

**BMA postestimation** — Postestimation tools for Bayesian model averaging

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## Description

The following Bayesian model averaging (BMA) postestimation commands are available after `bmaregress`:

Command	Description
<code>bmacoefsample</code>	posterior samples of regression coefficients
<code>bmagraph</code>	graphical summaries
<code>bmagraph pmp</code>	model-probability plots
<code>bmagraph msize</code>	model-size distribution plots
<code>bmagraph varmap</code>	variable-inclusion maps
<code>bmagraph coefdensity</code>	coefficient posterior density plots
<code>bmastats</code>	summaries for models and predictors
<code>bmastats models</code>	posterior model and variable-inclusion summaries
<code>bmastats msize</code>	model-size summary
<code>bmastats pip</code>	posterior inclusion probabilities (PIPs) for predictors
<code>bmastats jointness</code>	jointness measures for predictors
<code>bmastats lps</code>	log predictive-score
<code>bmapredict</code>	BMA predictions
* <code>estimates</code>	cataloging estimation results

\* `estimates table`, `estimates stats`, and `estimates selected` are not appropriate with `bmaregress` estimation results.

The following standard Bayesian postestimation commands are of particular interest after `bmaregress` followed by `bmacoefsample` (see [BMA] [bmacoefsample](#)):

Command	Description
<code>bayesgraph</code>	graphical summaries and convergence diagnostics
<code>bayesstats summary</code>	Bayesian summary statistics for model parameters and their functions
<code>bayesstats ess</code>	effective sample sizes and related statistics
<code>bayesstats ppvalues</code>	Bayesian predictive $p$ -values
<code>bayespredict</code>	Bayesian predictions
* <code>estimates</code>	cataloging estimation results

\* `estimates table`, `estimates stats`, and `estimates selected` are not appropriate with `bmacoefsample` estimation results.

## Remarks and examples

BMA postestimation includes both BMA-specific postestimation tools and some of the standard Bayesian postestimation tools. BMA-specific postestimation is focused on BMA convergence, model exploration, and the importance of predictors based on how frequently they are included in various models. The standard Bayesian postestimation is used for exploring posterior samples of model parameters and regression coefficients, in particular.

After you fit a BMA model by using the `bmaregress` command, the first step of a BMA postestimation analysis, and any Bayesian analysis in general, is to check convergence. The `bmagraph pmp` command provides a visual way to assess BMA convergence by plotting the analytical posterior model probability (PMP) (or its estimate) versus the frequency PMP, estimated from a Markov chain Monte Carlo (MCMC) model sample. If a model converged, the analytical and frequency PMP will be close. See [\[BMA\] `bmagraph pmp`](#) and *Convergence of BMA* in *Remarks and examples* of [\[BMA\] `bmaregress`](#) for details. The PMP graph is also useful to explore the models with high PMP.

Once BMA convergence is established, you can explore the BMA results in more detail. You can use the `bmastats models` command to examine models with high PMP and models that include certain predictors. The `bmagraph pmp` and `bmagraph varmap` commands are essentially graphical counterparts of `bmastats models`. The latter produces a variable-inclusion map, a map that shows each model and all predictors included in that model with color-coded bars that represent the signs of the corresponding coefficients.

The model-size summaries as provided by `bmastats msize` are useful to measure the complexity of the visited models—small-sized models tend to have a few strong predictors whereas larger-sized models tend to have many weaker predictors. In addition to summaries, you can use the `bmagraph msize` command to explore the entire model-size distribution.

The `bmastats pip` command reports PIPs for predictors. In the context of BMA, PIP is used to measure the importance of one predictor relative to the others. And you can also examine the tendency of pairs of predictors to be included together, separately, or independently by computing various jointness measures using `bmastats jointness`.

The `bmagraph coefdensity` command can be used to plot posterior distributions of regression coefficients. These distributions are available analytically for models with a *fixed*  $g$ . But to fully explore the regression coefficients, you will often need to have an MCMC sample from their posterior distribution. You can use the `bmacoefsample` command to generate this sample. In fact, some of the postestimation commands require that a sample like this is available. (`bmaregress` does not generate this sample automatically to save time, because it is not always needed in a BMA analysis.)

The `bmastats lps` command computes log predictive-scores, which can be used to compare goodness of fit and predictive performance of models; see [\[BMA\] `bmastats lps`](#) for details.

Finally, you can use `bmapredict` to obtain various predictions after a BMA model, both in and out of sample; see [\[BMA\] `bmapredict`](#).

Once an MCMC sample of regression coefficients or, more generally, model parameters is available, you can use some of the standard Bayesian postestimation tools as described in [\[BAYES\] Bayesian postestimation](#). For instance, you can use the `bayesstats summary` command to explore posterior summaries, including credible intervals, for regression coefficients; see [\[BAYES\] `bayesstats summary`](#). And you can use the `bayespredict` command to obtain more complicated BMA predictions; see [\[BAYES\] `bayespredict`](#).

You can use `estimates store` and `estimates save` (see [\[R\] `estimates`](#)) to store or save estimation results after `bmaregress` and `bmacoefsample`. The `estimates` commands require that you first use the `saving()` option with both BMA commands to save their MCMC simulation results. If you use one of the `estimates` commands after `bmaregress`, you will store BMA estimation results and the

MCMC model simulation results. If you do this after `bmacoefsample`, in addition to the `bmaregress` estimation results, you will store additional estimation results from `bmacoefsample` and the MCMC model-parameter simulation results.

## Also see

[BMA] [bmaregress](#) — Bayesian model averaging for linear regression

[BMA] [bmacoefsample](#) — Posterior samples of regression coefficients

[BMA] [Intro](#) — Introduction to Bayesian model averaging

[BMA] [Glossary](#)

[BAYES] [Bayesian postestimation](#) — Postestimation tools for `bayesmh` and the `bayes` prefix

[U] [20 Estimation and postestimation commands](#)

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