Postestimation commands

The following postestimation commands are available after `tobit`:

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
* forecast	dynamic forecasts and simulations
* hausman	Hausman's specification test
lincom	point estimates, standard errors, testing, and inference for linear combinations of parameters
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 parameters
predict	linear, censored, and truncated predictions
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

*forecast, hausman, and lrtest are not appropriate with svy estimation results.

predict

Description for predict

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

Menu for predict

Statistics > Postestimation

Syntax for predict

predict [*type*] *newvar* [*if*] [*in*] [, *statistic* <u>nooff</u>set]

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

statistic	Description
Main	
xb	linear prediction; the default
stdp	standard error of the linear prediction
stdf	standard error of the forecast
pr(*a*,*b*)	$\Pr(a < y_j < b)$
e(*a*,*b*)	$E(y_j \mid a < y_j < b)$
<u>y</u>star(*a*,*b*)	$E(y_j^*), y_j^* = \max\{a, \min(y_j, b)\}$

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

stdf is not allowed with svy estimation results.

where *a* and *b* may be numbers or variables; *a* missing ($a \geq .$) means $-\infty$, and *b* missing ($b \geq .$) means $+\infty$; see [U] **12.2.1 Missing values**.

Options for predict

    Main

xb, the default, calculates the linear prediction.

stdp calculates the standard error of the prediction, which can be thought of as the standard error of the predicted expected value or mean for the observation's covariate pattern. The standard error of the prediction is also referred to as the standard error of the fitted value.

stdf calculates the standard error of the forecast, which is the standard error of the point prediction for 1 observation. It is commonly referred to as the standard error of the future or forecast value. By construction, the standard errors produced by stdf are always larger than those produced by stdp; see *Methods and formulas* in [R] **regress postestimation**.

pr(a,b) calculates $\Pr(a < \mathbf{x}_j\boldsymbol{\beta} + \epsilon_j < b)$, the probability that $y_j|\mathbf{x}_j$ would be observed in the interval (a, b).

a and b may be specified as numbers or variable names; *lb* and *ub* are variable names;
pr(20,30) calculates $\Pr(20 < \mathbf{x}_j\boldsymbol{\beta} + \epsilon_j < 30)$;
pr(*lb*,*ub*) calculates $\Pr(lb < \mathbf{x}_j\boldsymbol{\beta} + \epsilon_j < ub)$; and
pr(20,*ub*) calculates $\Pr(20 < \mathbf{x}_j\boldsymbol{\beta} + \epsilon_j < ub)$.

a missing ($a \geq .$) means $-\infty$; pr(.,30) calculates $\Pr(-\infty < \mathbf{x}_j\boldsymbol{\beta} + \epsilon_j < 30)$;
pr(*lb*,30) calculates $\Pr(-\infty < \mathbf{x}_j\boldsymbol{\beta} + \epsilon_j < 30)$ in observations for which $lb \geq .$
and calculates $\Pr(lb < \mathbf{x}_j\boldsymbol{\beta} + \epsilon_j < 30)$ elsewhere.

b missing ($b \geq .$) means $+\infty$; pr(20,.) calculates $\Pr(+\infty > \mathbf{x}_j\boldsymbol{\beta} + \epsilon_j > 20)$;
pr(20,*ub*) calculates $\Pr(+\infty > \mathbf{x}_j\boldsymbol{\beta} + \epsilon_j > 20)$ in observations for which $ub \geq .$
and calculates $\Pr(20 < \mathbf{x}_j\boldsymbol{\beta} + \epsilon_j < ub)$ elsewhere.

e(a,b) calculates $E(\mathbf{x}_j\boldsymbol{\beta} + \epsilon_j \mid a < \mathbf{x}_j\boldsymbol{\beta} + \epsilon_j < b)$, the expected value of $y_j|\mathbf{x}_j$ conditional on $y_j|\mathbf{x}_j$ being in the interval (a, b), meaning that $y_j|\mathbf{x}_j$ is truncated.
a and b are specified as they are for pr().

ystar(a,b) calculates $E(y_j^*)$, where $y_j^* = a$ if $\mathbf{x}_j\boldsymbol{\beta} + \epsilon_j \leq a$, $y_j^* = b$ if $\mathbf{x}_j\boldsymbol{\beta} + \epsilon_j \geq b$, and $y_j^* = \mathbf{x}_j\boldsymbol{\beta} + \epsilon_j$ otherwise, meaning that y_j^* is censored. a and b are specified as they are for pr().

