Title

> **reg3 postestimation** — Postestimation tools for reg3

Postestimation commands

The following postestimation commands are available after `reg3`:

Command	Description
contrast	contrasts and ANOVA-style joint tests of estimates
* estat ic	Akaike's and Schwarz's Bayesian information criteria (AIC and BIC)
estat summarize	summary statistics for the estimation sample
estat vce	variance–covariance matrix of the estimators (VCE)
estimates	cataloging 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	predictions, residuals, influence statistics, and other diagnostic measures
predictnl	point estimates, standard errors, testing, and inference for generalized predictions
pwcompare	pairwise comparisons of estimates
test	Wald tests of simple and composite linear hypotheses
testnl	Wald tests of nonlinear hypotheses

*estat ic is not appropriate after `reg3, 2sls`.

predict

Description for predict

predict creates a new variable containing predictions such as linear predictions, standard errors, residuals, and differences between the linear predictions of two equations.

Menu for predict

Statistics > Postestimation

Syntax for predict

> predict [*type*] *newvar* [*if*] [*in*] [, <u>eq</u>uation(*eqno*[,*eqno*]) *statistic*]

statistic	Description
Main	
xb	linear prediction; the default
stdp	standard error of the linear prediction
<u>res</u>iduals	residuals
difference	difference between the linear predictions of two equations
stddp	standard error of the difference in linear predictions

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

equation(*eqno*[,*eqno*]) specifies to which equation you are referring.

equation() is filled in with one *eqno* for the xb, stdp, and residuals options. equation(#1) would mean the calculation is to be made for the first equation, equation(#2) would mean the second, and so on. You could also refer to the equations by their names. equation(income) would refer to the equation named income and equation(hours) to the equation named hours.

If you do not specify equation(), results are the same as if you specified equation(#1).

difference and stddp refer to between-equation concepts. To use these options, you must specify two equations, for example, equation(#1,#2) or equation(income,hours). When two equations must be specified, equation() is required.

xb, the default, calculates the linear prediction (fitted values)—the prediction of $\mathbf{x}_j\mathbf{b}$ for the specified equation.

stdp calculates the standard error of the prediction for the specified equation. It 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.

residuals calculates the residuals.

difference calculates the difference between the linear predictions of two equations in the system. With equation(#1,#2), difference computes the prediction of equation(#1) minus the prediction of equation(#2).

stddp is allowed only after you have previously fit a multiple-equation model. The standard error of the difference in linear predictions $(\mathbf{x}_{1j}\mathbf{b} - \mathbf{x}_{2j}\mathbf{b})$ between equations 1 and 2 is calculated.

For more information on using predict after multiple-equation estimation commands, see [R] **predict**.

margins

Description for margins

margins estimates margins of response for linear predictions and differences between the linear predictions of two equations.

Menu for margins

Statistics > Postestimation

Syntax for margins

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

statistic	Description
default	linear predictions for each equation
xb	linear prediction for a specified equation
<u>difference</u>	difference between the linear predictions of two equations
stdp	not allowed with margins
<u>residuals</u>	not allowed with margins
<u>stddp</u>	not allowed with margins

xb defaults to the first equation.

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

For the full syntax, see [R] **margins**.

Remarks and examples

▷ Example 1: Using predict

In example 2 of [R] **reg3**, we fit a simple supply-and-demand model. Here we obtain the fitted supply and demand curves assuming that the exogenous regressors equal their sample means. We first replace each of the three exogenous regressors with their sample means, then we call predict to obtain the predictions.

```
. use http://www.stata-press.com/data/r14/supDem
. global demand "(qDemand: quantity price pcompete income)"
. global supply "(qSupply: quantity price praw)"
. reg3 $demand $supply, endog(price)
 (output omitted )
. summarize pcompete, meanonly
. replace pcompete = r(mean)
(49 real changes made)
. summarize income, meanonly
. replace income = r(mean)
(49 real changes made)
. summarize praw, meanonly
. replace praw = r(mean)
(49 real changes made)
. predict demand, equation(qDemand)
(option xb assumed; fitted values)
. predict supply, equation(qSupply)
(option xb assumed; fitted values)
. graph twoway line demand price, sort || line supply price, ytitle(" ")
> legend(label(1 "Fitted values: qDemand") label(2 "Fitted values: qSupply"))
```
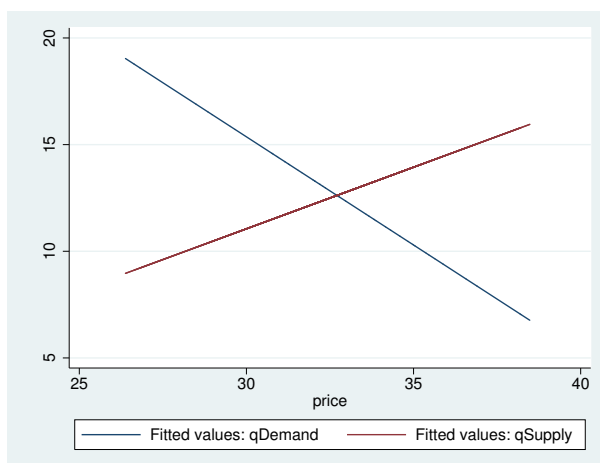

