slogit postestimation — Postestimation tools for slogit

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Postestimation commands

The following postestimation commands are available after `slogit`:

Command	Description
`contrast`	contrasts and ANOVA-style joint tests of parameters
`estat ic`	Akaike's, consistent Akaike's, corrected Akaike's, and Schwarz's Bayesian information criteria (AIC, CAIC, AICc, and BIC, respectively)
`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`	point estimates, standard errors, testing, and inference for linear combinations 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 parameters
`predict`	probabilities, linear predictions and their SEs, etc.
`predictnl`	point estimates, standard errors, testing, and inference for generalized predictions
`pwcompare`	pairwise comparisons of parameters
`suest`	seemingly unrelated estimation
`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.

predict

Description for predict

predict creates a new variable containing predictions such as probabilities, indexes for the *k*th outcome, and standard errors.

Menu for predict

Statistics > Postestimation

Syntax for predict

predict [*type*] { *stub** | *newvar* | *newvarlist* } [*if*] [*in*] [, *statistic* outcome(*outcome*)]

predict [*type*] *stub** [*if*] [*in*] , scores

statistic	Description
Main	
pr	probability of one of or all the dependent variable outcomes; the default
xb	index for the *k*th outcome
stdp	standard error of the index for the *k*th outcome

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 index, $\theta_k - \sum_{j=1}^{d} \phi_{\rm jk}\mathbf{x}_i\boldsymbol{\beta}_j$, for outcome level $k \neq$ e(i_base) and dimension $d =$ e(k_dim). It returns a vector of zeros if $k =$ e(i_base). A synonym for xb is index. If outcome() is not specified, outcome(#1) is assumed.

stdp calculates the standard error of the index. A synonym for stdp is seindex. If outcome() is not specified, outcome(#1) is assumed.

`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 the equation-level score variables. For models with d dimensions and m levels, $d + (d+1)(m-1)$ new variables are created. Assume $j = 1, \ldots, d$ and $k = 1, \ldots, m$ in the following.

The first d new variables will contain $\partial \ln L / \partial (\mathbf{x}\boldsymbol{\beta}_j)$.

The next $d(m-1)$ new variables will contain $\partial \ln L / \partial \phi_{jk}$.

The last $m-1$ new variables will contain $\partial \ln L / \partial \theta_k$.

margins

Description for margins

`margins` estimates margins of response for probabilities and indexes for the kth outcome.

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 of one of or all the dependent variable outcomes
`xb`	index for the kth 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 stereotype logistic model, you can obtain the predicted probabilities by using the `predict` command for both the estimation sample and other samples; see **[U] 20 Estimation and postestimation commands** and [R] **predict**.

`predict` without arguments (or with the `pr` option) calculates the predicted probability of each outcome of the dependent variable. You must therefore give a new variable name for each of the outcomes. To compute the estimated probability of one outcome, you use the `outcome(`*outcome*`)` option where *outcome* is the level encoding the outcome. If the dependent variable's levels are labeled, the outcomes can also be identified by the label values (see [D] **label**).

The `xb` option in conjunction with `outcome(`*outcome*`)` specifies that the index be computed for the outcome encoded by level *outcome*. Its approximate standard error is computed if the `stdp` option is specified. Only one of the `pr`, `xb`, or `stdp` options can be specified with a call to `predict`.

▷ Example 1

In example 2 of [R] **slogit**, we fit the one-dimensional stereotype model, where the *depvar* is `insure` with levels $k = 1$ for outcome *Indemnity*, $k = 2$ for *Prepaid*, and $k = 3$ for *Uninsure*. The base outcome for the model is *Indemnity*, so for $k \neq 1$ the vector of indices for the kth level is

$$\boldsymbol{\eta}_k = \theta_k - \phi_k \left(\beta_1 \texttt{age} + \beta_2 \texttt{male} + \beta_3 \texttt{nonwhite} + \beta_4 \texttt{2.site} + \beta_5 \texttt{3.site}\right)$$

We estimate the group probabilities by calling `predict` after `slogit`.

```
. use https://www.stata-press.com/data/r19/sysdsn1
(Health insurance data)

. slogit insure age male nonwhite i.site, dim(1) base(1) nolog
  (output omitted)

. predict pIndemnity pPrepaid pUninsure, p

. list pIndemnity pPrepaid pUninsure insure in 1/10

     +-------------------------------------------+
     | pIndem~y   pPrepaid   pUnins~e     insure |
     |-------------------------------------------|
  1. | .5419344   .3754875   .0825782  Indemnity |
  2. | .4359638    .496328   .0677081    Prepaid |
  3. | .5111583   .4105107   .0783309  Indemnity |
  4. | .3941132   .5442234   .0616633    Prepaid |
  5. | .4655651   .4625064   .0719285          . |
     |-------------------------------------------|
  6. | .4401779   .4915102   .0683118    Prepaid |
  7. | .4632122   .4651931   .0715948    Prepaid |
  8. | .3772302   .5635696   .0592002          . |
  9. | .4867758   .4383018   .0749225   Uninsure |
 10. | .5823668   .3295802   .0880531    Prepaid |
     +-------------------------------------------+
```

Observations 5 and 8 are not used to fit the model because `insure` is missing at these points, but `predict` estimates the probabilities for these observations because none of the independent variables is missing. You can use `if e(sample)` in the call to `predict` to use only those observations that are used to fit the model.

◁

Methods and formulas

predict

Let level b be the base outcome that is used to fit the stereotype logistic regression model of dimension d. The index for observation i and level $k \neq b$ is $\eta_{ik} = \theta_k - \sum_{j=1}^{d} \phi_{jk} \mathbf{x}_i \boldsymbol{\beta}_j$. This is the log odds of outcome encoded as level k relative to that of b so that we define $\eta_{ib} \equiv 0$. The outcome probabilities for this model are defined as $\Pr(Y_i = k) = e^{\eta_{ik}} / \sum_{j=1}^{m} e^{\eta_{ij}}$. Unlike in `mlogit`, `ologit`, and `oprobit`, the index is no longer a linear function of the parameters. The standard error of index η_{ik} is thus computed using the delta method (see also [R] **predictnl**).

The equation-level score for regression coefficients is

$$\frac{\partial \ln L_{ik}}{\partial \mathbf{x}_i \boldsymbol{\beta}_j} = \left(\sum_{l=1}^{m-1} \phi_{jl} p_{il} - \phi_{jk} \right)$$

the equation-level score for the scale parameters is

$$\frac{\partial \ln L_{ik}}{\partial \phi_{jl}} = \begin{cases} \mathbf{x}_i \boldsymbol{\beta}_j (p_{ik} - 1), & \text{if } l = k \\ \mathbf{x}_i \boldsymbol{\beta}_j p_{il}, & \text{if } l \neq k \end{cases}$$

for $l = 1, \dots, m-1$; and the equation-level score for the intercepts is

$$\frac{\partial \ln L_{ik}}{\partial \theta_l} = \begin{cases} 1 - p_{ik}, & \text{if } l = k \\ -p_{il}, & \text{if } l \neq k \end{cases}$$

Also see

[R] **slogit** — Stereotype logistic regression

[U] 20 Estimation and postestimation commands

For suggested citations, see the FAQ on citing Stata documentation.