

mecloglog postestimation — Postestimation tools for mecloglog

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Postestimation commands

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

Command	Description
<code>estat group</code>	summarize the composition of the nested groups
<code>estat icc</code>	estimate intraclass correlations
<code>estat sd</code>	display variance components as standard deviations and correlations

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>estat (svy)</code>	postestimation statistics for survey data
<code>estimates</code>	cataloging estimation results
<code>etable</code>	table of estimation results
* <code>hausman</code>	Hausman's specification test
<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>	means, probabilities, densities, REs, residuals, etc.
<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

*`hausman` and `lrtest` are not appropriate with `svy` estimation results.

predict

Description for predict

`predict` creates a new variable containing predictions such as mean responses; linear predictions; density and distribution functions; standard errors; and Pearson, deviance, and Anscombe residuals.

Menu for predict

Statistics > Postestimation

Syntax for predict

Syntax for obtaining predictions of the outcome and other statistics

```
predict [type] { stub* | newvarlist } [if] [in] [, statistic options]
```

Syntax for obtaining estimated random effects and their standard errors

```
predict [type] { stub* | newvarlist } [if] [in], reffects [re_options]
```

Syntax for obtaining ML scores

```
predict [type] { stub* | newvarlist } [if] [in], scores
```

statistic

Description

Main	
<code>mu</code>	mean response; the default
<code>eta</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>density</code>	predicted density function
<code>distribution</code>	predicted distribution function
<code>pearson</code>	Pearson residuals
<code>deviance</code>	deviance residuals
<code>anscombe</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
Main	
<code>conditional(<i>ctype</i>)</code>	compute <i>statistic</i> conditional on estimated random effects; default is <code>conditional(ebmeans)</code>
<code>marginal</code>	compute <i>statistic</i> marginally with respect to the random effects
<code>nooffset</code>	make calculation ignoring offset or exposure
Integration	
<code>int_options</code>	integration options
pearson, deviance, anscombe may not be combined with marginal.	
<i>ctype</i>	Description
<code>ebmeans</code>	empirical Bayes means of random effects; the default
<code>ebmodes</code>	empirical Bayes modes of random effects
<code>fixedonly</code>	prediction for the fixed portion of the model only
<i>re_options</i>	Description
Main	
<code>ebmeans</code>	use empirical Bayes means of random effects; the default
<code>ebmodes</code>	use empirical Bayes modes of random effects
<code>reses(<i>stub*</i> <i>newvarlist</i>)</code>	calculate standard errors of empirical Bayes estimates
Integration	
<code>int_options</code>	integration options
<i>int_options</i>	Description
<code>intpoints(#)</code>	use # quadrature points to compute marginal predictions and empirical Bayes means
<code>iterate(#)</code>	set maximum number of iterations in computing statistics involving empirical Bayes estimators
<code>tolerance(#)</code>	set convergence tolerance for computing statistics involving empirical Bayes estimators

Options for predict

Main

`mu`, the default, calculates the predicted mean, that is, the probability of a positive outcome.
`eta`, `xb`, `stdp`, `density`, `distribution`, `pearson`, `deviance`, `anscombe`, `scores`, `conditional()`, `marginal`, and `nooffset`; see [ME] [meglm postestimation](#).
`reffects`, `ebmeans`, `ebmodes`, and `reses()`; see [ME] [meglm postestimation](#).

Integration

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

margins

Description for margins

`margins` estimates margins of response for mean responses and linear predictions.

Menu for margins

Statistics > Postestimation

Syntax for margins

```
margins [marginlist] [, options]
```

```
margins [marginlist] , predict(statistic ...) [predict(statistic ...) ...] [options]
```

<i>statistic</i>	Description
<code>mu</code>	mean response; the default
<code>eta</code>	fitted linear predictor
<code>xb</code>	linear predictor for the fixed portion of the model only
<code>stdp</code>	not allowed with <code>margins</code>
<code>density</code>	not allowed with <code>margins</code>
<code>distribution</code>	not allowed with <code>margins</code>
<code>pearson</code>	not allowed with <code>margins</code>
<code>deviance</code>	not allowed with <code>margins</code>
<code>anscombe</code>	not allowed with <code>margins</code>
<code>reflects</code>	not allowed with <code>margins</code>
<code>scores</code>	not allowed with <code>margins</code>

Options `conditional(ebmeans)` and `conditional(ebmodes)` are not allowed with `margins`.

