Title

> **cmmprobit postestimation** — Postestimation tools for cmmprobit

Postestimation commands

The following postestimation commands are of special interest after `cmmprobit`:

Command	Description
estat covariance	covariance matrix of the utility errors for the alternatives
estat correlation	correlation matrix of the utility errors for the alternatives
estat facweights	covariance factor weights matrix

The following standard postestimation commands are also available:

Command	Description
contrast	contrasts and ANOVA-style joint tests of estimates
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)
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 coefficients
lrtest	likelihood-ratio test
margins	adjusted predictions, predictive margins, and 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	probabilities, etc.
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

predict

Description for predict

predict creates a new variable containing predictions such as probabilities, linear predictions, and standard errors.

Menu for predict

Statistics > Postestimation

Syntax for predict

> predict [*type*] *newvar* [*if*] [*in*] [, *statistic*]

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

statistic	Description
Main	
pr	probability alternative is chosen; the default
xb	linear prediction
stdp	standard error of the linear prediction

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

predict omits missing values casewise if cmmprobit used casewise deletion (the default); if cmmprobit used alternativewise deletion (option altwise), predict uses alternativewise deletion.

Options for predict

    Main

pr, the default, calculates the probability of choosing each alternative.

xb calculates the linear prediction.

stdp calculates the standard error of the linear prediction.

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 the *stub** syntax to have predict generate enumerated variables with prefix *stub*.

margins

Description for margins

margins estimates margins of response for probabilities and linear predictions.

Menu for margins

Statistics > Postestimation

Syntax for margins

margins [*marginlist*] [, *options*]

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

statistic	Description
pr	probability alternative is chosen; the default
xb	linear prediction
stdp	not allowed with margins
<u>sc</u>ores	not allowed with margins

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

For more details, see [CM] **margins**.

estat

Description for estat

estat covariance computes the estimated variance–covariance matrix of the utility (latent-variable) errors for the alternatives. The estimates are displayed, and the variance–covariance matrix is stored in r(cov).

estat correlation computes the estimated correlation matrix of the utility (latent-variable) errors for the alternatives. The estimates are displayed, and the correlation matrix is stored in r(cor).

estat facweights displays the covariance factor weights matrix and stores it in r(C).

Menu for estat

Statistics > Postestimation

Syntax for estat

Covariance matrix of the utility errors for the alternatives

> estat <u>cov</u>ariance [, <u>form</u>at(*%fmt*) <u>bor</u>der(*bspec*) left(*#*)]

Correlation matrix of the utility errors for the alternatives

> estat <u>cor</u>relation [, <u>form</u>at(*%fmt*) <u>bor</u>der(*bspec*) left(*#*)]

Covariance factor weights matrix

> estat <u>facwe</u>ights [, <u>form</u>at(*%fmt*) <u>bor</u>der(*bspec*) left(*#*)]

collect is allowed with estat covariance; see [U] **11.1.10 Prefix commands**.

Options for estat covariance, estat correlation, and estat facweights

format(*%fmt*) sets the matrix display format. The default for estat covariance and estat facweights is format(%9.0g); the default for estat correlation is format(%9.4f).

border(*bspec*) sets the matrix display border style. The default is border(all). See [P] **matlist**.

left(*#*) sets the matrix display left indent. The default is left(2). See [P] **matlist**.

Remarks and examples   stata.com

Remarks are presented under the following headings:

> *Predicted probabilities*
> *Obtaining estimation statistics*

Predicted probabilities

After fitting a multinomial probit choice model, you can use `predict` to obtain the simulated probabilities that an individual will choose each of the alternatives.

When evaluating the multivariate normal probabilities via Monte Carlo simulation, `predict` uses the same method to generate the random sequence of numbers as the previous call to `cmmprobit`. For example, if you specified `intmethod(Halton)` when fitting the model, `predict` also uses the Halton sequence.

In example 1 of [CM] **cmmprobit**, we fit a model of individuals' travel-mode choices. We can obtain the simulated probabilities that an individual chooses each alternative by using `predict`:

```
. use https://www.stata-press.com/data/r18/travel
(Modes of travel)

. cmset id mode
     Case ID variable: id
Alternatives variable: mode

. quietly cmmprobit choice travelcost termtime, casevars(income)

. predict prob
(option pr assumed; Pr(mode))

. list id mode prob choice in 1/12, sepby(id)
```

	id	mode	prob	choice
1.	1	Air	.1491488	0
2.	1	Train	.3291686	0
3.	1	Bus	.1319882	0
4.	1	Car	.3899048	1
5.	2	Air	.2565295	0
6.	2	Train	.2761068	0
7.	2	Bus	.0116262	0
8.	2	Car	.4557356	1
9.	3	Air	.2098824	0
10.	3	Train	.1082094	0
11.	3	Bus	.1671392	0
12.	3	Car	.5147675	1

Obtaining estimation statistics

Once you have fit a `cmmprobit` model, you can obtain the estimated variance or correlation matrices for the model alternatives by using the `estat` command.

To display the correlations of the errors in the utility equations, we type

```
. estat correlation
```

	Train	Bus	Car
Train	1.0000		
Bus	0.8909	1.0000	
Car	0.7895	0.8953	1.0000

Note: Correlations are for alternatives differenced with Air.

The covariance matrix can be displayed by typing

```
. estat covariance
```

	Train	Bus	Car
Train	2		
Bus	1.601736	1.616288	
Car	1.374374	1.401054	1.515069

Note: Covariances are for alternatives differenced with Air.

Also see

[CM] **cmmprobit** — Multinomial probit choice model

[CM] **margins** — Adjusted predictions, predictive margins, and marginal effects

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