Bayesian two-level ordered logistic regression of \( y \) on \( x_1 \) and \( x_2 \) 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.

\[
\text{bayes: meologit} \ y \ x_1 \ x_2 \ || \ id:
\]

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

\[
\text{bayes, normalprior(10): meologit} \ y \ x_1 \ x_2 \ || \ id:
\]

Use uniform priors for the slopes and a normal prior for the intercept

\[
\begin{align*}
\text{bayes, prior(\{y: x_1 \ x_2\}, uniform(-10,10))} \\
\text{prior(\{y: \_cons\}, normal(0,10)): meologit} \ y \ x_1 \ x_2 \ || \ id:
\end{align*}
\]

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

\[
\text{bayes, saving(simdata) rseed(123): meologit} \ y \ x_1 \ x_2 \ || \ id:
\]

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

\[
\text{bayes, mcmcsize(20000) burnin(5000) dots(500): meologit} \ y \ x_1 \ x_2 \ || \ id:
\]

In the above, request that the 90\% HPD credible interval be displayed instead of the default 95\% equal-tailed credible interval

\[
\text{bayes, clevel(90) hpd}
\]

Display odds ratios instead of coefficients

\[
\text{bayes: meologit} \ y \ x_1 \ x_2 \ || \ id: , \text{ or}
\]

Display odds ratios on replay

\[
\text{bayes, or}
\]

Also see \textit{Quick start} in \texttt{[BAYES] bayes} and \textit{Quick start} in \texttt{[ME] meologit}.
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.

Weights 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.
bayesopts

Priors

*normalprior(#)

**Description**

specify standard deviation of default normal priors for regression coefficients; default is normalprior(100)

*igammaprior(# #)

specify shape and scale of default inverse-gamma prior for variance components; default is igammaprior(0.01 0.01)

*iwishartprior(# [...])

specify degrees of freedom and, optionally, scale matrix of default inverse-Wishart prior for unstructured random-effects covariance prior for model parameters; this option may be repeated

prior(priorspec)

dryrun

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

restubs(restub1 restub2 ...)

specify stubs for random-effects parameters for all levels

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

initial(initspec)

specify initial values for model parameters with a single chain

init#(initspec)

specify initial values for #th chain; requires nchains()

initall(initspec)

specify initial values for all chains; requires nchains()

nomleinitial

suppress the use of maximum likelihood estimates as starting values

initrandom

specify random initial values

initsummary

display initial values used for simulation

*noisily

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
Bayesian multilevel ordered logistic regression

**Reporting**

- `clevel(#)`: set credible interval level; default is `clevel(95)`
- `hpd`: display HPD credible intervals instead of the default equal-tailed credible intervals
- `*or` `eform[(string)]`: report coefficients as odds ratios
- `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
- `namesummary`: 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`
- `dists(#[, 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**

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 \texttt{bayes} prefix, see \textit{Introductory example} in \texttt{BAYES bayes}. For multilevel examples, see \textit{Multilevel models} in \texttt{BAYES bayes}.

**Stored results**

See \textit{Stored results} in \texttt{BAYES bayes}.

**Methods and formulas**

See \textit{Methods and formulas} in \texttt{BAYES bayesmh}.

**Also see**

\texttt{[BAYES] bayes} — Bayesian regression models using the bayes prefix

\texttt{[ME] meologit} — Multilevel mixed-effects ordered logistic regression

\texttt{[BAYES] Bayesian postestimation} — Postestimation tools for bayesmh and the bayes prefix

\texttt{[BAYES] Bayesian estimation} — Bayesian estimation commands

\texttt{[BAYES] Bayesian commands} — Introduction to commands for Bayesian analysis

\texttt{[BAYES] Intro} — Introduction to Bayesian analysis

\texttt{[BAYES] Glossary}