The following postestimation commands are available after `tnbreg`:

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<th>Command</th>
<th>Description</th>
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<td>contrasts and ANOVA-style joint tests of estimates</td>
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<td>Akaike’s and Schwarz’s Bayesian information criteria (AIC and BIC)</td>
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<tr>
<td>estat summarize</td>
<td>summary statistics for the estimation sample</td>
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<tr>
<td>estat vce</td>
<td>variance–covariance matrix of the estimators (VCE)</td>
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<tr>
<td>estat (svy)</td>
<td>postestimation statistics for survey data</td>
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<td>forecast</td>
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<td>lincom</td>
<td>point estimates, standard errors, testing, and inference for linear combinations of coefficients</td>
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<tr>
<td>lrtest</td>
<td>likelihood-ratio test</td>
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<tr>
<td>margins</td>
<td>marginal means, predictive margins, marginal effects, and average marginal effects</td>
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<td>marginsplot</td>
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<tr>
<td>nlcom</td>
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<tr>
<td>predict</td>
<td>predictions, residuals, influence statistics, and other diagnostic measures</td>
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<td>predictnl</td>
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<td>pwcompare</td>
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<tr>
<td>test</td>
<td>Wald tests of simple and composite linear hypotheses</td>
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<tr>
<td>testnl</td>
<td>Wald tests of nonlinear hypotheses</td>
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</table>

1. `forecast` is not appropriate with `svy` estimation results.
2. `lrtest` is not appropriate with `svy` estimation results.
Syntax for predict

\[ \text{predict \ [type] \ newvar \ [if] \ [in] \ [\ , \ statistic \ nooffset]} \]

\[ \text{predict \ [type] \ \{stub\*|newvar} \text{reg} \text{newvar} \text{disp}) \ [if] \ [in] \ , \ \text{scores} \]

\begin{tabular}{ll}
\textbf{statistic} & \textbf{Description} \\
\hline
\text{n} & number of events; the default \\
\text{ir} & incidence rate \\
\text{cm} & conditional mean, \( E(y_j \mid y_j > \tau_j) \) \\
\text{pr(n)} & probability \( \Pr(y_j = n) \) \\
\text{pr(a,b)} & probability \( \Pr(a \leq y_j \leq b) \) \\
\text{cpr(n)} & conditional probability \( \Pr(y_j = n \mid y_j > \tau_j) \) \\
\text{cpr(a,b)} & conditional probability \( \Pr(a \leq y_j \leq b \mid y_j > \tau_j) \) \\
\text{xb} & linear prediction \\
\text{stdp} & standard error of the linear prediction \\
\end{tabular}

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

Menu for predict

Statistics > Postestimation > Predictions, residuals, etc.

Options for predict

\text{n}, the default, calculates the predicted number of events, which is \( \exp(x_j\beta) \) if neither \text{offset()}\ nor \text{exposure()}\ was specified when the model was fit; \( \exp(x_j\beta + \text{offset}_j) \) if \text{offset()}\ was specified; or \( \exp(x_j\beta) \times \text{exposure}_j \) if \text{exposure()}\ was specified.

\text{ir} calculates the incidence rate \( \exp(x_j\beta) \), which is the predicted number of events when exposure is 1. This is equivalent to specifying both the \text{n} and the \text{nooffset} options.

\text{cm} calculates the conditional mean,

\[ E(y_j \mid y_j > \tau_j) = \frac{E(y_j)}{\Pr(y_j > \tau_j)} \]

where \( \tau_j \) is the truncation point found in \text{e(llopt)}.

\text{pr(n)} calculates the probability \( \Pr(y_j = n) \), where \( n \) is a nonnegative integer that may be specified as a number or a variable.

\text{pr(a,b)} calculates the probability \( \Pr(a \leq y_j \leq b) \), where \( a \) and \( b \) are nonnegative integers that may be specified as numbers or variables;

\( b \) missing \( (b \geq .) \) means \(+\infty\):

\text{pr(20,\ )} calculates \( \Pr(y_j \geq 20) \);

\text{pr(20,b)} calculates \( \Pr(y_j \geq 20) \) in observations for which \( b \geq . \) and calculates \( \Pr(20 \leq y_j \leq b) \) elsewhere.
\texttt{pr}(.,b) \text{ produces a syntax error. A missing value in an observation of the variable } a \text{ causes a missing value in that observation for } \texttt{pr}(a,b).

