

bayes: zioprobit — Bayesian zero-inflated ordered probit regression

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Description

`bayes: zioprobit` fits a Bayesian zero-inflated ordered probit regression to an ordinal outcome with a high fraction of zeros; see [\[BAYES\] bayes](#) and [\[R\] zioprobit](#) for details.

Quick start

Bayesian zero-inflated ordered probit regression of y on x_1 and x_2 , using z to model excess zeros and using default normal priors for regression coefficients and flat priors for cutpoints

```
bayes: zioprobit y x1 x2, inflate(z)
```

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

```
bayes, normalprior(10): zioprobit y x1 x2, inflate(z)
```

Use uniform priors for the slopes and a normal prior for the intercept of the main regression

```
bayes, prior({y: x1 x2}, uniform(-10,10)) ///
prior({y:_cons}, normal(0,10)): zioprobit y x1 x2, inflate(z)
```

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

```
bayes, saving(simdata) rseed(123): ///
zioprobit y x1 x2, inflate(z)
```

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): ///
zioprobit y x1 x2, inflate(z)
```

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
```

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

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Syntax

```
bayes [, bayesopts] : zioprobit depvar [indepvars] [if] [in] [weight],
  inflate(varlist [, noconstant offset(varname)] | _cons) [options]
```

<i>options</i>	Description
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Model	
* <u>inflate</u> ()	equation that determines excess zero values
<u>offset</u> (<i>varname</i>)	include <i>varname</i> in model with coefficient constrained to 1
<u>collinear</u>	keep collinear variables

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

* inflate(*varlist* [, noconstant offset(*varname*)] | _cons) is required.

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

fweights are allowed; see [U] 11.1.6 weight.

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

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

<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

`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
`[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)`

*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}` for the main regression and `{inflate: varlist}` for the inflation equation and cutpoints `{cut1}`, `{cut2}`, and so on. 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

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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] `zioprobit`.

For a simple example of the `bayes` prefix, see *Introductory example* in [BAYES] `bayes`. Also see *Zero-inflated negative binomial 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

[R] **zioprobit** — Zero-inflated ordered probit 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**