As we would expect based on economic theory, the demand curve slopes downward while the supply curve slopes upward. With the exogenous variables at their mean levels, the equilibrium price and quantity are slightly less than 33 and 13, respectively.

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▷ Example 2: Obtaining forecasts

In example 3 of [R] **reg3**, we fit Klein's (1950) model of the U.S. economy. That model includes three stochastic equations we fit using reg3 as well as four identities. Here we briefly illustrate how the forecast command can be used to obtain forecasts for all the endogenous variables in the model. For a more detailed discussion of how to forecast with this model, see [TS] **forecast**.

In Stata, we type

```
. use http://www.stata-press.com/data/r14/klein2, clear
. reg3 (c p L.p w) (i p L.p L.k) (wp y L.y yr), endog(w p y) exog(t wg g)
  (output omitted)
. estimates store kleineqs
. forecast create kleinmodel
  Forecast model kleinmodel started.
. forecast estimates kleineqs
  Added estimation results from reg3.
  Forecast model kleinmodel now contains 3 endogenous variables.
. forecast identity y = c + i + g
  Forecast model kleinmodel now contains 4 endogenous variables.
. forecast identity p = y - t - wp
  Forecast model kleinmodel now contains 5 endogenous variables.
. forecast identity k = L.k + i
  Forecast model kleinmodel now contains 6 endogenous variables.
. forecast identity w = wg + wp
  Forecast model kleinmodel now contains 7 endogenous variables.
. forecast solve, begin(1937)
Computing dynamic forecasts for model kleinmodel.
─────────────────────────────────────────────────────
Starting period:   1937
Ending period:     1941
Forecast prefix:   f_
1937:  ........................................
1938:  .........................................
1939:  ........................................
1940:  .......................................
1941:  ..........................................
Forecast 7 variables spanning 5 periods.
─────────────────────────────────────────────────────
```

Here we have obtained dynamic forecasts for our 7 endogenous variables beginning in 1937. By default, the variables containing the forecasts begin with the prefix f_. Next we plot the forecast and actual values of consumption:

```
. tsline c f_c
```
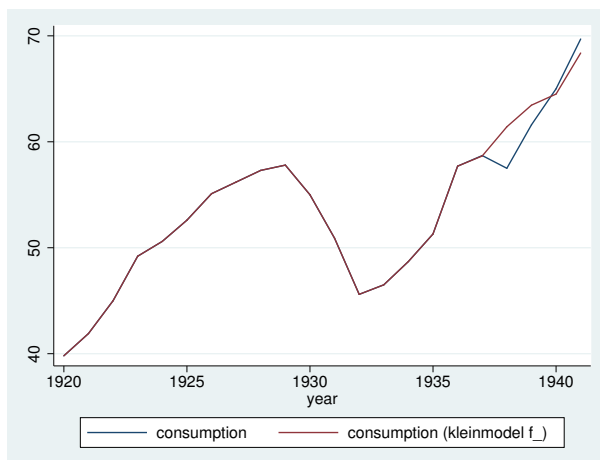
For more information about producing forecasts, see [TS] **forecast**.

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Methods and formulas

The computational formulas for the statistics produced by `predict` can be found in [R] **predict** and [R] **regress postestimation**.

Reference

Klein, L. R. 1950. *Economic Fluctuations in the United States 1921–1941*. New York: Wiley.

Also see

[R] **reg3** — Three-stage estimation for systems of simultaneous equations

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