

**xtnbreg postestimation** — Postestimation tools for xtnbreg

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## Postestimation commands

The following postestimation commands are available after `xtnbreg`:

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>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 coefficients
* <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 coefficients
<code>predict</code>	linear predictions and their SEs, number of events, incidence rates, probabilities
<code>predictnl</code>	point estimates, standard errors, testing, and inference for generalized predictions
<code>pwcompare</code>	pairwise comparisons of estimates
<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 `xtnbreg`, `pa`.

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

# predict

## Description for predict

`predict` creates a new variable containing predictions such as linear predictions, standard errors, numbers of events, incidence rates, probabilities, and the equation-level score.

## Menu for predict

Statistics > Postestimation

## Syntax for predict

*Random-effects (RE) and conditional fixed-effects (FE) overdispersion models*

```
predict [type] newvar [if] [in] [, RE/FE_statistic nooffset]
```

*Population-averaged (PA) model*

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

<i>RE/FE_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>nu0</code>	predicted number of events; assumes fixed or random effect is zero
<code>iru0</code>	predicted incidence rate; assumes fixed or random effect is zero
<code>pr0(<i>n</i>)</code>	probability $\Pr(y = n)$ assuming the random effect is zero; only allowed after <code>xtnbreg, re</code>
<code>pr0(<i>a</i>,<i>b</i>)</code>	probability $\Pr(a \leq y \leq b)$ assuming the random effect is zero; only allowed after <code>xtnbreg, re</code>

<i>PA_statistic</i>	Description
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Main

<code>mu</code>	predicted number of events; considers the <code>offset()</code> ; the default
<code>rate</code>	predicted number of events
<code>xb</code>	linear prediction
<code>stdp</code>	standard error of the linear prediction
<code>score</code>	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 and fixed-effects models.

`mu` and `rate` both calculate the predicted number of events. `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.

`nu0` calculates the predicted number of events, assuming a zero random or fixed effect.

`iru0` calculates the predicted incidence rate, assuming a zero random or fixed effect.

`pr0(n)` calculates the probability  $\Pr(y = n)$  assuming the random effect is zero, where *n* is a nonnegative integer that may be specified as a number or a variable (only allowed after `xtnbreg, re`).

`pr0(a,b)` calculates the probability  $\Pr(a \leq y \leq b)$  assuming the random effect is zero, where *a* and *b* are nonnegative integers that may be specified as numbers or variables (only allowed after `xtnbreg, re`);

*b* missing ( $b \geq .$ ) means  $+\infty$ ;

`pr0(20, .)` calculates  $\Pr(y \geq 20)$ ;

`pr0(20,b)` calculates  $\Pr(y \geq 20)$  in observations for which  $b \geq .$  and calculates  $\Pr(20 \leq y \leq b)$  elsewhere.

`pr0(.,b)` produces a syntax error. A missing value in an observation on the variable *a* causes a missing value in that observation for `pr0(a,b)`.

`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 `xtnbreg`. 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, numbers of events, incidence rates, and probabilities.

### Menu for margins

Statistics > Postestimation

### Syntax for margins

```
margins [marginlist] [, options]
```

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

*Random-effects (RE) and conditional fixed-effects (FE) overdispersion models*

<i>statistic</i>	Description
<code>xb</code>	linear prediction; the default
<code>nu0</code>	predicted number of events; assumes fixed or random effect is zero
<code>iru0</code>	predicted incidence rate; assumes fixed or random effect is zero
<code>pr0(<i>n</i>)</code>	probability $\Pr(y = n)$ assuming the random effect is zero; only allowed after <code>xtnbreg</code> , <code>re</code>
<code>pr0(<i>a</i>,<i>b</i>)</code>	probability $\Pr(a \leq y \leq b)$ assuming the random effect is zero; only allowed after <code>xtnbreg</code> , <code>re</code>
<code>stdp</code>	not allowed with <code>margins</code>

*Population-averaged (PA) model*

<i>statistic</i>	Description
<code>mu</code>	predicted number of events; considers the <code>offset()</code> ; the default
<code>rate</code>	predicted number of events
<code>xb</code>	linear prediction
<code>stdp</code>	not allowed with <code>margins</code>
<code>score</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](#).

## Methods and formulas

The probabilities calculated using the `pr0(n)` option are the probability  $\Pr(y_{it} = n)$  for a RE model assuming the random effect is zero. A negative binomial model is an overdispersed Poisson model, and the nominal overdispersion can be calculated as  $\delta = s/(r - 1)$ , where  $r$  and  $s$  are as given in the estimation results. Define  $\mu_{it} = \exp(\mathbf{x}_{it}\boldsymbol{\beta} + \text{offset}_{it})$ . Then the probabilities in `pr0(n)` are calculated as the probability that  $y_{it} = n$ , where  $y_{it}$  has a negative binomial distribution with mean  $\delta\mu_{it}$  and variance  $\delta(1 + \delta)\mu_{it}$ .

## Also see

[XT] [xtnbreg](#) — Fixed-effects, random-effects, & population-averaged negative binomial models

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