

cmmprobit postestimation — Postestimation tools for cmmprobit

Postestimation commands
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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 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) |
| 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 | 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], scores
```

| <i>statistic</i> | Description |
|-------------------|--|
| Main | |
| <code>pr</code> | probability alternative is chosen; the default |
| <code>xb</code> | linear prediction |
| <code>stdp</code> | 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] , predict(statistic ...) [predict(statistic ...) ...] [options]
```

| <i>statistic</i> | Description |
|---------------------|--|
| <code>pr</code> | probability alternative is chosen; the default |
| <code>xb</code> | linear prediction |
| <code>stdp</code> | not allowed with <code>margins</code> |
| <code>scores</code> | not allowed with <code>margins</code> |

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 covariance [ , format(%fmt) border(bspec) left(#) ]
```

Correlation matrix of the utility errors for the alternatives

```
estat correlation [ , format(%fmt) border(bspec) left(#) ]
```

Covariance factor weights matrix

```
estat facweights [ , format(%fmt) border(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](https://www.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/r17/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**