Option `marginal` is assumed where applicable if `conditional(fixedonly)` is not specified.

Statistics not allowed with `margins` are functions of stochastic quantities other than $e(b)$.

For the full syntax, see [R] [margins](#).

Remarks and examples

[stata.com](#)

Various predictions, statistics, and diagnostic measures are available after fitting a mixed-effects complementary log–log model with `mecloglog`. Here we show a short example of predicted probabilities and predicted random effects; refer to [ME] [meglm postestimation](#) for additional examples.

► Example 1: Obtaining predicted probabilities and random effects

In [example 2](#) of [ME] [mecloglog](#), we analyzed the cognitive ability (`dtlm`) of patients with schizophrenia compared with their relatives and control subjects, by using a three-level complementary log–log model with random effects at the family and subject levels. Cognitive ability was measured as the successful completion of the “Tower of London”, a computerized task, measured at three levels of difficulty.

```
. use https://www.stata-press.com/data/r17/towerlondon
(Tower of London data)
. mecloglog dtlm difficulty i.group || family: || subject:
Fitting fixed-effects model:
(output omitted)
Mixed-effects cloglog regression           Number of obs   =       677
```

Grouping information

Group variable	No. of groups	Observations per group		
		Minimum	Average	Maximum
family	118	2	5.7	27
subject	226	2	3.0	3

```
Integration method: mvaghermite           Integration pts. =         7
                                           Wald chi2(3)    =       83.32
Log likelihood = -305.26516                Prob > chi2     =       0.0000
```

dtlm	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
difficulty	-1.342844	.1501508	-8.94	0.000	-1.637135	-1.048554
group						
2	-.1331007	.269389	-0.49	0.621	-.6610935	.3948922
3	-.7714314	.3097099	-2.49	0.013	-1.378452	-.164411
_cons	-1.6718	.2290325	-7.30	0.000	-2.120695	-1.222905
family						
var(_cons)	.2353453	.2924064			.0206122	2.687117
family>						
subject						
var(_cons)	.7737687	.4260653			.2629714	2.276742

```
LR test vs. cloglog model: chi2(2) = 16.61           Prob > chi2 = 0.0002
Note: LR test is conservative and provided only for reference.
```

We obtain predicted probabilities based on the contribution of both fixed effects and random effects by typing

```
. predict pr
(option mu assumed)
(predictions based on fixed effects and posterior means of random effects)
(using 7 quadrature points)
```

As the note says, the predicted values are based on the posterior means of random effects. You can use the `modes` option to obtain predictions based on the posterior modes of random effects.

We obtain predictions of the posterior means themselves by typing

```
. predict re*, reffects
(calculating posterior means of random effects)
(using 7 quadrature points)
```

Because we have one random effect at the family level and another random effect at the subject level, Stata saved the predicted posterior means in the variables `re1` and `re2`, respectively. If you are not sure which prediction corresponds to which level, you can use the `describe` command to show the variable labels.

Here we list the data for family 16:

```
. list family subject dtlm pr re1 re2 if family==16, sepby(subject)
```

	family	subject	dtlm	pr	re1	re2
208.	16	5	1	.486453	.4184933	.2760492
209.	16	5	0	.1597047	.4184933	.2760492
210.	16	5	0	.0444156	.4184933	.2760492
211.	16	34	1	.9659582	.4184933	1.261488
212.	16	34	1	.5862808	.4184933	1.261488
213.	16	34	1	.205816	.4184933	1.261488
214.	16	35	0	.5571261	.4184933	-.1616545
215.	16	35	1	.1915688	.4184933	-.1616545
216.	16	35	0	.0540124	.4184933	-.1616545

We can see that the predicted random effects (**re1**) at the family level are the same for all members of the family. Similarly, the predicted random effects (**re2**) at the individual level are constant within each individual.

◀

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] **mecloglog** — Multilevel mixed-effects complementary log–log regression

[ME] **meglm postestimation** — Postestimation tools for meglm

[U] **20 Estimation and postestimation commands**