bayes: meologit — Bayesian multilevel ordered logistic regression

Description

bayes: meologit fits a Bayesian multilevel ordered logistic regression to an ordinal outcome; see [BAYES] bayes and [ME] meologit for details.

Quick start

Bayesian two-level ordered logistic regression of y on x1 and x2 with random intercepts by id, using default normal priors for regression coefficients, flat priors for cutpoints, and default inverse-gamma prior for the variance of random intercepts

bayes: meologit y x1 x2 || id:

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

bayes, normalprior(10): meologit y x1 x2 || id:

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)): meologit y x1 x2 || id:

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

bayes, saving(simdata) rseed(123): meologit y x1 x2 || id:

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): meologit y x1 x2 || id:

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

Display odds ratios instead of coefficients

bayes: meologit y x1 x2 || id: , or

Display odds ratios on replay

bayes, or

Also see Quick start in [BAYES] bayes and Quick start in [ME] meologit.

Menu

Statistics > Multilevel mixed-effects models > Bayesian regression > Ordered logistic regression
Syntax

bayes [, bayesopts] : meologit depvar fe_equation
    [ || re_equation ] [ || re_equation ... ] [ , options ]

where the syntax of fe_equation is

    [ indepvars ] [ if ] [ in ] [ weight ] [ , fe_options ]

and the syntax of re_equation is one of the following:

for random coefficients and intercepts

    levelvar: [ varlist ] [ , re_options ]

for random effects among the values of a factor variable

    levelvar: R.varname

levelvar either is a variable identifying the group structure for the random effects at that level or is _all, representing one group comprising all observations.

fe_options Description

Model

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

re_options Description

Model

covariance(vartype) variance–covariance structure of the random effects; only structures independent, identity, and unstructured supported

noconstant suppress constant term from the random-effects equation

options Description

Reporting

or report odds ratios
notable suppress coefficient table
noheader suppress output header
nogroup suppress table summarizing groups
display_options control spacing, line width, and base and empty cells
level(#) set credible level; default is level(95)

indepvars may contain factor variables; see [U] 11.4.3 Factor variables.
depvar, indepvars, and varlist may contain time-series operators; see [U] 11.4.4 Time-series varlists.
fweights are allowed; see [U] 11.1.6 weight.
bayes: meologit, level() is equivalent to bayes, clevel(): meologit.
For a detailed description of options, see Options in [ME] meologit.
### bayes: meologit — Bayesian multilevel ordered logistic regression

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<td>specify standard deviation of default normal priors for regression coefficients; default is normalprior(100)</td>
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<td><code>*igammaprior(# #)</code></td>
<td>specify shape and scale of default inverse-gamma prior for variance components; default is igammaprior(0.01 0.01)</td>
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<td><code>*iwishartprior(# [...])</code></td>
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<td>initial proposal covariance; default is the identity matrix</td>
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</table>
Reporting

clevel(#)        set credible interval level; default is clevel(95)
hpd             display HPD credible intervals instead of the default equal-tailed credible intervals
* or             report coefficients as odds ratios
  eform[(string)] report exponentiated coefficients and, optionally, label as string
remargl         compute log marginal-likelihood
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
nomesummary     suppress multilevel-structure 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 dots

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
melabel         display estimation table using the same row labels as meologit
nogroup         suppress table summarizing groups
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.

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 {rename}, and either variance components {rename:sigma2} or, if option covariance(unstructured) is specified, matrix parameter {restub:Sigma,matrix}; see Likelihood model in [BAYES] bayes for how renames and restub are defined.  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  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 [ME] meologit.
For a simple example of the `bayes` prefix, see *Introductory example* in [BAYES] bayes. For multilevel examples, see *Multilevel models* 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

[ME] meologit — Multilevel mixed-effects ordered logistic 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