Title

> **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 Markov chain Monte Carlo (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): ///
    glm y x1 x2, family(gaussian) link(log)

In the above, request that the 90% highest posterior density (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*⎤

options	Description
Model	
family(*[familyname](#)*)	distribution of *[depvar](#)*; default is family(gaussian)
link(*[linkname](#)*)	link function; default is canonical link for family() specified
Model 2	
noconstant	suppress constant term
exposure(*[varname](#)*)	include ln(*varname*) in model with coefficient constrained to 1
offset(*[varname](#)*)	include *varname* in model with coefficient constrained to 1
asis	retain perfect predictor variables
mu(*[varname](#)*)	use *varname* as the initial estimate for the mean of *[depvar](#)*
init(*[varname](#)*)	synonym for mu(*varname*)
Reporting	
eform	report exponentiated coefficients
[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.

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.

bayesopts	Description
[Priors](#)	
* 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](#)	
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](#)	
* 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*)	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

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
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)

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

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

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 regression coefficients {*depvar*:*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

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] **bayes**.

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**