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

scores calculates equation-level score variables.

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

The second new variable will contain $\partial\ln L/\partial\sigma$.

margins

Description for margins

margins estimates margins of response for linear predictions, probabilities, and expected values.

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
xb	linear prediction; the default
pr(*a*,*b*)	$\Pr(a < y_j < b)$
e(*a*,*b*)	$E(y_j \mid a < y_j < b)$
<u>y</u>star(*a*,*b*)	$E(y_j^*), y_j^* = \max\{a, \min(y_j, b)\}$
stdp	not allowed with margins
stdf	not allowed with margins

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

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

Remarks and examples

▷ Example 1: Marginal predictions

In example 2 of [R] **tobit**, we fit a tobit model of annual number of hours that married women spend working and then obtained estimated average marginal effect of 47.47 for years of education on observed hours worked.

```
. use https://www.stata-press.com/data/r19/mroz87
(1975 PSID data from Mroz, 1987)
. tobit whrs75 nwinc wedyrs wexper c.wexper#c.wexper wifeage kl6 k618, ll(0)
(output omitted)
. margins, dydx(wedyrs) predict(ystar(0,.))
(output omitted)
```

However, we may not want this overall effect. To obtain marginal effects for specific alternative scenarios, we use margins with the at() option. For example, continuing with example 2 of [R] **tobit** to estimate the means of the marginal effects on the expected value of the censored outcome conditional on education ranging from 8 years to 17 years, we type

```
. margins, dydx(wedyrs) predict(ystar(0,.)) at(wedyrs=(8(1)17))
Average marginal effects                        Number of obs = 753
Model VCE: OIM

Expression: E(whrs75*|whrs75>0), predict(ystar(0,.))
dy/dx wrt:  wedyrs
1._at:  wedyrs =   8
2._at:  wedyrs =   9
3._at:  wedyrs = 10
4._at:  wedyrs = 11
5._at:  wedyrs = 12
6._at:  wedyrs = 13
7._at:  wedyrs = 14
8._at:  wedyrs = 15
9._at:  wedyrs = 16
10._at: wedyrs = 17
```

	dy/dx	Delta-method std. err.	z	P>|z|	[95% conf. interval]	
wedyrs						
_at						
1	39.58775	8.432006	4.69	0.000	23.06132	56.11418
2	41.4497	9.421414	4.40	0.000	22.98407	59.91533
3	43.30531	10.41233	4.16	0.000	22.89752	63.71309
4	45.14859	11.39804	3.96	0.000	22.80885	67.48833
5	46.97371	12.37208	3.80	0.000	22.72489	71.22254
6	48.77504	13.32825	3.66	0.000	22.65216	74.89793
7	50.54717	14.26071	3.54	0.000	22.5967	78.49765
8	52.28499	15.16403	3.45	0.001	22.56403	82.00594
9	53.98369	16.03324	3.37	0.001	22.55912	85.40827
10	55.63887	16.8639	3.30	0.001	22.58624	88.6915

The estimated mean of the marginal effects is about 39.59 hours for 8 years of schooling, about 41.45 hours for 9 years of schooling, and so on.

◁

Reference

McDonald, J. F., and R. A. Moffitt. 1980. The use of tobit analysis. *Review of Economics and Statistics* 62: 318–321. https://doi.org/10.2307/1924766.

Also see

[R] **tobit** — Tobit regression

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