

## Postestimation commands

The following postestimation commands are available after `xtprobit`:

Command	Description
<code>contrast</code>	contrasts and ANOVA-style joint tests of parameters
* <code>estat ic</code>	Akaike's, consistent Akaike's, corrected Akaike's, and Schwarz's Bayesian information criteria (AIC, CAIC, AICc, and BIC, respectively)
<code>estat summarize</code>	summary statistics for the estimation sample
<code>estat vce</code>	variance–covariance matrix of the estimators (VCE)
<code>estimates</code>	cataloging estimation results
<code>etable</code>	table of estimation results
† <code>forecast</code>	dynamic forecasts and simulations
<code>hausman</code>	Hausman's specification test
<code>lincom</code>	point estimates, standard errors, testing, and inference for linear combinations of parameters
* <code>lrtest</code>	likelihood-ratio test
<code>margins</code>	marginal means, predictive margins, marginal effects, and average marginal effects
<code>marginsplot</code>	graph the results from margins (profile plots, interaction plots, etc.)
<code>nlcom</code>	point estimates, standard errors, testing, and inference for nonlinear combinations of parameters
<code>predict</code>	linear predictions and their SEs, probabilities
<code>predictnl</code>	point estimates, standard errors, testing, and inference for generalized predictions
<code>pwcompare</code>	pairwise comparisons of parameters
<code>test</code>	Wald tests of simple and composite linear hypotheses
<code>testnl</code>	Wald tests of nonlinear hypotheses

\* `estat ic` and `lrtest` are not appropriate after `xtprobit`, `pa`.

† `forecast` is not appropriate with `mi` estimation results.

# predict

## Description for predict

predict creates a new variable containing predictions such as linear predictions, probabilities, standard errors, and the equation-level score.

## Menu for predict

Statistics > Postestimation

## Syntax for predict

Random-effects model

```
predict [type] newvar [if] [in] [ , RE_statistic nooffset ]
```

Population-averaged model

```
predict [type] newvar [if] [in] [ , PA_statistic nooffset ]
```

RE_statistic	Description
Main	
xb	linear prediction; the default
pr	marginal probability of a positive outcome
pu0	probability of a positive outcome
stdp	standard error of the linear prediction

PA_statistic	Description
Main	
mu	probability of <i>depvar</i> ; considers the <code>offset()</code> ; the default
rate	probability of <i>depvar</i>
xb	linear prediction
stdp	standard error of the linear prediction
score	first derivative of the log likelihood with respect to $\mathbf{x}_{it}\beta$

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

`xb` calculates the linear prediction. This is the default for the random-effects model.

`pr` calculates the probability of a positive outcome that is marginal with respect to the random effect, which means that the probability is calculated by integrating the prediction function with respect to the random effect over its entire support.

`pu0` calculates the probability of a positive outcome, assuming that the random effect for that observation's panel is zero ( $\nu_i = 0$ ). This probability may not be similar to the proportion of observed outcomes in the group.

`mu` and `rate` both calculate the predicted probability of *depvar*. `mu` takes into account the `offset()`, and `rate` ignores those adjustments. `mu` and `rate` are equivalent if you did not specify `offset()`. `mu` is the default for the population-averaged model.

`stdp` calculates the standard error of the linear prediction.

`score` calculates the equation-level score,  $u_{it} = \partial \ln L(\mathbf{x}_{it}|\boldsymbol{\beta}) / \partial (\mathbf{x}_{it}|\boldsymbol{\beta})$ .

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

# margins

## Description for margins

margins estimates margins of response for linear predictions and probabilities.

## Menu for margins

Statistics > Postestimation

## Syntax for margins

```
margins [marginlist] [ , options ]
margins [marginlist] , predict(statistic ...) [predict(statistic ...) ...] [options]
```

### Random-effects model

statistic	Description
pr	marginal probability of a positive outcome; the default
pu0	probability of a positive outcome
xb	linear prediction
stdp	not allowed with margins

### Population-averaged model

statistic	Description
mu	probability of <i>depvar</i> ; considers the <code>offset()</code> ; the default
rate	probability of <i>depvar</i>
xb	linear prediction
stdp	not allowed with margins
<u>s</u> core	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: Calculating average marginal effects

In [example 2](#) of [\[XT\] xtprobit](#), we fit a population-averaged model of union status on the woman's age and level of schooling, whether she lived in an urban area, whether she lived in the south, and the year observed. Here we compute the average marginal effects from that fitted model on the probability of being in a union.

```
. use https://www.stata-press.com/data/r19/union
(NLS Women 14-24 in 1968)

. xtprobit union age grade i.not_smsa south#c.year, pa
(output omitted)

. margins, dydx(*)

Average marginal effects                                Number of obs = 26,200
Model VCE: Conventional

Expression: Pr(union != 0), predict()
dy/dx wrt:  age grade 1.not_smsa 1.south year
```

	Delta-method				[95% conf. interval]	
	dy/dx	std. err.	z	P> z		
age	.0025337	.0015035	1.69	0.092	-.0004132	.0054805
grade	.0094109	.0017566	5.36	0.000	.005968	.0128537
1.not_smsa	-.0199744	.0075879	-2.63	0.008	-.0348464	-.0051023
1.south	-.0910805	.0073315	-12.42	0.000	-.10545	-.076711
year	-.000938	.0015413	-0.61	0.543	-.0039589	.0020828

Note: dy/dx for factor levels is the discrete change from the base level.

On average, not living in a metropolitan area (`not_smsa = 1`) lowers the probability of being in a union by about two percentage points.



## Also see

[\[XT\] xtprobit](#) — Random-effects and population-averaged probit models

[\[U\] 20 Estimation and postestimation commands](#)

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