# Title

> **mprobit postestimation** — Postestimation tools for mprobit

Postestimation commands      predict      margins      Remarks and examples
References                    Also see

## Postestimation commands

The following postestimation commands are available after `mprobit`:

| 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) |
| estat (svy) | postestimation statistics for survey data |
| estimates | cataloging estimation results |
| etable | table of estimation results |
| *forecast | dynamic forecasts and simulations |
| *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 | probabilities, linear predictions and their SEs, etc. |
| predictnl | point estimates, standard errors, testing, and inference for generalized predictions |
| pwcompare | pairwise comparisons of estimates |
| suest | seemingly unrelated estimation |
| test | Wald tests of simple and composite linear hypotheses |
| testnl | Wald tests of nonlinear hypotheses |

*`forecast`, `hausman`, and `lrtest` are not appropriate with svy estimation results. `forecast` is also not appropriate with mi estimation results.

# 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 $\big[$ *type* $\big]$ $\big\{$ *stub*\* | *newvar* | *newvarlist* $\big\}$ $\big[$ *if* $\big]$ $\big[$ *in* $\big]$ $\big[$ , *statistic* <u>o</u>utcome(*outcome*) $\big]$

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

| *statistic* | Description |
|---|---|
| Main | |
| pr | predicted probabilities; the default |
| xb | linear prediction |
| stdp | standard error of the linear prediction |

You specify one or $k$ new variables with pr, where $k$ is the number of outcomes. If you specify one new variable and you do not specify outcome(), then outcome(#1) is assumed.

You specify one new variable with xb and stdp. If you do not specify outcome(), then outcome(#1) is assumed.

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

## Options for predict

> Main

pr, the default, computes the predicted probabilities for all outcomes or for a specific outcome. To compute probabilities for all outcomes, you specify $k$ new variables, where $k$ is the number of categories of the dependent variable. Alternatively, you can specify *stub*\*; in which case, pr will store predicted probabilities in variables *stub*1, *stub*2, ..., *stubk*. To compute the probability for a specific outcome, you specify one new variable and, optionally, the outcome value in option outcome(); if you omit outcome(), the first outcome value, outcome(#1), is assumed.

Say that you fit a model by typing *estimation_cmd* y x1 x2, and y takes on four values. Then, you could type predict p1 p2 p3 p4 to obtain all four predicted probabilities; alternatively, you could type predict p\* to generate the four predicted probabilities. To compute specific probabilities one at a time, you can type predict p1, outcome(#1) (or simply predict p1), predict p2, outcome(#2), and so on. See option outcome() for other ways to refer to outcome values.

xb calculates the linear prediction, $\mathbf{x}_i \boldsymbol{\alpha}_j$, for alternative $j$ and individual $i$. The index, $j$, corresponds to the outcome specified in outcome().

stdp calculates the standard error of the linear prediction.

outcome(*outcome*) specifies for which outcome the predicted probabilities are to be calculated. outcome() should contain either one value of the dependent variable or one of #1, #2, ..., with #1 meaning the first category of the dependent variable, #2 meaning the second category, etc. outcome() is not allowed with scores.

scores calculates equation-level score variables. The *j*th new variable will contain the scores for the *j*th fitted equation.

# 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>predict</u>(*statistic* ...) [ <u>predict</u>(*statistic* ...) ... ] [ *options* ]

| *statistic* | Description |
|---|---|
| default | probabilities for each outcome |
| pr | probability for a specified outcome |
| xb | linear prediction for a specified outcome |
| stdp | not allowed with margins |

pr and xb default to the first outcome.

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

For the full syntax, see [R] **margins**.

# Remarks and examples

Once you have fit a multinomial probit model, you can use predict to obtain probabilities that an individual will choose each of the alternatives for the estimation sample, as well as other samples; see [U] **20 Estimation and postestimation commands** and [R] **predict**.

▷ Example 1

In example 1 of [R] **mprobit**, we fit the multinomial probit model to a dataset containing the type of health insurance available to 616 psychologically depressed subjects in the United States (Tarlov et al. 1989; Wells et al. 1989). We can obtain the predicted probabilities by typing

```
. use https://www.stata-press.com/data/r18/sysdsn1
(Health insurance data)

. mprobit insure age male nonwhite i.site
  (output omitted )

. predict p1-p3
(option pr assumed; predicted probabilities)

. list p1-p3 insure in 1/10
```

|      | p1       | p2       | p3       | insure    |
|------|----------|----------|----------|-----------|
| 1.   | .5961306 | .3741824 | .029687  | Indemnity |
| 2.   | .4719296 | .4972289 | .0308415 | Prepaid   |
| 3.   | .4896086 | .4121961 | .0981953 | Indemnity |
| 4.   | .3730529 | .5416623 | .0852848 | Prepaid   |
| 5.   | .5063069 | .4629773 | .0307158 | .         |
| 6.   | .4768125 | .4923548 | .0308327 | Prepaid   |
| 7.   | .5035672 | .4657016 | .0307312 | Prepaid   |
| 8.   | .3326361 | .5580404 | .1093235 | .         |
| 9.   | .4758165 | .4384811 | .0857024 | Uninsure  |
| 10.  | .5734057 | .3316601 | .0949342 | Prepaid   |

insure contains a missing value for observations 5 and 8. Because of that, those two observations were not used in the estimation. However, because none of the independent variables is missing, predict can still calculate the probabilities. Had we typed

```
. predict p1-p3 if e(sample)
```

predict would have filled in missing values for p1, p2, and p3 for those observations because they were not used in the estimation.

◁

# References

Tarlov, A. R., J. E. Ware, Jr., S. Greenfield, E. C. Nelson, E. Perrin, and M. Zubkoff. 1989. The medical outcomes study. An application of methods for monitoring the results of medical care. *Journal of the American Medical Association* 262: 925–930. https://doi.org/10.1001/jama.1989.03430070073033.

Wells, K. B., R. D. Hays, M. A. Burnam, W. H. Rogers, S. Greenfield, and J. E. Ware, Jr. 1989. Detection of depressive disorder for patients receiving prepaid or fee-for-service care. Results from the Medical Outcomes Survey. *Journal of the American Medical Association* 262: 3298–3302. https://doi.org/10.1001/jama.1989.03430230083030.

# Also see

[R] **mprobit** — Multinomial probit regression

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