\textsf{cpr}(n) \text{ calculates the conditional probability } \Pr(y_j = n \mid y_j > \tau_j), \text{ where } \tau_j \text{ is the truncation point found in } \texttt{e(1lopt)}. n \text{ is an integer greater than the truncation point that may be specified as a number or a variable.}

\textsf{cpr}(a,b) \text{ calculates the conditional probability } \Pr(a \leq y_j \leq b \mid y_j > \tau_j), \text{ where } \tau_j \text{ is the truncation point found in } \texttt{e(1lopt)}. \text{ The syntax for this option is analogous to that used for } \texttt{pr}(a,b) \text{ except that } a \text{ must be greater than the truncation point.}

\textsf{xb} \text{ calculates the linear prediction, which is } x_j \beta \text{ if neither } \texttt{offset()} \text{ nor } \texttt{exposure()} \text{ was specified when the model was fit; } x_j \beta + \text{offset}_j \text{ if } \texttt{offset()} \text{ was specified; or } x_j \beta + \ln(\text{exposure}_j) \text{ if } \texttt{exposure()} \text{ was specified; see } \texttt{nooffset} \text{ below.}

\textsf{stdp} \text{ calculates the standard error of the linear prediction.}

\textsf{nooffset} \text{ is relevant only if you specified } \texttt{offset()} \text{ or } \texttt{exposure()} \text{ when you fit the model. It modifies the calculations made by } \texttt{predict} \text{ so that they ignore the offset or exposure variable; the linear prediction is treated as } x_j \beta \text{ rather than as } x_j \beta + \text{offset}_j \text{ or } x_j \beta + \ln(\text{exposure}_j). \text{ Specifying } \texttt{predict ...}, \texttt{nooffset} \text{ is equivalent to specifying } \texttt{predict ...}, \texttt{ir}.

\textsf{scores} \text{ calculates equation-level score variables.}

The first new variable will contain \( \partial \ln L / \partial (x_j \beta) \).

The second new variable will contain \( \partial \ln L / \partial (\ln \alpha) \) for dispersion(mean).

The second new variable will contain \( \partial \ln L / \partial (\ln \delta) \) for dispersion(constant).

\section*{Methods and formulas}

In the following formulas, we use the same notation as in \texttt{[R] tnbreg}.

Methods and formulas are presented under the following headings:

\begin{itemize}
  \item \textit{Mean-dispersion model}
  \item \textit{Constant-dispersion model}
\end{itemize}

\section*{Mean-dispersion model}

The equation-level scores are given by

\begin{align*}
\text{score}(x_j \beta)_j &= p_j(y_j - \mu_j) - \frac{p_j^{(m+1)} \mu_j}{\Pr(Y > \tau_j \mid p_j, m)} \\
\text{score}(\omega)_j &= -m \left\{ \frac{\alpha(\mu_j - y_j)}{1 + \alpha \mu_j} - \ln(1 + \alpha \mu_j) + \psi(y_j + m) - \psi(m) \right\} \\
&\quad - \frac{p_j^m}{\Pr(Y > \tau_j \mid p_j, m)} \{ m \ln(p_j) + \mu_j p_j \}
\end{align*}

where \( \omega_j = \ln \alpha_j \), \( \psi(z) \) is the digamma function, and \( \tau_j \) is the truncation point found in \texttt{e(1lopt)}. 
Constant-dispersion model

The equation-level scores are given by

\[
\text{score}(x\beta)_j = m_j \left\{ \psi(y_j + m_j) - \psi(m_j) + \ln(p) + \frac{p^m_j \ln(p)}{\Pr(Y > \tau_j | p, m_j)} \right\}
\]

\[
\text{score}(\omega)_j = y_j - (y_j + m_j)(1 - p) - \text{score}(x\beta)_j - \frac{\mu_j p}{\Pr(Y > \tau_j | p, m_j)}
\]

where \( \omega_j = \ln \delta_j \) and \( \tau_j \) is the truncation point found in \( \text{e(llopt)} \).

Also see

[R] tnbreg — Truncated negative binomial regression

[U] 20 Estimation and postestimation commands