

**ivprobit postestimation** — Postestimation tools for ivprobit

Postestimation commands	predict	margins	estat
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## Postestimation commands

The following postestimation commands are of special interest after `ivprobit`:

Command	Description
<code>estat classification</code>	report various summary statistics, including the classification table
<code>estat correlation</code>	report the correlation matrix of the errors of the dependent variable and the endogenous variables
<code>estat covariance</code>	report the covariance matrix of the errors of the dependent variable and the endogenous variables
<code>lroc</code>	compute area under ROC curve and graph the curve
<code>lsens</code>	graph sensitivity and specificity versus probability cutoff

These commands are not appropriate after the two-step estimator or the `svy` prefix.

The following standard postestimation commands are also available:

Command	Description
<code>contrast</code>	contrasts and ANOVA-style joint tests of estimates
* <code>estat ic</code>	Akaike's and Schwarz's Bayesian information criteria (AIC and BIC)
<code>estat summarize</code>	summary statistics for the estimation sample
<code>estat vce</code>	variance–covariance matrix of the estimators (VCE)
<code>estat (svy)</code>	postestimation statistics for survey data
<code>estimates</code>	cataloging 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 coefficients
† <code>lrtest</code>	likelihood-ratio test; not available with two-step estimator
<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 coefficients
<code>predict</code>	predictions, residuals, influence statistics, and other diagnostic measures
<code>predictnl</code>	point estimates, standard errors, testing, and inference for generalized predictions
<code>pwcompare</code>	pairwise comparisons of estimates
* <code>suest</code>	seemingly unrelated estimation
<code>test</code>	Wald tests of simple and composite linear hypotheses
<code>testnl</code>	Wald tests of nonlinear hypotheses

\* `estat ic`, `forecast`, and `suest` are not appropriate after `ivprobit`, `twostep`.

† `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, and probabilities.

## Menu for predict

Statistics > Postestimation

## Syntax for predict

After *ML* or *twostep*

```
predict [type] newvar [if] [in] [, statistic rules asif]
```

After *ML*

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

<i>statistic</i>	Description
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Main

<code>xb</code>	linear prediction; the default
<code>stdp</code>	standard error of the linear prediction
<code>pr</code>	probability of a positive outcome accounting for endogeneity; not available with two-step estimator

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`, the default, calculates the linear prediction.

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

`pr` calculates the probability of a positive outcome accounting for endogeneity. `pr` is not available with the two-step estimator.

`rules` requests that Stata use any rules that were used to identify the model when making the prediction. By default, Stata calculates missing for excluded observations. `rules` is not available with the two-step estimator.

`asif` requests that Stata ignore the rules and the exclusion criteria and calculate predictions for all observations possible using the estimated parameters from the model. `asif` is not available with the two-step estimator.

scores, not available with `twostep`, calculates equation-level score variables.

For models with one endogenous regressor, four new variables are created.

The first new variable will contain  $\partial \ln L / \partial (z_i \delta)$ .

The second new variable will contain  $\partial \ln L / \partial (x_i \Pi)$ .

The third new variable will contain  $\partial \ln L / \partial \text{atanh } \rho$ .

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

For models with  $p$  endogenous regressors,  $p + \{(p + 1)(p + 2)\}/2$  new variables are created.

The first new variable will contain  $\partial \ln L / \partial (z_i \delta)$ .

The second through  $(p + 1)$ th new variables will contain  $\partial \ln L / \partial (x_i \Pi_k)$ ,  $k = 1, \dots, p$ , where  $\Pi_k$  is the  $k$ th column of  $\Pi$ .

The remaining score variables will contain the partial derivatives of  $\ln L$  with respect to  $s_{21}$ ,  $s_{31}$ ,  $\dots$ ,  $s_{p+1,1}$ ,  $s_{22}$ ,  $\dots$ ,  $s_{p+1,2}$ ,  $\dots$ ,  $s_{p+1,p+1}$ , where  $s_{m,n}$  denotes the  $(m, n)$  element of the Cholesky decomposition of the error covariance matrix.

