Title

> **hetregress postestimation** — Postestimation tools for hetregress

Postestimation commands

The following postestimation commands are available after `hetregress`:

Command	Description
contrast	contrasts and ANOVA-style joint tests of estimates
* estat ic	Akaike's, consistent Akaike's, corrected Akaike's, and Schwarz's Bayesian information criteria (AIC, CAIC, AICc, and BIC)
estat summarize	summary statistics for the estimation sample
estat vce	variance–covariance matrix of the estimators (VCE)
* estat (svy)	postestimation statistics for survey data
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
linktest	link test for model specification
*† lrtest	likelihood-ratio test
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, etc.
predictnl	point estimates, standard errors, testing, and inference for generalized predictions
pwcompare	pairwise comparisons of estimates
* suest	seemingly unrelated estimation
test	Wald tests of simple and composite linear hypotheses
testnl	Wald tests of nonlinear hypotheses

* `estat ic`, `estat (svy)`, `lrtest`, and `suest` are not appropriate after `hetregress, twostep`.

† `forecast`, `hausman`, and `lrtest` are not appropriate with `svy` estimation results.

predict

Description for predict

predict creates a new variable containing predictions such as linear predictions, standard errors, and standard deviations.

Menu for predict

Statistics > Postestimation

Syntax for predict

After ML or two-step

> predict $\big[$ *type* $\big]$ *newvar* $\big[$ *if* $\big]$ $\big[$ *in* $\big]$ $\big[$, *statistic* $\big]$

After ML

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

statistic	Description
Main	
xb	linear prediction; the default
stdp	standard error of the linear prediction
sigma	standard deviation of the error term

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]

xb, the default, calculates the linear prediction.

stdp calculates the standard errors of the linear prediction.

sigma calculates the standard deviations of the error term.

scores calculates equation-level score variables.

> The first new variable will contain the derivative of the log likelihood with respect to the regression equation, $\partial \ln L / \partial(\mathbf{x}_i \boldsymbol{\beta})$.

> The second new variable will contain the derivative of the log likelihood with respect to the scale equation (lnsigma2), $\partial \ln L / \partial(\mathbf{z}_i \boldsymbol{\alpha})$.

margins

Description for margins

margins estimates margins of response for linear predictions and of standard deviations.

Menu for margins

Statistics > Postestimation

Syntax for margins

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

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

statistic	Description
xb	linear prediction; the default
stdp	not allowed with margins
sigma	standard deviation of the error term

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

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

Remarks and examples

Once you have fit a heteroskedastic regression model, you can use the predict command to obtain the predicted values both for the estimation sample and for other samples; see [U] **20 Estimation and postestimation commands** and [R] **predict**. predict without arguments calculates the linear prediction from the fitted model $\mathbf{x}_i \mathbf{b}$, where $\mathbf{x}_i$ are the independent variables in the jth observation and $\mathbf{b}$ is the estimated parameter vector for the mean model. With the stdp option, predict calculates the standard error of the linear prediction. With the sigma option, predict calculates the predicted standard deviations of the error term, $\widehat{\sigma}_j = \exp(0.5 \times \mathbf{z}_i \mathbf{a})$, where $\mathbf{g}$ is the estimated parameter vector for the variance model.

▷ Example 1: Predicting heteroskedastic standard deviation

We can use `predict` to compute the predicted values of the standard deviations for female and male faculty based on the model from example 2 in [R] **hetregress**.

```
. use https://www.stata-press.com/data/r18/salary
(DeMaris (2004) - Faculty salaries)

. hetregress salary i.female##(c.priorexp c.yrrank c.yrbg c.salfac),
> het(i.female) twostep
  (output omitted )

. predict sigma, sigma

. tabulate female, summarize(sigma)
```

1 = female; 0 = male	Summary of Heteroskedastic standard deviation Mean	Std. dev.	Freq.
0	7741.8481	0	511
1	5828.6973	0	214
Total	7177.1388	873.22924	725

The predicted standard deviation for male faculty is approximately $7742/5829 \approx 1.3$ times the size for female faculty. We could have obtained the same results using `margins` with the `predict(sigma)` option.

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▷ Example 2: Marginal means

We can use `margins` to compute the adjusted mean `salary` for male and female faculty when other factors are fixed at their means:

```
. margins female, atmeans
```

Adjusted predictions   Number of obs = 725
Model VCE: Conventional

Expression: Linear prediction, predict()
At: 0.female = .7048276 (mean)
    1.female = .2951724 (mean)
    priorexp = 2.89931 (mean)
    yrrank   = 7.397241 (mean)
    yrbg   = 12.52966 (mean)
    salfac   = .9399862 (mean)

	Margin	Delta-method std. err.	z	P>|z|	[95% conf. interval]	
female						
0	49036.29	420.3711	116.65	0.000	48212.37	49860.2
1	43822.74	569.9368	76.89	0.000	42705.69	44939.8

If everyone in the population were male faculty while holding all other factors at their mean values, the average salary would be $49,036. If, instead, everyone were female faculty, the average salary would be $43,823.

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Also see

[R] **hetregress** — Heteroskedastic linear regression

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