**bayes: intreg — Bayesian interval regression**

**Description**

bayes: intreg fits a Bayesian interval regression to a continuous, interval-measured outcome; see [BAYES] bayes and [R] intreg for details.

**Quick start**

Bayesian interval regression of $y_{\text{lower}}$ and $y_{\text{upper}}$ on $x_1$ and $x_2$, using default normal priors for regression coefficients and log-variance

```
bayes: intreg $y_{\text{lower}}$ $y_{\text{upper}}$ $x_1$ $x_2$
```

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

```
bayes, normalprior(10): intreg $y_{\text{lower}}$ $y_{\text{upper}}$ $x_1$ $x_2$
```

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

```
bayes, prior({$y_{\text{lower}}}: x_1 x_2), uniform(-10,10)) ///
    prior({$y_{\text{lower}}: \text{cons}}, normal(0,10)): intreg $y_{\text{lower}}$ $y_{\text{upper}}$ $x_1$ $x_2$
```

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

```
bayes, saving(simdata) rseed(123): ///
    intreg $y_{\text{lower}}$ $y_{\text{upper}}$ $x_1$ $x_2$
```

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): ///
    intreg $y_{\text{lower}}$ $y_{\text{upper}}$ $x_1$ $x_2$
```

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] intreg.

**Menu**

Statistics > Linear models and related > Bayesian regression > Interval regression
## Syntax

```
bayes [, bayesopts] : intreg depvar1 depvar2 [ indepvars ] [ if ] [ in ] [ weight ] [ , options ]
```

### options

<table>
<thead>
<tr>
<th>Description</th>
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<tr>
<td><strong>Model</strong></td>
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<tr>
<td><code>noconstant</code> suppress constant term</td>
</tr>
<tr>
<td><code>het(varlist[, noconstant])</code> independent variables to model the variance; use noconstant to suppress constant term</td>
</tr>
<tr>
<td><code>offset(varname)</code> include <code>varname</code> in model with coefficient constrained to 1</td>
</tr>
<tr>
<td><strong>Reporting</strong></td>
</tr>
<tr>
<td><code>display_options</code> control spacing, line width, and base and empty cells</td>
</tr>
<tr>
<td><code>level(#)</code> set credible level; default is <code>level(95)</code></td>
</tr>
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`indepvars` and `varlist` may contain factor variables; see [U] 11.4.3 Factor variables.
`depvar1`, `depvar2`, `indepvars`, and `varlist` may contain time-series operators; see [U] 11.4.4 Time-series varlists.
`fweight`s are allowed; see [U] 11.1.6 weight.

`bayes: intreg, level()` is equivalent to `bayes, clevel(): intreg`.
For a detailed description of `options`, see Options in [R] intreg.

### bayesopts

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<tr>
<th>Description</th>
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<tr>
<td><strong>Priors</strong></td>
</tr>
<tr>
<td><code>normalprior(#)</code> specify standard deviation of default normal priors for regression coefficients and log-variance; default is <code>normalprior(100)</code></td>
</tr>
<tr>
<td><code>prior(priorspec)</code> prior for model parameters; this option may be repeated</td>
</tr>
<tr>
<td><code>dryrun</code> show model summary without estimation</td>
</tr>
<tr>
<td><strong>Simulation</strong></td>
</tr>
<tr>
<td><code>nchains(#)</code> number of chains; default is to simulate one chain</td>
</tr>
<tr>
<td><code>mcmcsize(#)</code> MCMC sample size; default is <code>mcmcsiz(10000)</code></td>
</tr>
<tr>
<td><code>burnin(#)</code> burn-in period; default is <code>burnin(2500)</code></td>
</tr>
<tr>
<td><code>thinning(#)</code> thinning interval; default is <code>thinning(1)</code></td>
</tr>
<tr>
<td><code>rseed(#)</code> random-number seed</td>
</tr>
<tr>
<td><code>exclude(paramref)</code> specify model parameters to be excluded from the simulation results</td>
</tr>
<tr>
<td><strong>Blocking</strong></td>
</tr>
<tr>
<td><code>blocksize(#)</code> maximum block size; default is <code>blocksize(50)</code></td>
</tr>
<tr>
<td><code>block(paramref[, blockopts])</code> specify a block of model parameters; this option may be repeated</td>
</tr>
<tr>
<td><code>blocksummary</code> display block summary</td>
</tr>
<tr>
<td><code>noblocking</code> do not block parameters by default</td>
</tr>
</tbody>
</table>
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
*initsummary specify random initial values
*noisily display initial values used for simulation

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
*chainsdetail display detailed simulation summary for each chain
*nodots suppress dots or display dots every 100 iterations and iteration numbers every 1,000 iterations; default is nodots
*dots(#) 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() 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} and log-standard deviation {lnsigma} or, if option het(varlist) is specified, coefficients {lnsigma: varlist} of the log-standard-deviation equation. 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

For a general introduction to Bayesian analysis, see \[\text{[BAYES] Intro.}\] For a general introduction to Bayesian estimation using an adaptive Metropolis–Hastings algorithm, see \[\text{[BAYES] bayesmh.}\] For remarks and examples specific to the \texttt{bayes} prefix, see \[\text{[BAYES] bayes.}\] For details about the estimation command, see \[\text{[R] intreg.}\]

For a simple example of the \texttt{bayes} prefix, see \textit{Introductory example} in \[\text{[BAYES] bayes.}\]

Stored results

\textit{See \textit{Stored results} in \[\text{[BAYES] bayes.}\]}

Methods and formulas

\textit{See \textit{Methods and formulas} in \[\text{[BAYES] bayesmh.}\]}

Also see

\[\text{[BAYES] bayes — Bayesian regression models using the bayes prefix}\]
\[\text{[R] intreg — Interval regression}\]
\[\text{[BAYES] Bayesian postestimation — Postestimation tools for bayesmh and the bayes prefix}\]
\[\text{[BAYES] Bayesian estimation — Bayesian estimation commands}\]
\[\text{[BAYES] Bayesian commands — Introduction to commands for Bayesian analysis}\]
\[\text{[BAYES] Intro — Introduction to Bayesian analysis}\]
\[\text{[BAYES] Glossary}\]