

menbreg postestimation — Postestimation tools for menbreg

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Description

The following postestimation command is of special interest after `menbreg`:

Command	Description
<code>estat group</code>	summarize the composition of the nested groups

The following standard postestimation commands are also available:

Command	Description
<code>contrast</code>	contrasts and ANOVA-style joint tests of estimates
<code>estat ic</code>	Akaike's and Schwarz's Bayesian information criteria (AIC and BIC)
<code>estat summarize</code>	summary statistics for the estimation sample
<code>estat vce</code>	variance–covariance matrix of the estimators (VCE)
<code>estimates</code>	cataloging estimation results
<code>lincom</code>	point estimates, standard errors, testing, and inference for linear combinations of coefficients
<code>lrtest</code>	likelihood-ratio test
<code>margins</code>	marginal means, predictive margins, marginal effects, and average marginal effects
<code>marginsplot</code>	graph the results from margins (profile plots, interaction plots, etc.)
<code>nlcom</code>	point estimates, standard errors, testing, and inference for nonlinear combinations of coefficients
<code>predict</code>	predictions, residuals, influence statistics, and other diagnostic measures
<code>predictnl</code>	point estimates, standard errors, testing, and inference for generalized predictions
<code>pwcompare</code>	pairwise comparisons of estimates
<code>test</code>	Wald tests of simple and composite linear hypotheses
<code>testnl</code>	Wald tests of nonlinear hypotheses

Special-interest postestimation commands

`estat group` reports the number of groups and minimum, average, and maximum group sizes for each level of the model. Model levels are identified by the corresponding group variable in the data. Because groups are treated as nested, the information in this summary may differ from what you would get if you used the `tabulate` command on each group variable individually.

Syntax for predict

Syntax for obtaining predictions of random effects and their standard errors

```
predict [type] newvarsspec [if] [in], {remeans | remodes} [reses(newvarsspec) ]
```

Syntax for obtaining other predictions

```
predict [type] newvarsspec [if] [in] [, statistic options ]
```

newvarsspec is *stub** or *newvarlist*.

<i>statistic</i>	Description
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Main	
<code>mu</code>	number of events; the default
<code><u>f</u>itted</code>	fitted linear predictor
<code>xb</code>	linear predictor for the fixed portion of the model only
<code>stdp</code>	standard error of the fixed-portion linear prediction
<code><u>p</u>earson</code>	Pearson residuals
<code><u>d</u>eviance</code>	deviance residuals
<code><u>a</u>nscombe</code>	Anscombe residuals

These statistics are available both in and out of sample; type `predict ... if e(sample) ... if` wanted only for the estimation sample.

<i>options</i>	Description
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Main	
<code>means</code>	compute <i>statistic</i> using empirical Bayes means; the default
<code>modes</code>	compute <i>statistic</i> using empirical Bayes modes
<code><u>n</u>ooffset</code>	ignore the offset or exposure variable in calculating predictions; relevant only if you specified <code>offset()</code> or <code>exposure()</code> when you fit the model
<code><u>f</u>ixedonly</code>	prediction for the fixed portion of the model only
Integration	
<code><u>i</u>ntpoints(#)</code>	use # quadrature points to compute empirical Bayes means
<code><u>i</u>terate(#)</code>	set maximum number of iterations in computing statistics involving empirical Bayes estimators
<code><u>t</u>olerance(#)</code>	set convergence tolerance for computing statistics involving empirical Bayes estimators

Menu for predict

Statistics > Postestimation > Predictions, residuals, etc.

Options for predict

Main

`remeans`, `remodes`, `reses()`; see [\[ME\] meglm postestimation](#).

`mu`, the default, calculates the predicted mean (the predicted number of events), that is, the inverse link function applied to the linear prediction. By default, this is based on a linear predictor that includes both the fixed effects and the random effects, and the predicted mean is conditional on the values of the random effects. Use the `fixedonly` option if you want predictions that include only the fixed portion of the model, that is, if you want random effects set to 0.

