

bayes: melogit — Bayesian multilevel logistic regression
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Description

`bayes: melogit` fits a Bayesian multilevel logistic regression to a binary outcome; see [\[BAYES\] bayes](#) and [\[ME\] melogit](#) for details.

Quick start

Bayesian two-level logistic regression of `y` on `x1` and `x2` with random intercepts by `id`, using default normal priors for regression coefficients and default inverse-gamma prior for the variance of random intercepts

```
bayes: melogit y x1 x2 || id:
```

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

```
bayes, normalprior(10): melogit y x1 x2 || id:
```

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)): melogit y x1 x2 || id:
```

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

```
bayes, saving(simdata) rseed(123): melogit y x1 x2 || id:
```

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): melogit y x1 x2 || id:
```

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
```

Display odds ratios instead of coefficients

```
bayes: melogit y x1 x2 || id: , or
```

Display odds ratios on replay

```
bayes, or
```

Also see [Quick start](#) in [\[BAYES\] bayes](#) and [Quick start](#) in [\[ME\] melogit](#).

Menu

Statistics > Multilevel mixed-effects models > Bayesian regression > Logistic regression

Syntax

```
bayes [ , bayesopts ] : melogit depvar fe_equation
      [ || re_equation ] [ || re_equation ... ] [ , options ]
```

where the syntax of *fe_equation* is

```
[ indepvars ] [ if ] [ in ] [ weight ] [ , fe_options ]
```

and the syntax of *re_equation* is one of the following:

for random coefficients and intercepts

```
levelvar: [ varlist ] [ , re_options ]
```

for random effects among the values of a factor variable

```
levelvar: R.varname
```

levelvar either is a variable identifying the group structure for the random effects at that level or is `_all`, representing one group comprising all observations.

<i>fe_options</i>	Description
Model	
<u>noconstant</u>	suppress constant term from the fixed-effects equation
<u>offset</u>(<i>varname</i>)	include <i>varname</i> in model with coefficient constrained to 1
<u>asis</u>	retain perfect predictor variables

<i>re_options</i>	Description
Model	
<u>covariance</u>(<i>vartype</i>)	variance–covariance structure of the random effects ; only structures independent , identity , and unstructured supported
<u>noconstant</u>	suppress constant term from the random-effects equation

<i>options</i>	Description
Model	
<u>binomial</u>(<i>varname</i> #)	set binomial trials if data are in binomial form
<u>collinear</u>	keep collinear variables
Reporting	
or	report odds ratios
<u>notable</u>	suppress coefficient table
<u>noheader</u>	suppress output header
<u>nogroup</u>	suppress table summarizing groups
<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, *indepvars*, and *varlist* may contain time-series operators; see [U] 11.4.4 **Time-series varlists**.

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

bayes: **melogit**, **level()** is equivalent to **bayes**, **clevel()**: **melogit**.

For a detailed description of *options*, see *Options* in [ME] **melogit**.

<i>bayesopts</i>	Description
Priors	
* normalprior (#)	specify standard deviation of default normal priors for regression coefficients; default is normalprior (100)
* igammaprior (# #)	specify shape and scale of default inverse-gamma prior for variance components; default is igammaprior (0.01 0.01)
* iwishartprior (# [...])	specify degrees of freedom and, optionally, scale matrix of default inverse-Wishart prior for unstructured random-effects covariance
prior (<i>priorspec</i>)	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 (<i>paramref</i>)	specify model parameters to be excluded from the simulation results
restubs (<i>restub1 restub2 ...</i>)	specify stubs for random-effects parameters for all levels
Blocking	
* blocksize (#)	maximum block size; default is blocksize (50)
block (<i>paramref</i> [, <i>blockopts</i>])	specify a block of model parameters; this option may be repeated
blocksummary	display block summary
* noblocking	do not block parameters by default
Initialization	
initial (<i>initspec</i>)	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 (<i>adaptopts</i>)	control the adaptive MCMC procedure
scale (#)	initial multiplier for scale factor; default is scale (2.38)
covariance (<i>cov</i>)	initial proposal covariance; default is the identity matrix

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
* or	report odds ratios
<code>eform[<i>(string)</i>]</code>	report exponentiated coefficients and, optionally, label as <i>string</i>
<code>remargl</code>	compute log marginal likelihood
<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 <i>filename.dta</i>
<code>nomodelsummary</code>	suppress model summary
<code>nomesummary</code>	suppress multilevel-structure summary
<code>[no]dots</code>	suppress dots or display dots every 100 iterations and iteration numbers every 1,000 iterations; default is <code>dots</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>showeffects[<i>(ref)</i>]</code>	specify that all or a subset of random-effects parameters be included in the output
<code>melabel</code>	display estimation table using the same row labels as <code>melogit</code>
<code>nogroup</code>	suppress table summarizing groups
<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>corrctl(#)</code>	specify autocorrelation tolerance; default is <code>corrctl(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 `{depvar: indepvars}`, random effects `{rename}`, and either variance components `{rename: sigma2}` or, if option `covariance(unstructured)` is specified, matrix parameter `{restub: Sigma, matrix}`; see *Likelihood model* in [BAYES] `bayes` for how `renames` and `restub` are defined. 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 [ME] `melogit`.

For a simple example of the `bayes` prefix, see *Introductory example* in [BAYES] `bayes`. For multilevel examples, see *Multilevel models* 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

[ME] `melogit` — Multilevel mixed-effects logistic 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`