

bayes: probit — Bayesian probit regression

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Description

`bayes: probit` fits a Bayesian probit regression to a binary outcome; see [\[BAYES\] bayes](#) and [\[R\] probit](#) for details.

Quick start

Bayesian probit regression of y on x_1 and x_2 , using default normal priors for regression coefficients

```
bayes: probit y x1 x2
```

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

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

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

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

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, mcmcsize(20000) burnin(5000) dots(500): probit y x1 x2
```

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

Menu

Statistics > Binary outcomes > Bayesian regression > Probit regression

Syntax

```
bayes [ , bayesopts ] : probit deprvar [indepvars] [if] [in] [weight] [ , options ]
```

| <i>options</i> | Description |
|---|---|
| Model | |
| <u>noconstant</u> | suppress constant term |
| <u>offset</u> (<i>varname</i>) | include <i>varname</i> in model with coefficient constrained to 1 |
| <u>asis</u> | retain perfect predictor variables |
| <u>collinear</u> | keep collinear variables |
| Reporting | |
| <u>display_options</u> | control spacing, line width, and base and empty cells |
| <u>level</u> (#) | set credible level; default is level(95) |
| <hr/> | |
| <i>indepvars</i> may contain factor variables; see [U] 11.4.3 Factor variables . | |
| <i>deprvar</i> and <i>indepvars</i> may contain time-series operators; see [U] 11.4.4 Time-series varlists . | |
| fweights are allowed; see [U] 11.1.6 weight . | |
| bayes: <code>probit</code> , <code>level()</code> is equivalent to bayes, <code>clevel()</code> : <code>probit</code> . | |
| For a detailed description of <i>options</i> , see <i>Options</i> in [R] probit . | |
| <hr/> | |
| <i>bayesopts</i> | Description |
| 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}`. 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 [R] `probit`.

For a simple example of the `bayes` prefix, see *Introductory example* in [BAYES] `bayes`. Also see *Logistic regression with perfect predictors* 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] **probit** — 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**