

xhtaylor postestimation — Postestimation tools for xhtaylor

Postestimation commands
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Postestimation commands

The following postestimation commands are available after `xhtaylor`:

Command	Description
<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>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>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 and their SEs, residuals, etc.
<code>predictnl</code>	point estimates, standard errors, testing, and inference for generalized predictions
<code>test</code>	Wald tests of simple and composite linear hypotheses
<code>testnl</code>	Wald tests of nonlinear hypotheses

predict

Description for predict

`predict` creates a new variable containing predictions such as fitted values, standard errors, combined residuals, predictions, random-error components, and idiosyncratic error components.

Menu for predict

Statistics > Postestimation

Syntax for predict

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

<i>statistic</i>	Description
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Main

<code>xb</code>	$\mathbf{X}_{it}\hat{\boldsymbol{\beta}} + \mathbf{Z}_{it}\hat{\boldsymbol{\delta}}$, fitted values; the default
<code>stdp</code>	standard error of the fitted values
<code>ue</code>	$\hat{\mu}_i + \hat{\epsilon}_{it}$, the combined residual
* <code>xbu</code>	$\mathbf{X}_{it}\hat{\boldsymbol{\beta}} + \mathbf{Z}_{it}\hat{\boldsymbol{\delta}} + \hat{\mu}_i$, prediction including effect
* <code>u</code>	$\hat{\mu}_i$, the random-error component
* <code>e</code>	$\hat{\epsilon}_{it}$, prediction of the idiosyncratic error component

Unstarred statistics are available both in and out of sample; type `predict ... if e(sample) ...` if wanted only for the estimation sample. Starred statistics are calculated only for the estimation sample, even when `if e(sample)` is not specified.

Options for predict

Main

`xb`, the default, calculates the linear prediction, that is, $\mathbf{X}_{it}\hat{\boldsymbol{\beta}} + \mathbf{Z}_{it}\hat{\boldsymbol{\delta}}$.

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

`ue` calculates the prediction of $\hat{\mu}_i + \hat{\epsilon}_{it}$.

`xbu` calculates the prediction of $\mathbf{X}_{it}\hat{\boldsymbol{\beta}} + \mathbf{Z}_{it}\hat{\boldsymbol{\delta}} + \hat{\nu}_i$, the prediction including the random effect.

`u` calculates the prediction of $\hat{\mu}_i$, the estimated random effect.

`e` calculates the prediction of $\hat{\epsilon}_{it}$.

margins

Description for margins

`margins` estimates margins of response for fitted values.

Menu for margins

Statistics > Postestimation

Syntax for margins

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

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

<i>statistic</i>	Description
<code>xb</code>	$\mathbf{X}_{it}\widehat{\beta} + \mathbf{Z}_i\widehat{\delta}$, fitted values; the default
<code>stdp</code>	not allowed with <code>margins</code>
<code>ue</code>	not allowed with <code>margins</code>
<code>xbu</code>	not allowed with <code>margins</code>
<code>u</code>	not allowed with <code>margins</code>
<code>e</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](#).

Remarks and examples

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

▶ Example 1

Continuing with [example 1](#) of [XT] [xhtaylor](#), we use `hausman` to test whether we should use the Hausman–Taylor estimator instead of the fixed-effects estimator. We follow the empirical illustration in [Baltagi \(2013, sec. 7.5\)](#), but we fit the model without including the `exp2` and `wks` variables.

