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Description

`bayes: xtoprobit` fits a Bayesian panel-data random-effects ordered probit model to an ordinal outcome; see [\[BAYES\] bayes](#) and [\[XT\] xtoprobit](#) for details.

Quick start

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

```
bayes: xtoprobit y x1 x2
```

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

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

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

```
bayes, saving(simdata) rseed(123): xtoprobit 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): xtoprobit 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
```

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

Menu

Statistics > Longitudinal/panel data > Ordinal outcomes > Bayesian regression > Ordered probit regression

Syntax

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

<i>options</i>	Description
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Model	
<code>offset(<i>varname</i>)</code>	include <i>varname</i> in model with coefficient constrained to 1

Reporting	
<code>display_options</code>	control spacing, line width, and base and empty cells

<code>level(#)</code>	set credible level; default is level(95)
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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](#).

fweights are allowed; see [U] [11.1.6 weight](#).

bayes: xtoprobit, level() is equivalent to bayes, clevel(): xtoprobit.

For a detailed description of *options*, see *Options* in [XT] [xtoprobit](#).

<i>bayesopts</i>	Description
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Priors	
* <code>normalprior(#)</code>	specify standard deviation of default normal priors for regression coefficients; default is normalprior(100)

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

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

<code>block(<i>paramref</i> [, <i>blockopts</i>])</code>	specify a block of model parameters; this option may be repeated
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<code>blocksummary</code>	display block summary
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Initialization

<code>initial(<i>initspec</i>)</code>	specify initial values for model parameters with a single chain
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<code>init#(<i>initspec</i>)</code>	specify initial values for #th chain; requires nchains()
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<code>initall(<i>initspec</i>)</code>	specify initial values for all chains; requires nchains()
---------------------------------------	---

<code>nomleinitial</code>	suppress the use of maximum likelihood estimates as starting values
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<code>initransom</code>	specify random initial values
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<code>initsummary</code>	display initial values used for simulation
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* <code>noisily</code>	display output from the estimation command during initialization
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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*
`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}`, cutpoints `{cut1}`, `{cut2}`, and so on, 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.

Flat priors, `flat`, are used by default for cutpoints.

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] [xtoprobit](#).

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: xtoprobit 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] [xtoprobit](#) — Random-effects ordered probit model

[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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