Title

> **fmm postestimation** — Postestimation tools for fmm

Postestimation commands

The following postestimation commands are of special interest after estimation with fmm:

Command	Description
estat eform	display exponentiated parameters
estat lcmean	latent class marginal means
estat lcprob	latent class marginal probabilities

The following standard postestimation commands are also available:

Command	Description
contrast	contrasts and linear hypothesis tests
estat ic	Akaike's, consistent Akaike's, corrected Akaike's, and Schwarz's Bayesian information criteria (AIC, CAIC, AICc, 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
etable	table of estimation results
* hausman	Hausman's specification test
lincom	linear combination 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 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.

Postestimation commands such as lincom and nlcom require referencing estimated parameter values, which are accessible via _b[*name*]. To find out what the names are, type fmm, coeflegend.

predict

Description for predict

predict after fmm creates new variables containing predictions such as means, probabilities, linear predictions, densities, or latent class probabilities.

Menu for predict

Statistics > Postestimation

Syntax for predict

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

> predict [*type*] *stub** [*if*] [*in*], <u>sc</u>ores

statistic	Description
Main	
mu	expected value of *depvar*; the default
<u>eta</u>	linear prediction of *depvar*
<u>den</u>sity	density function at *depvar*
<u>sur</u>vival	distribution function at *depvar*
survival	survivor function at *depvar*
classpr	latent class probability
<u>classposterior</u>pr	posterior latent class probability

options	Description
Main	
marginal	compute *statistic* marginally with respect to the latent classes
<u>pm</u>arginal	compute mu marginally with respect to the posterior latent class probabilities
<u>nooff</u>set	make calculation ignoring offset or exposure
* <u>out</u>come(*depvar* [*#*])	specify observed response variable (default all)
class(*#*)	specify latent class (default all)

* outcome(*depvar #*) is allowed only if *depvar* is from mlogit, ologit, or oprobit.
outcome(*depvar #*) may also be specified as outcome(*#.depvar*) or outcome(*depvar ##*).
outcome(*depvar #3*) means the third outcome value. outcome(*depvar #3*) would mean the same as
outcome(*depvar 4*) if outcomes were 1, 3, and 4.

Options for predict

    ⌐ Main ⌐

mu, the default, calculates the expected value of the outcomes.

eta calculates the fitted linear prediction.

density calculates the density function. This prediction is computed using the current values of the observed variables, including the dependent variable.

distribution calculates the distribution function. This prediction is computed using the current values of the observed variables, including the dependent variable. This option is not allowed for mlogit outcomes.

survival calculates the survivor function. This prediction is computed using the current values of the observed variables, including the dependent variable. This option is allowed only for streg outcomes.

classpr calculates predicted probabilities for each latent class.

classposteriorpr calculates predicted posterior probabilities for each latent class. The posterior probabilities are a function of the latent-class predictors and the fitted outcome densities.

marginal specifies that the prediction be computed marginally with respect to the latent classes. The marginal prediction is computed by combining the class specific predictions using the latent-class probabilities.

    This option is allowed only with mu and density.

pmarginal specifies that the prediction is computed by combining the class specific expected values using the posterior latent-class probabilities.

    This option is allowed only with mu.

nooffset is relevant only if option offset() or exposure() was specified at estimation time. nooffset specifies that offset() or exposure() be ignored, which produces predictions as if all subjects had equal exposure.

outcome(*depvar* [#]) specifies the *depvar* for which predictions should be calculated. Predictions for all observed response variables are computed by default. Most models have only one *depvar*. If *depvar* is an mlogit, ologit, or oprobit outcome, then # optionally specifies which outcome level to predict. The default is the first level.

class(#) specifies that predictions for latent class # be calculated. Predictions for all latent classes are computed by default.

scores calculates the scores for each coefficient in e(b). This option requires a new variable list of length equal to the number of columns in e(b). Otherwise, use *stub** to have predict generate enumerated variables with prefix *stub*.

margins

Description for margins

margins estimates margins of response for outcome means, outcome probabilities, and latent-class probabilities.

Menu for margins

Statistics > Postestimation

Syntax for margins

> margins [*marginlist*] [, *options*]
>
> margins [*marginlist*] , <u>predict</u>(*statistic* ...) [<u>predict</u>(*statistic* ...) ...] [*options*]

statistic	Description
default	calculate expected values for each *depvar*
mu	calculate expected value of *depvar*
eta	calculate expected value of linear prediction of *depvar*
classpr	calculate latent class prior probabilities
density	not allowed with margins
distribution	not allowed with margins
survival	not allowed with margins
classposteriorpr	not allowed with margins
scores	not allowed with margins

mu defaults to the first *depvar* if option outcome() is not specified. If *depvar* is mlogit, ologit, or oprobit, the default is the first level of the outcome. The default is the first latent class if class() is not specified.

eta defaults to the first *depvar* if option outcome() is not specified. If *depvar* is mlogit, the default is the first level of the outcome.

classpr defaults to the first latent class if option class() is not specified.

predict's option marginal is assumed if predict's option class() 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]

For examples using estimates stats to compare models based on Akaike information criterion and Bayesian information criterion, see [FMM] **Example 1a**, [FMM] **Example 1b**, and [FMM] **Example 1d**.

For examples using estat lcprob to obtain marginal latent class probabilities and estat lcmean to obtain marginal predicted means, see [FMM] **Example 2** and [FMM] **Example 3**.

For examples using test and contrast to test equality of coefficients across classes, see [FMM] **Example 1c**.

For examples using predict, see [FMM] **Example 2**, [FMM] **Example 3**, and [FMM] **Example 4**.

Methods and formulas

See *Methods and formulas* in [FMM] **fmm**.

Also see

[FMM] **fmm** — Finite mixture models using the fmm prefix

[FMM] **fmm estimation** — Fitting finite mixture models

[FMM] **fmm intro** — Introduction to finite mixture models