Title

mecloglog postestimation — Postestimation tools for mecloglog

Postestimation commands
estat
Also see
predict
Remarks and examples
margins
Methods and formulas

Postestimation commands

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

Command	Description
`estat group`	summarize the composition of the nested groups

The following standard postestimation commands are also available:

Command	Description
`contrast`	contrasts and ANOVA-style joint tests of estimates
`estat ic`	Akaike's and Schwarz's Bayesian information criteria (AIC and BIC)
`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
* `hausman`	Hausman's specification test
`lincom`	point estimates, standard errors, testing, and inference for linear combinations of coefficients
* `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 coefficients
`predict`	predictions, residuals, influence statistics, and other diagnostic measures
`predictnl`	point estimates, standard errors, testing, and inference for generalized predictions
`pwcompare`	pairwise comparisons of estimates
`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*] *newvarsspec* [*if*] [*in*] [, *statistic options*]

Syntax for obtaining estimated random effects and their standard errors

`predict` [*type*] *newvarsspec* [*if*] [*in*], `reffects` [*re_options*]

Syntax for obtaining ML scores

`predict` [*type*] *newvarsspec* [*if*] [*in*], `scores`

newvarsspec is *stub*`*` or *newvarlist*.

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**.

estat

Description for estat

`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.

Menu for estat

Statistics > Postestimation

Syntax for estat

```
estat group
```

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

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 http://www.stata-press.com/data/r14/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

------------------------------------------------------------------------
                |     No. of       Observations per Group
 Group Variable |     Groups    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 |      Coef.   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
(predictions based on fixed effects and posterior means of random effects)
(option mu assumed)
(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. Based on a cutoff of 0.5, the predicted probabilities (`pr`) for this family do not match the observed outcomes (`dtlm`) as well as the predicted probabilities from the logistic example; see example 1 in [ME] **melogit 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] **mecloglog** — Multilevel mixed-effects complementary log-log regression

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

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