Title

> **xtdpdsys postestimation —** Postestimation tools for xtdpdsys

Postestimation commands

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

Command	Description
estat abond	test for autocorrelation
estat sargan	Sargan test of overidentifying restrictions

The following standard postestimation commands are also available:

Command	Description
estat summarize	summary statistics for the estimation sample
estat vce	variance–covariance matrix of the estimators (VCE)
estimates	cataloging estimation results
etable	table of estimation results
forecast	dynamic forecasts and simulations
hausman	Hausman's specification test
lincom	point estimates, standard errors, testing, and inference for linear combinations of coefficients
margins	marginal means, predictive margins, marginal effects, and average marginal effects
marginsplot	graph the results from margins (profile plots, interaction plots, etc.)
nlcom	point estimates, standard errors, testing, and inference for nonlinear combinations of coefficients
predict	linear predictions and their SEs, residual errors
predictnl	point estimates, standard errors, testing, and inference for generalized predictions
test	Wald tests of simple and composite linear hypotheses
testnl	Wald tests of nonlinear hypotheses

predict

Description for predict

predict creates a new variable containing predictions such as linear predictions.

Menu for predict

Statistics > Postestimation

Syntax for predict

> predict $\big[$*type*$\big]$ *newvar* $\big[$*if*$\big]$ $\big[$*in*$\big]$ $\big[$, xb e stdp <u>diff</u>erence$\big]$

Options for predict

     ⎣ Main ⎤

xb, the default, calculates the linear prediction.

e calculates the residual error.

stdp calculates the standard error of the prediction, which can be thought of as the standard error of
    the predicted expected value or mean for the observation's covariate pattern. The standard error
    of the prediction is also referred to as the standard error of the fitted value. stdp may not be
    combined with difference.

difference specifies that the statistic be calculated for the first differences instead of the levels, the
    default.

margins

Description for margins

margins estimates margins of responses for linear predictions.

Menu for margins

Statistics > Postestimation

Syntax for margins

margins [*marginlist*] [, *options*]

margins [*marginlist*] , <u>predict</u>(*statistic* ...) [*options*]

statistic	Description
xb	linear prediction; the default
e	not allowed with margins
stdp	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**.

estat

Description for estat

estat abond reports the Arellano–Bond test for serial correlation in the first-differenced residuals.

estat sargan reports the Sargan test of the overidentifying restrictions.

Menu for estat

Statistics > Postestimation

Syntax for estat

Test for autocorrelation

estat <u>ab</u>ond [, <u>artes</u>ts(*#*)]

Sargan test of overidentifying restrictions

estat sargan

Option for estat abond

artests(*#*) specifies the highest order of serial correlation to be tested. By default, the tests computed during estimation are reported. The model will be refit when artests(*#*) specifies a higher order than that computed during the original estimation. The model can only be refit if the data have not changed.

Remarks and examples

Remarks are presented under the following headings:

estat abond

The moment conditions used by xtdpdsys are valid only if there is no serial correlation in the idiosyncratic errors. Testing for serial correlation in dynamic panel-data models is tricky because one needs to apply a transform to remove the panel-level effects, but the transformed errors have a more complicated error structure than the idiosyncratic errors. The Arellano–Bond test for serial correlation reported by estat abond tests for serial correlation in the first-differenced errors.

Because the first difference of independent and identically distributed idiosyncratic errors will be serially correlated, rejecting the null hypothesis of no serial correlation in the first-differenced errors at order one does not imply that the model is misspecified. Rejecting the null hypothesis at higher orders implies that the moment conditions are not valid. See example 5 in [XT] **xtdpd** for an alternative estimator that allows for idiosyncratic errors that follow a first-order moving average process.

After the one-step system estimator, the test can be computed only when vce(robust) has been specified.

estat sargan

Like all GMM estimators, the estimator in xtdpdsys can produce consistent estimates only if the moment conditions used are valid. Although there is no method to test if the moment conditions from an exactly identified model are valid, one can test whether the overidentifying moment conditions are valid. estat sargan implements the Sargan test of overidentifying conditions discussed in Arellano and Bond (1991).

Only for a homoskedastic error term does the Sargan test have an asymptotic χ^2 distribution. In fact, Arellano and Bond (1991) show that the one-step Sargan test overrejects in the presence of heteroskedasticity. Because its asymptotic distribution is not known under the assumptions of the vce(robust) model, xtdpdsys does not compute it when vce(robust) is specified. See [XT] **xtdpd** for an example in which the null hypothesis of the Sargan test is not rejected.

```
. use https://www.stata-press.com/data/r18/abdata
. xtdpdsys n L(0/2).(w k) yr1980-yr1984 year
  (output omitted)
. estat sargan
Sargan test of overidentifying restrictions
H0: Overidentifying restrictions are valid
        chi2(33)    =   63.63911
        Prob > chi2 =     0.0011
```

The output above presents strong evidence against the null hypothesis that the overidentifying restrictions are valid. Rejecting this null hypothesis implies that we need to reconsider our model or our instruments, unless we attribute the rejection to heteroskedasticity in the data-generating process. Although performing the Sargan test after the two-step estimator is an alternative, Arellano and Bond (1991) found a tendency for this test to underreject in the presence of heteroskedasticity.

Methods and formulas

The formulas are given in *Methods and formulas* of [XT] **xtdpd postestimation**.

Reference

Arellano, M., and S. Bond. 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *Review of Economic Studies* 58: 277–297. https://doi.org/10.2307/2297968.

Also see

[XT] **xtdpdsys** — Arellano–Bover/Blundell–Bond linear dynamic panel-data estimation

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