Postestimation commands

The following postestimation command is of special interest after eteffects:

Command	Description
estat endogenous	perform tests of endogeneity

The following standard postestimation commands are available after eteffects:

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
hausman	Hausman's specification test
lincom	point estimates, standard errors, testing, and inference for linear combinations of parameters
nlcom	point estimates, standard errors, testing, and inference for nonlinear combinations of parameters
predict	treatment effects, conditional means at treatment, propensity scores, etc.
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 treatment effects, conditional means, propensity scores, and linear predictions.

Menu for predict

Statistics > Postestimation

Syntax for predict

> predict [*type*] { *stub** | *newvar* | *newvarlist* } [*if*] [*in*] [, *statistic* <u>tle</u>vel]

> predict [*type*] *stub** [*if*] [*in*], <u>sc</u>ores

statistic	Description
Main	
te	treatment effect; the default
<u>cm</u>ean	conditional mean at treatment level
ps	propensity score
xb	linear prediction
psxb	linear prediction for propensity score
<u>xbt</u>otal	linear prediction, using residuals from treatment model

Specify one new variable with te; specify one or two new variables with cmean, ps, and xb.

Options for predict

> Main

te, the default, calculates the treatment effect.

cmean calculates the conditional mean for the control group. To also obtain the conditional mean for the treatment group, specify two variables. If you want the conditional mean for only the treatment group, specify the tlevel option.

ps calculates the probability of being in the control group. To also obtain the probability of being in the treatment group, specify two variables. If you want the probability of being in the treatment group only, specify the tlevel option.

xb calculates the linear prediction for the control group. To also obtain the linear prediction for the treatment group, specify two variables. If you want the linear prediction for only the treatment group, specify the tlevel option.

psxb calculates the linear prediction for the propensity score.

xbtotal calculates the linear prediction for the control group, including the residuals from the treatment model as regressors. To also obtain the linear prediction for the treatment group, specify two variables. If you want the linear prediction, including the residuals from the treatment model as regressors, only for the treatment group, specify the tlevel option.

tlevel specifies that the statistic be calculated for the treatment group; the default is to calculate the statistic for the control group.

scores calculates the score variables. For eteffects, this is the same as the residuals in the moment conditions used by the generalized method of moments (see [R] **gmm**). For the average treatment effect, the average treatment effect on the treated, and the potential-outcome means, parameter-level scores are computed. For the auxiliary equations, equation-level scores are computed.

estat

Description for estat

estat endogenous performs a Wald test to determine whether the estimated correlations between the treatment-assignment and potential-outcome models are different from zero. The null hypothesis is that the correlations are jointly zero. Rejection of the null hypothesis suggests endogeneity.

Menu for estat

Statistics > Postestimation

Syntax for estat

estat <u>endogenous</u>

collect is allowed with estat endogenous; see [U] **11.1.10 Prefix commands**.

Remarks and examples

▷ Example 1: Testing for endogeneity

In example 3 of [CAUSAL] **eteffects**, endogeneity could arise if unobservable factors that determine wages are correlated with the decision to live in an urban area. If there is no endogeneity, we would prefer to use one of the teffects estimators because they will give us the more efficient standard errors. The control-function approach used by eteffects allows us to test for endogeneity.

The control-function approach estimates the correlation between the unobservables of the treatment-assignment and potential-outcome models. If there is no correlation between the unobservables, then there is no endogeneity. We test for correlation, and thus for endogeneity, by typing

```
. use https://www.stata-press.com/data/r19/nlsy80
. eteffects (wage exper iq i.college, exponential nocons)
> (urban i.college fcollege)
  (output omitted)
. estat endogenous
Test of endogeneity
H0: Treatment and outcome unobservables are uncorrelated
         chi2(  2) =  275.36
       Prob > chi2 =   0.0000
```

We reject the null hypothesis of no endogeneity. This suggests that unobservable factors that determine wages mediate the decision to live in an urban area.

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❑ Technical note

The estimated correlations between the unobservables of the treatment-assignment and potential-outcome models are auxiliary parameters. They appear under the headings TEOM0 and TEOM1, which refer to treatment residuals (TE) for outcome model 0 (OM0) and outcome model 1 (OM1), when the option aequations is specified.

For the model in example 3 of [CAUSAL] **eteffects** with the aequations option, the results are the following:

```
. eteffects (wage exper iq i.college, exponential nocons)
> (urban i.college fcollege), aequations

Iteration 0:  EE criterion = 2.903e-25
Iteration 1:  EE criterion = 2.903e-25  (backed up)

Endogenous treatment-effects estimation              Number of obs = 935
Outcome model: exponential
Treatment model: probit
```

wage	Coefficient	Robust std. err.	z	P>|z|	[95% conf. interval]	
ATE						
urban						
(1 vs 0)	481.0465	31.74882	15.15	0.000	418.82	543.2731
POmean						
urban						
0	233.8083	13.51028	17.31	0.000	207.3286	260.288
TME1						
college						
1	.195811	.1012119	1.93	0.053	-.0025607	.3941827
fcollege	.1069748	.0992075	1.08	0.281	-.0874683	.3014179
_cons	.498012	.056408	8.83	0.000	.3874543	.6085698
OME0						
exper	.0193244	.0085633	2.26	0.024	.0025405	.0361082
iq	.0099473	.0036949	2.69	0.007	.0027053	.0171892
college						
1	-.3718598	.2678636	-1.39	0.165	-.8968629	.1531433
OME1						
exper	.0238566	.017597	1.36	0.175	-.0106329	.058346
iq	.0148581	.0113311	1.31	0.190	-.0073505	.0370667
college						
1	1.236947	.6401383	1.93	0.053	-.0177013	2.491595
TEOM0						
_cons	-7.771932	.6406251	-12.13	0.000	-9.027534	-6.51633
TEOM1						
_cons	16.7739	4.777519	3.51	0.000	7.410131	26.13766

Among other things, we can use these correlations to test the joint significance of the coefficients on the residuals from the treatment-assignment models. This is equivalent to the endogeneity test in example 1. We type

```
. test [TEOM0]_cons [TEOM1]_cons

 ( 1)   [TEOM0]_cons = 0
 ( 2)   [TEOM1]_cons = 0

           chi2(  2) =   275.36
         Prob > chi2 =    0.0000
```

❏

Also see

[CAUSAL] **eteffects** — Endogenous treatment-effects estimation

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