mecloglog postestimation — Postestimation tools for mecloglog

Postestimation commands

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

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

The following standard postestimation commands are also available:

Command	Description
`contrast`	contrasts and ANOVA-style joint tests of parameters
`estat ic`	Akaike's, consistent Akaike's, corrected Akaike's, and Schwarz's Bayesian information criteria (AIC, CAIC, AICc, and BIC, respectively)
`estat summarize`	summary statistics for the estimation sample
`estat vce`	variance–covariance matrix of the estimators (VCE)
`estat (svy)`	postestimation statistics for survey data
`estimates`	cataloging estimation results
`etable`	table of estimation results
* `hausman`	Hausman's specification test
`lincom`	point estimates, standard errors, testing, and inference for linear combinations of parameters
* `lrtest`	likelihood-ratio test
`margins`	marginal means, predictive margins, marginal effects, and average marginal effects
`marginsplot`	graph the results from margins (profile plots, interaction plots, etc.)
`nlcom`	point estimates, standard errors, testing, and inference for nonlinear combinations of parameters
`predict`	means, probabilities, densities, REs, residuals, etc.
`predictnl`	point estimates, standard errors, testing, and inference for generalized predictions
`pwcompare`	pairwise comparisons of parameters
`test`	Wald tests of simple and composite linear hypotheses
`testnl`	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	
`mu`	mean response; the default
`eta`	fitted linear predictor
`xb`	linear predictor for the fixed portion of the model only
`stdp`	standard error of the fixed-portion linear prediction
`density`	predicted density function
`distribution`	predicted distribution function
`pearson`	Pearson residuals
`deviance`	deviance residuals
`anscombe`	Anscombe residuals

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

options	Description
Main	
conditional(*ctype*)	compute *statistic* conditional on estimated random effects; default is conditional(ebmeans)
marginal	compute *statistic* marginally with respect to the random effects
nooffset	make calculation ignoring offset or exposure
Integration	
int_options	integration options

pearson, deviance, anscombe may not be combined with marginal.

ctype	Description
ebmeans	empirical Bayes means of random effects; the default
ebmodes	empirical Bayes modes of random effects
fixedonly	prediction for the fixed portion of the model only

re_options	Description
Main	
ebmeans	use empirical Bayes means of random effects; the default
ebmodes	use empirical Bayes modes of random effects
reses(*stub** | *newvarlist*)	calculate standard errors of empirical Bayes estimates
Integration	
int_options	integration options

int_options	Description
intpoints(#)	use # quadrature points to compute marginal predictions and empirical Bayes means
iterate(#)	set maximum number of iterations in computing statistics involving empirical Bayes estimators
tolerance(#)	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*]

statistic	Description
`mu`	mean response; the default
`eta`	fitted linear predictor
`xb`	linear predictor for the fixed portion of the model only
`stdp`	not allowed with `margins`
`density`	not allowed with `margins`
`distribution`	not allowed with `margins`
`pearson`	not allowed with `margins`
`deviance`	not allowed with `margins`
`anscombe`	not allowed with `margins`
`reffects`	not allowed with `margins`
`scores`	not allowed with `margins`

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

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/r19/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