Title

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oprobit postestimation — Postestimation tools for oprobit

Postestimation commands predict margins Remarks and examples
Also see

Postestimation commands

The following postestimation commands are available after `oprobit`:

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
* `forecast`	dynamic forecasts and simulations
* `hausman`	Hausman's specification test
`lincom`	point estimates, standard errors, testing, and inference for linear combinations of coefficients
`linktest`	link test for model specification
* `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
`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 [type] {stub* | newvar | newvarlist} [if] [in] [, statistic
    outcome(outcome) nooffset]

predict [type] {stub* | newvarlist} [if] [in], scores
```

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

If you do not specify `outcome()`, `pr` (with one new variable specified) assumes `outcome(#1)`.

You specify one or k new variables with `pr`, where k is the number of outcomes.

You specify one new variable with `xb` and `stdp`.

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, calculates the predicted probabilities. If you do not also specify the `outcome()` option, you specify k new variables, where k is the number of categories of the dependent variable. Say that you fit a model by typing `oprobit result x1 x2`, and `result` takes on three values. Then you could type `predict p1 p2 p3` to obtain all three predicted probabilities. If you specify the `outcome()` option, you must specify one new variable. Say that `result` takes on values 1, 2, and 3. Typing `predict p1, outcome(1)` would produce the same `p1`.

`xb` calculates the linear prediction. You specify one new variable, for example, `predict linear, xb`. The linear prediction is defined, ignoring the contribution of the estimated cutpoints.

`stdp` calculates the standard error of the linear prediction. You specify one new variable, for example, `predict se, stdp`.

`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.

`nooffset` is relevant only if you specified `offset(`*varname*`)` for `oprobit`. It modifies the calculations made by `predict` so that they ignore the offset variable; the linear prediction is treated as $\mathbf{x}_j\mathbf{b}$ rather than as $\mathbf{x}_j\mathbf{b} + \text{offset}_j$.

`scores` calculates equation-level score variables. The number of score variables created will equal the number of outcomes in the model. If the number of outcomes in the model was k, then

the first new variable will contain $\partial \ln L/\partial(\mathbf{x}_j\mathbf{b})$;

the second new variable will contain $\partial \ln L/\partial\kappa_1$;

the third new variable will contain $\partial \ln L/\partial\kappa_2$;

...

and the kth new variable will contain $\partial \ln L/\partial\kappa_{k-1}$, where κ_i refers to the ith cutpoint.

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*]

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` defaults 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

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See [U] 20 Estimation and postestimation commands for instructions on obtaining the variance–covariance matrix of the estimators, predicted values, and hypothesis tests. Also see [R] lrtest for performing likelihood-ratio tests.

▷ Example 1

In example 1 of [R] oprobit, we fit the model `oprobit rep77 foreign length mpg`. The `predict` command can be used to obtain the predicted probabilities. We type `predict` followed by the names of the new variables to hold the predicted probabilities, ordering the names from low to high. In our data, the lowest outcome is "poor" and the highest is "excellent". We have five categories, so we must type five names following `predict`; the choice of names is up to us:

```
. use http://www.stata-press.com/data/r14/fullauto
(Automobile Models)
. oprobit rep77 foreign length mpg
  (output omitted)
. predict poor fair avg good exc
(option pr assumed; predicted probabilities)
. list make model exc good if rep77>=., sep(4) divider
```

	make	model	exc	good
3.	AMC	Spirit	.0006044	.0351813
10.	Buick	Opel	.0043803	.1133763
32.	Ford	Fiesta	.0002927	.0222789
44.	Merc.	Monarch	.0093209	.1700846
53.	Peugeot	604	.0734199	.4202766
56.	Plym.	Horizon	.001413	.0590294
57.	Plym.	Sapporo	.0197543	.2466034
63.	Pont.	Phoenix	.0234156	.266771

◁

❑ Technical note

For ordered probit, `predict, xb` produces $S_j = x_{1j}\beta_1 + x_{2j}\beta_2 + \cdots + x_{kj}\beta_k$. Ordered probit is identical to ordered logit, except that we use different distribution functions for calculating probabilities. The ordered-probit predictions are then the probability that $S_j + u_j$ lies between a pair of cutpoints κ_{i-1} and κ_i. The formulas for ordered probit are

$$\begin{aligned}
\Pr(S_j + u < \kappa) &= \Phi(\kappa - S_j) \\
\Pr(S_j + u > \kappa) &= 1 - \Phi(\kappa - S_j) = \Phi(S_j - \kappa) \\
\Pr(\kappa_1 < S_j + u < \kappa_2) &= \Phi(\kappa_2 - S_j) - \Phi(\kappa_1 - S_j)
\end{aligned}$$

Rather than using `predict` directly, we could calculate the predicted probabilities by hand.

```
. predict pscore, xb
. generate probexc = normal(pscore-_b[/cut4])
. generate probgood = normal(_b[/cut4]-pscore) - normal(_b[/cut3]-pscore)
```

❑

Also see

[R] **oprobit** — Ordered probit regression

[U] 20 Estimation and postestimation commands