## 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]
```

<i>statistic</i>	Description
Main	
<code>xb</code>	linear prediction; the default
<code>pr</code>	probability of a positive outcome accounting for endogeneity; not available with two-step estimator
<code>stdp</code>	not allowed with <code>margins</code>

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

For the full syntax, see [R] [margins](#).

## estat

### Description for estat

`estat correlation` displays the correlation matrix of the errors of the dependent variable and the endogenous variables.

`estat covariance` displays the covariance matrix of the errors of the dependent variable and the endogenous variables.

`estat correlation` and `estat covariance` are not allowed after the `ivprobit` two-step estimator.

### Menu for estat

Statistics > Postestimation

### Syntax for estat

*Correlation matrix*

```
estat correlation [ , border(bspec) left(#) format(%fmt) ]
```

*Covariance matrix*

```
estat correlation [ , border(bspec) left(#) format(%fmt) ]
```

### Options for estat

Main

`border`(*bspec*) sets border style of the matrix display. The default is `border(all)`.

`left`(#) sets the left indent of the matrix display. The default is `left(2)`.

`format`(%*fmt*) specifies the format for displaying the individual elements of the matrix. The default is `format(%9.0g)`.

### Remarks and examples

[stata.com](http://www.stata.com)

Remarks are presented under the following headings:

*Marginal effects*

*Obtaining predicted values*

## Marginal effects

### ▷ Example 1

We can obtain marginal effects by using the `margins` command after `ivprobit`. We will calculate average marginal effects by using the labor-supply model of [example 1](#) in [\[R\] ivprobit](#).

```
. use http://www.stata-press.com/data/r14/laborsup
. ivprobit fem_work fem_educ kids (other_inc = male_educ)
  (output omitted)
. margins, dydx(*) predict(pr)
Average marginal effects          Number of obs      =          500
Model VCE      : OIM
Expression    : Probability of positive outcome, predict(pr)
dy/dx w.r.t.  : other_inc fem_educ kids male_educ
```

	Delta-method				[95% Conf. Interval]	
	dy/dx	Std. Err.	z	P> z		
other_inc	-.0097802	.0014994	-6.52	0.000	-.012719	-.0068414
fem_educ	.0623273	.007099	8.78	0.000	.0484135	.076241
kids	-.0614265	.0139446	-4.41	0.000	-.0887574	-.0340956
male_educ	-.0194406	.0022103	-8.80	0.000	-.0237728	-.0151084

Here we see that a \$1,000 increase in `other_inc` leads to an average decrease of 0.01 in the probability that the woman has a job. `male_educ` has no effect because it appears only as an instrument.

◀

## Obtaining predicted values

After fitting your model with `ivprobit`, you can obtain the linear prediction and its standard error for both the estimation sample and other samples by using the `predict` command; see [\[U\] 20 Estimation and postestimation commands](#) and [\[R\] predict](#). If you had used the maximum likelihood estimator, you could also obtain the probability of a positive outcome.

`predict`'s `pr` option calculates the probability of a positive outcome, remembering any rules used to identify the model, and calculates missing for excluded observations. `predict`'s `rules` option uses the rules in predicting probabilities, whereas `predict`'s `asif` option ignores both the rules and the exclusion criteria and calculates probabilities for all possible observations by using the estimated parameters from the model. See [Obtaining predicted values](#) in [\[R\] probit postestimation](#) for an example.

## Methods and formulas

The linear prediction is calculated as  $z_i \hat{\delta}$ , where  $\hat{\delta}$  is the estimated value of  $\delta$ , and  $z_i$  and  $\delta$  are defined in [\(1a\)](#) of [\[R\] ivprobit](#). The probability of a positive outcome is  $\Phi(m_i)$ , where  $\Phi(\cdot)$  is the standard normal distribution function and  $m_i$  is defined in [Methods and formulas](#) of [\[R\] ivprobit](#). Using  $m_i$  instead of  $z_i \hat{\delta}$  to evaluate  $\Phi(\cdot)$  accounts for endogeneity.

## Also see

[R] **ivprobit** — Probit model with continuous endogenous covariates

[R] **estat classification** — Classification statistics and table

[R] **lroc** — Compute area under ROC curve and graph the curve

[R] **lsens** — Graph sensitivity and specificity versus probability cutoff

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