<u>initransom</u>	specify random initial values
<u>initsummary</u>	display initial values used for simulation
* <u>noisily</u>	display output from the estimation command during initialization

Adaptation

<u>adaptation</u> (<i>adaptopts</i>)	control the adaptive MCMC procedure
<u>scale</u> (#)	initial multiplier for scale factor; default is <code>scale(2.38)</code>
<u>covariance</u> (<i>cov</i>)	initial proposal covariance; default is the identity matrix

Reporting

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

Advanced

<u>search</u> (<i>search_options</i>)	control the search for feasible initial values
<u>corrlag</u> (#)	specify maximum autocorrelation lag; default varies
<u>corrtol</u> (#)	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`. 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 {*devar:indepvars*}. 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`.

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 [R] `glm`.

For a simple example of the `bayes` prefix, see *Introductory example* in [BAYES] `bayes`. Also see *Generalized linear model* in [BAYES] `bayes`.

`bayes: glm` does not estimate the scale parameter but uses a fixed value as provided by the `glm` command. If you want to fit a GLM and estimate the scale parameter, use `bayes: meglm` without specifying random effects.

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

[R] `glm` — Generalized linear 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`