We first fit the model with `xhtaylor` and then with `xtreg, fe`:

```
. use https://www.stata-press.com/data/r17/psidextract
. xhtaylor lwage occ south smsa ind exp ms union fem blk ed,
> endog(exp ms union ed)
  (output omitted)
. estimates store eq_ht
. xtreg lwage occ south smsa ind exp ms union fem blk ed, fe
  (output omitted)
. estimates store eq_fe
```

We can now use `hausman` to compare the two estimators, but we need to specify the `df()` to indicate the degrees of freedom for the χ^2 statistic, which would be determined by the overidentifying restrictions in the Hausman–Taylor estimation. In this case, there are three degrees of freedom because there are four time-varying exogenous variables (`occ`, `south`, `smsa`, `ind`) that can be used as instruments for only one time-invariant endogenous variable (`ed`).

```
. hausman eq_fe eq_ht, df(3)
```

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) Std. err.
	(b) eq_fe	(B) eq_ht		
occ	-.0239323	-.0231694	-.0007629	.0002395
south	-.0037282	.0062699	-.0099982	.0124188
smsa	-.0436251	-.0433518	-.0002733	.0042296
ind	.021184	.0156376	.0055465	.0025159
exp	.0965738	.0964748	.0000991	.000063
ms	-.0299908	-.0300703	.0000795	.000321
union	.0349156	.0348494	.0000662	.0006336

b = Consistent under H0 and Ha; obtained from **xtreg**.

B = Inconsistent under Ha, efficient under H0; obtained from **xhtaylor**.

Test of H0: Difference in coefficients not systematic

```
chi2(3) = (b-B)'[(V_b-V_B)^(-1)](b-B)
        = 5.22
```

```
Prob > chi2 = 0.1567
```

```
(V_b-V_B is not positive definite)
```

The p -value for the test provides evidence favoring the null hypothesis; therefore, in this case, the Hausman–Taylor estimation is adequate.

Notice that the variance–covariance matrix for the difference (b-B) is not positive definite. As [Greene \(2012, 237\)](#) points out, this kind of result is due to finite-sample conditions. He also states that Hausman considers it preferable to take the test statistic as zero and, therefore, not to reject the null hypothesis.

◀

▶ Example 2

We now want to determine whether the Amemiya–MaCurdy estimator produces significant efficiency gains with respect to the Hausman–Taylor estimator. We refit the two models, and we use the Hausman test again:

```
. use https://www.stata-press.com/data/r17/psidextract
. xhtaylor lwage occ south smsa ind exp ms union fem blk ed,
> endog(exp ms union ed)
  (output omitted)
. estimates store eq_ht
. xhtaylor lwage occ south smsa ind exp ms union fem blk ed,
> endog(exp ms union ed) amacurdy
  (output omitted)
. estimates store eq_am
```

```
. hausman eq_ht eq_am
```

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) Std. err.
	(b) eq_ht	(B) eq_am		
occ	-.0231694	-.023354	.0001846	.0006485
south	.0062699	.0060857	.0001842	.0010641
smsa	-.0433518	-.0434638	.0001121	.0006297
ind	.0156376	.0156602	-.0000226	.000492
exp	.0964748	.0962147	.00026	.0000694
ms	-.0300703	-.0303139	.0002436	.0006735
union	.0348494	.0345742	.0002752	.0006471
fem	-.1277756	-.1287857	.0010101	.0036717
blk	-.2911574	-.291645	.0004876	.0082831
ed	.1390257	.1380699	.0009558	.005436

b = Consistent under H0 and Ha; obtained from **xhtaylor**.

B = Inconsistent under Ha, efficient under H0; obtained from **xhtaylor**.

Test of H0: Difference in coefficients not systematic

$$\text{chi2}(10) = (b-B)' [(V_b-V_B)^{-1}] (b-B)$$

$$= 14.42$$

$$\text{Prob} > \text{chi2} = 0.1548$$

The result indicates that we should use the more efficient estimation produced by the Amemiya–MaCurdy estimator.



References

- Baltagi, B. H. 2013. *Econometric Analysis of Panel Data*. 5th ed. Chichester, UK: Wiley.
- Greene, W. H. 2012. *Econometric Analysis*. 7th ed. Upper Saddle River, NJ: Prentice Hall.

Also see

- [[XT](#)] [xhtaylor](#) — Hausman–Taylor estimator for error-components models
- [[U](#)] [20 Estimation and postestimation commands](#)