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Description

`bayes: xtlogit` fits a Bayesian panel-data random-effects logit model to a binary outcome; see [\[BAYES\] bayes](#) and [\[XT\] xtlogit](#) for details.

Quick start

Bayesian random-effects logit model of y on x_1 and x_2 with random intercepts by `id` (after `xtsetting` on panel variable `id`), using default normal priors for regression coefficients and default inverse-gamma prior for the variance of random intercepts

```
bayes: xtlogit y x1 x2
```

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

```
bayes, normalprior(10): xtlogit y x1 x2
```

Use a shape of 1 and a scale of 2 instead of values of 0.01 for the default inverse-gamma prior

```
bayes, igammaprior(1 2): xtlogit y x1 x2
```

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)): xtlogit y x1 x2
```

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

```
bayes, saving(simdata) rseed(123): xtlogit y x1 x2
```

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): xtlogit y x1 x2
```

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
```

Report odds ratios instead of regression coefficients

```
bayes, or
```

Also see [Quick start](#) in [\[BAYES\] bayes](#) and [Quick start](#) in [\[XT\] xtlogit](#).

Menu

Statistics > Longitudinal/panel data > Binary outcomes > Bayesian regression > Logistic regression

Syntax

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

<i>options</i>	Description
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Model

<code>noconstant</code>	suppress constant term
<code>offset(<i>varname</i>)</code>	include <i>varname</i> in model with coefficient constrained to 1
<code>asis</code>	retain perfect predictor variables

Reporting

<code>or</code>	report odds ratios
<code>display_options</code>	control spacing, line width, and base and empty cells
<code>level(#)</code>	set credible level; default is level(95)

A panel variable must be specified; see [XT] `xtset`.

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**.

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

For a detailed description of options, see *Options* in [XT] `xtlogit`.

<i>bayesopts</i>	Description
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Priors

* <code>normalprior(#)</code>	specify standard deviation of default normal priors for regression coefficients; default is <code>normalprior(100)</code>
* <code>igammaprior(##)</code>	specify shape and scale of default inverse-gamma prior for variance components; default is <code>igammaprior(0.01 0.01)</code>
<code>prior(<i>priorspec</i>)</code>	prior for model parameters; this option may be repeated
<code>dryrun</code>	show model summary without estimation

Simulation

<code>nchains(#)</code>	number of chains; default is to simulate one chain
<code>mcmcsize(#)</code>	MCMC sample size; default is <code>mcmcsize(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>initall(<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>initransom</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

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
 * or
`eform(string)` report exponentiated coefficients and, optionally, label as *string*
`remargl` compute log marginal-likelihood; suppressed by default
`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
`showeffects(reref)` specify that all or a subset of random-effects parameters be 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()` 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}`, random effects `{U[panelvar]}` or simply `{U}`, and random-effects variance `{var_U}`. 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 [XT] xtlogit.

For a simple example of the bayes prefix, see *Introductory example* in [BAYES] [bayes](#). Also see *Panel-data models* in [BAYES] [bayes](#).

Stored results

See *Stored results* in [BAYES] [bayes](#). In addition, bayes: xtlogit also stores the following results:

Macros

e(ivar)	variable denoting groups
e(redistrib)	distribution of random effects

Methods and formulas

See *Methods and formulas* in [BAYES] [bayesmh](#).

Also see

[BAYES] [bayes](#) — Bayesian regression models using the bayes prefix

[XT] [xtlogit](#) — Fixed-effects, random-effects, and population-averaged logit models

[BAYES] [Bayesian postestimation](#) — Postestimation tools after Bayesian estimation

[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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