`fitted`, `xb`, `stdp`, `pearson`, `deviance`, `anscombe`, `means`, `modes`, `nooffset`, `fixedonly`; see [\[ME\] meglm postestimation](#).

By default or if the `means` option is specified, statistics `mu`, `pr`, `fitted`, `xb`, `stdp`, `pearson`, `deviance`, and `anscombe` are based on the posterior mean estimates of random effects. If the `modes` option is specified, these statistics are based on the posterior mode estimates of random effects.

Integration

`intpoints()`, `iterate()`, `tolerance()`; see [\[ME\] meglm postestimation](#).

Syntax for estat group

`estat group`

Menu for estat

Statistics > Postestimation > Reports and statistics

Remarks and examples

[stata.com](http://www.stata.com)

Various predictions, statistics, and diagnostic measures are available after fitting a mixed-effects negative binomial model with `menbreg`. For the most part, calculation centers around obtaining estimates of the subject/group-specific random effects. Random effects are not estimated when the model is fit but instead need to be predicted after estimation.

Here we show a short example of predicted counts and predicted random effects; refer to [\[ME\] meglm postestimation](#) for additional examples applicable to mixed-effects generalized linear models.

▷ Example 1

In [example 2](#) of [\[ME\] menbreg](#), we modeled the number of deaths among males in nine European nations as a function of exposure to ultraviolet radiation (`uv`). We used a three-level negative binomial model with random effects at the nation and region levels.

```
. use http://www.stata-press.com/data/r13/melanoma
(Skin cancer (melanoma) data)
. menbreg deaths uv, exposure(expected) || nation: || region:
(output omitted)
```

We can use `predict` to obtain the predicted counts as well as the estimates of the random effects at the nation and region levels.

```
. predict mu
(predictions based on fixed effects and posterior means of random effects)
(option mu assumed)
(using 7 quadrature points)
. predict re_nat re_reg, remeans
(calculating posterior means of random effects)
(using 7 quadrature points)
```

Stata displays a note that the predicted values of `mu` are based on the posterior means of random effects. You can use option `modes` to obtain predictions based on the posterior modes of random effects.

Here we list the data for the first nation in the dataset, which happens to be Belgium:

```
. list nation region deaths mu re_nat re_reg if nation==1, sepby(region)
```

	nation	region	deaths	mu	re_nat	re_reg
1.	Belgium	1	79	64.4892	-.0819939	.2937711
2.	Belgium	2	80	77.64736	-.0819939	.024005
3.	Belgium	2	51	44.56528	-.0819939	.024005
4.	Belgium	2	43	53.10434	-.0819939	.024005
5.	Belgium	2	89	65.35963	-.0819939	.024005
6.	Belgium	2	19	35.18457	-.0819939	.024005
7.	Belgium	3	19	8.770186	-.0819939	-.3434432
8.	Belgium	3	15	43.95521	-.0819939	-.3434432
9.	Belgium	3	33	34.17878	-.0819939	-.3434432
10.	Belgium	3	9	7.332448	-.0819939	-.3434432
11.	Belgium	3	12	12.93873	-.0819939	-.3434432

We can see that the predicted random effects at the nation level, `re_nat`, are the same for all the observations. Similarly, the predicted random effects at the region level, `re_reg`, are the same within each region. The predicted counts, `mu`, are not as close to the observed deaths as the predicted counts from the mixed-effects Poisson model in [example 1](#) of [\[ME\] mepoisson postestimation](#).

◀

Methods and formulas

Methods and formulas for predicting random effects and other statistics are given in [Methods and formulas](#) of [\[ME\] meglm postestimation](#).

Also see

[\[ME\] menbreg](#) — Multilevel mixed-effects negative binomial regression

[\[ME\] meglm postestimation](#) — Postestimation tools for meglm

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