

bayes: heckoprobit — Bayesian ordered probit model with sample selection

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Description

`bayes: heckoprobit` fits a Bayesian sample-selection ordered probit regression to a partially observed ordinal outcome; see [\[BAYES\] bayes](#) and [\[R\] heckoprobit](#) for details.

Quick start

Bayesian sample-selection ordered probit regression of `y` on `x1` and `x2`, using `z1` and `z2` to model selection, and using default normal priors for regression coefficients and atanh-correlation and flat priors for cutpoints

```
bayes: heckoprobit y x1 x2, select(z1 z2)
```

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

```
bayes, normalprior(10): heckoprobit y x1 x2, select(z1 z2)
```

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)): heckoprobit y x1 x2, select(z1 z2)
```

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

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

```
heckoprobit y x1 x2, select(z1 z2)
```

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):, ///
```

```
heckoprobit y x1 x2, select(z1 z2)
```

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 [\[R\] heckoprobit](#).

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Statistics > Ordinal outcomes > Bayesian regression > Ordered probit regression with sample selection

Syntax

```
bayes [ , bayesopts ] : heckoprobit depvar indepvars [ if ] [ in ] [ weight ] ,
  select( [ depvars = ] varlists [ , noconstant offset(varnameo) ) [ options ]
```

<i>options</i>	Description
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Model

* select() specify selection equation: dependent and independent variables; whether to have constant term and offset variable

offset(*varname*) include *varname* in model with coefficient constrained to 1

Reporting

display_options control spacing, line width, and base and empty cells

level(#) set credible level; default is `level(95)`

* select() is required.

The full specification is `select([depvars =] varlists [, noconstant offset(varnameo)])`.

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

depvar, *indepvars*, *varlist_s*, and *depvar_s* may contain time-series operators; see [U] 11.4.4 Time-series varlists.

fweights are allowed; see [U] 11.1.6 weight.

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

For a detailed description of *options*, see *Options* in [R] `heckoprobit`.

<i>bayesopts</i>	Description
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Priors

* normalprior(#) specify standard deviation of default normal priors for regression coefficients and atanh-correlation; 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

<code><u>initial</u>(<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><u>nomleinitial</u></code>	suppress the use of maximum likelihood estimates as starting values
<code><u>initrandom</u></code>	specify random initial values
<code><u>initsummary</u></code>	display initial values used for simulation
* <code><u>noisily</u></code>	display output from the estimation command during initialization

Adaptation

<code><u>adaptation</u>(<i>adaptopts</i>)</code>	control the adaptive MCMC procedure
<code><u>scale</u>(#)</code>	initial multiplier for scale factor; default is <code>scale(2.38)</code>
<code><u>covariance</u>(<i>cov</i>)</code>	initial proposal covariance; default is the identity matrix

Reporting

<code><u>clevel</u>(#)</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
<code><u>eform</u>[(<i>string</i>)]</code>	report exponentiated coefficients and, optionally, label as <i>string</i>
<code>batch(#)</code>	specify length of block for batch-means calculations; default is <code>batch(0)</code>
<code><u>saving</u>(<i>filename</i>[, <i>replace</i>])</code>	save simulation results to <i>filename.dta</i>
<code><u>nomodelsummary</u></code>	suppress model summary
<code><u>chainsdetail</u></code>	display detailed simulation summary for each chain
<code>[<i>no</i>] <u>dots</u></code>	suppress dots or display dots every 100 iterations and iteration numbers every 1,000 iterations; default is <code>nodots</code>
<code><u>dots</u>(#[, <i>every</i>(#)])</code>	display dots as simulation is performed
<code>[<i>no</i>] <u>show</u>(<i>paramref</i>)</code>	specify model parameters to be excluded from or included in the output
<code><u>notable</u></code>	suppress estimation table
<code><u>noheader</u></code>	suppress output header
<code><u>title</u>(<i>string</i>)</code>	display <i>string</i> as title above the table of parameter estimates
<code><u>display_options</u></code>	control spacing, line width, and base and empty cells

Advanced

<code><u>search</u>(<i>search_options</i>)</code>	control the search for feasible initial values
<code><u>corrlag</u>(#)</code>	specify maximum autocorrelation lag; default varies
<code><u>corrtol</u>(#)</code>	specify autocorrelation tolerance; default is <code>corrtol(0.01)</code>

*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**.

See [U] 20 **Estimation and postestimation commands** for more capabilities of estimation commands.

Model parameters are regression coefficients `{deprvar:indepvars}` for the main regression and `{select:varlist_s}` for the selection equation, atanh-transformed correlation `{athrho}`, 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

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 [\[R\] heckoprobit](#).

For a simple example of the `bayes` prefix, see *Introductory example* in [\[BAYES\] bayes](#). Also see *Heckman selection model* in [\[BAYES\] bayes](#).

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

[\[R\] heckoprobit](#) — Ordered probit model with sample selection

[\[BAYES\] 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](#)